PROJECT SPECIFICATIONS
FOR

LONG SANDS BEACH BATHHOUSE
LONG BEACH AVENUE
YORK, MAINE

Prepared for:

TOWN OF YORK
YORK, ME 03909

Prepared by:

RANSOM CONSULTING, INC.
400 COMMERCIAL STREET, 4TH FL
PORTLAND, MAINE 04101

Ransom Project # 151.06011

September 2016

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BIDDING DOCUMENTS
LONG SANDS BEACH BATHHOUSE
YORK, MAINE

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1.1 PROJECT MANUAL VOLUME 1

A. Project Name: Long Sand Beach Bathhouse

B. Owner: Town of York

C. City/State: York, Maine.

D. Engineer Project No. 151.06011

E. RANSOM Consulting Engineers and Scientists

F. Engineering Firm: Ransom Consulting, Inc

G. Address: 400 Commercial Street, 4th Floor

H. City/State/Zip Code: Portland, Maine 04101

I. Phone: 207-772-2891

J. Bid Date: September 30, 2016

END OF DOCUMENT 000101

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DOCUMENT 000115 - LIST OF DRAWING SHEETS

1.1 LIST OF DRAWINGS

A. Drawings: Drawings consist of the Contract Drawings and other drawings listed on the Table of Contents page of the separately bound drawing set titled Long Sands Beach Bathhouse, dated October 4, 2016, as modified by subsequent Addenda and Contract modifications.

END OF DOCUMENT 000115

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DOCUMENT 001116 - INVITATION TO BID

1.1 PROJECT INFORMATION

A. Notice to Qualified Bidders: Bidders are invited to submit bids for Project as described in this Document according to the Instructions to Bidders.

B. Project Identification: Long Sands Beach Bathhouse

1. Project Location: Long Beach Avenue, York, Maine

C. Owner: Town of York, 186 York Street, York, Maine

1. Owner's Representative:

Ransom Consulting, Inc., Stephen J. Bradstreet, P.E.,
400 Commercial Street, Suite 404,
Portland, Maine 04101
Phone: 207-772-2891
Email: stephen.bradstreet@ransomenv.com

D. Architect: CWS Architects, Ben Walters
434 Cumberland Ave
Portland, ME 04101
Phone: 207-774-4441
Email: bwalters@cwsarch.com

E. Landscape Architect: Mitchell & Associates, Bob Metcalf
70 Center Street
Portland, ME 04101
Phone: 207-774-4427
Email: rmetcalf@mitchellassociates.biz

F. Construction Manager: Stephen J. Bradstreet, P.E

G. Project Description: Project consists of the removal of the existing bathhouse and construction of a new bathhouse with expanded capacity and the associated sidewalk and road re-alignment and landscape amenities.

1.2 DOCUMENTS

A. Bid documents will be available October 4, 2016 at Ransom Consulting, Inc.

1. Deposit: **$100.00** (non refundable)
2. Shipping: Additional shipping charges of **$20.00** will apply (non refundable)

1.3 BID SUBMITTAL AND OPENING

A. Owner will receive sealed bids until the bid time and date at the location indicated below. Owner will consider bids prepared in compliance with the Instructions to Bidders issued by Owner, and delivered as follows:

1. Bid Date: **October 19, 2016**.
2. Bid Time: **2:00 p.m.**, local time.
3. Location: **York Town Hall**
   186 York Street
   York, Maine 03909

B. Bids will be thereafter **publicly opened and read aloud**.

C. Bids shall include bonds and security as note below:

1. Each bid shall be accompanied by a bid security in the amount of five percent of the value of the bid.

2. A performance bond and payment bond each in the amount of 100 percent of the contract price will be required.

3. No bidder may withdraw his bid within 10 consecutive calendar days after the actual date of the bid opening.

4. The Owner may waive any informalities or minor defects, or reject any or all bids if it is in the best interest of the TOWN to do so.

5. The TOWN is an Equal Opportunity/Affirmative Action Employer.

1.4 PREBID CONFERENCE

A. A prebid conference for all bidders will be held at **The Town of York, Department of Public Works, 115 Chases Pond Rd, York, Maine 03909** on **Tuesday, October 11th, 2016** at **10:00 a.m.**, local time. Prospective bidders are **recommended** to attend.

B. Questions may be addressed to Stephen Bradstreet via email no later than October 14, 2016.

C. Questions to be addressed at Pre-Bid should be submitted no later than 5pm, October 7, 2016. Items addressed at Pre-Bid will be covered in an addendum.

END OF DOCUMENT 001116

DOCUMENT 002113 - INSTRUCTIONS TO BIDDERS

1.1 INSTRUCTIONS TO BIDDERS

A. AIA Document A701, "Instructions to Bidders," is hereby incorporated into the Procurement and Contracting Requirements by reference.

1. A copy of AIA Document A701, "Instructions to Bidders," is bound in this Project Manual.

END OF DOCUMENT 002113

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DOCUMENT 003119 - EXISTING CONDITION INFORMATION

1.1 EXISTING CONDITION INFORMATION

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 the 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. Existing drawings that include information on existing conditions including previous construction at Project site are included in the plan set title Long Sands Beach Bathhouse and dated 10/4/16.

END OF DOCUMENT 003119

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DOCUMENT 003143 - PERMIT APPLICATION

1.1 PERMIT APPLICATION INFORMATION

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 the Bidders' own investigations. This Document and its attachments are not part of the Contract Documents.

B. Permit Application: Complete building permit application and file with authorities having jurisdiction prior to construction.

END OF DOCUMENT 003143

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DOCUMENT 004113 - BID FORM - STIPULATED SUM (SINGLE-PRIME CONTRACT)

1.1 BID INFORMATION

A. Bidder: _____.

B. Project Name: **Long Sands Beach Bathhouse**.

C. Project Location: **Long Beach Avenue**.

D. Owner: **Town of York, York, Maine**

E. Construction Manager: **Ransom Consulting, Inc., 400 Commercial Street, Suite 404, Portland, Maine**.

F. Construction Manager Project Number: **151.06011**.

1.2 CERTIFICATIONS AND BASE BID

A. The undersigned Bidder, having carefully examined the Procurement and Contracting Requirements, Conditions of the Contract, Drawings, Specifications, and all subsequent Addenda, as prepared by Ransom Consulting, Inc., having visited the site, and being familiar with all conditions and requirements of the Work, hereby agrees to furnish all material, labor, equipment and services, including all scheduled allowances, necessary to complete the construction of Task 1, according to the requirements of the Procurement and Contracting Documents, for the stipulated sum of:

1. _____ Dollars ($_____).
2. The above amount may be modified by amounts indicated by the Bidder on the attached Document 004322 "Unit Prices Form".

1.3 BID GUARANTEE

A. The undersigned Bidder agrees to execute a contract for this Work in the above amount and to furnish surety as specified within ten days after a written Notice of Award, if offered within 10 days after receipt of bids, and on failure to do so agrees to forfeit to Owner the attached cash, cashier's check, certified check, U.S. money order, bid bond, or Approved Letter of Credit, as liquidated damages for such failure, in the following amount constituting five percent (5%) of the *total* bid amount above:

1. _____ Dollars ($_____).

The Town of York Selectmen have authorized that a letter of credit (LOC) satisfactory to the Town of York may be used in lieu of cash or bond as surety.

B. In the event Owner does not offer Notice of Award within the time limits stated above, Owner will return to the undersigned the cash, cashier's check, certified check, U.S. money order, or bid bond.

1.4 SUBCONTRACTORS AND SUPPLIERS

A. The following companies shall execute subcontracts for the portions of the Work indicated:

1. Site Work: _____.
2. Concrete Work: _____.
3. Masonry Work: _____.
4. Roofing Work: _____.
5. Carpentry Work: _____.
6. Plumbing Work: _____.
7. HVAC Work: _____.
8. Electrical Work: _____.

1.5 TIME OF COMPLETION

A. The undersigned Bidder proposes and agrees hereby to commence the Work of the Contract Documents on a date specified in a written Notice to Proceed to be issued by the Owner, and shall fully complete the Work by May 15, 2016.

1.6 ACKNOWLEDGEMENT OF ADDENDA

A. The undersigned Bidder acknowledges receipt of and use of the following Addenda in the preparation of this Bid:

1. Addendum No. 1, dated _____.
2. Addendum No. 2, dated _____.
3. Addendum No. 3, dated _____.
4. Addendum No. 4, dated _____.
5. Addendum No. 5, dated _____.

1.7 CONTRACTOR'S LICENSE

A. The undersigned further states that it is a duly licensed contractor, for the type of work proposed, in the State of Maine, and that all fees, permits, etc., pursuant to submitting this proposal have been paid in full.

1.8 SUBMISSION OF BID

A. Respectfully submitted this ____ day of _____, 2016.

B. Submitted By_____(Name of bidding firm or corporation).

C. Authorized Signature:_____(Handwritten signature).

D. Signed By:_____(Type or print name).

E. Title:_____(Owner/Partner/President/Vice President).

F. Witness By:_____(Handwritten signature).

G. Attest:_____(Handwritten signature).

H. By:_____(Type or print name).

I. Title:_____(Corporate Secretary or Assistant Secretary).

J. Street Address:_____.

K. City, State, Zip_____.

L. Phone:_____.

M. License No.:_____.

N. Federal ID No.:_____(Affix Corporate Seal Here).

END OF DOCUMENT 004113

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DOCUMENT 004313 - BID SECURITY FORMS

1.1 BID FORM SUPPLEMENT

A. A completed bid bond form is required to be attached to the Bid Form.

1.2 BID BOND FORM

A. AIA Document A310, "Bid Bond," is the recommended form for a bid bond. A bid bond acceptable to Owner, or other bid security as described in the Instructions to Bidders, is required to be attached to the Bid Form as a supplement.

B. Copies of AIA standard forms may be obtained from The American Institute of Architects; www.aia.org/contractdocs/purchase/index.htm; email: docspurchases@aia.org; (800) 942-7732.

END OF DOCUMENT 004313

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DOCUMENT 004322 - UNIT PRICES FORM

1.1 BID INFORMATION

A. Bidder: _____.

B. Project Name: **Long Sands Beach Bathhouse**.

C. Project Location: **Long Beach Avenue**.

D. Owner: **Town of York, York, Maine**.

E. Engineer: **Ransom Consulting, Inc., 400 Commercial Street, Suite 404, Portland, Maine**.

F. Engineer Project Number: **151.06011**.

1.2 BID FORM SUPPLEMENT

A. This form is required to be attached to the Bid Form.

B. The undersigned Bidder proposes that the sum of the amounts below equal the Contract Sum presented in the Bid Form.

C. Contractor may bid on any or all of the Tasks presented, below.

1.3 UNIT PRICES – BATHHOUSE CONSTRUCTION

A. Unit-Price No. 1: Mobilization and Demobilization.

1. _____ Dollars ($_____) per lump sum.

B. Unit Price No. 2: Traffic Control.

1. _____ Dollars ($_____) per lump sum.

C. Unit-Price No. 3: Erosion and Sedimentation Control..

1. _____ Dollars ($_____) per lump sum.

D. Unit-Price No. 4: Demolition.

1. _____ Dollars ($_____) per lump sum.

E. Unit-Price No. 5: Underground Electric Service.

1. _____ Dollars ($_____) per lump sum.

F. Unit-Price No. 6: 6” Sanitary Piping

1. _____ Dollars ($_____) per lineal foot.

G. Unit-Price No. 7: Sanitary Manhole

1. _____ Dollars ($_____) per each.

H. Unit-Price No. 8: TideFlex Valve

1. _____ Dollars ($_____) per each.

I. Unit-Price No. 9: 2” Water Service

1. _____ Dollars ($_____) per lump sum.

J. Unit-Price No. 10: Concrete Slabs adjacent to Building (see attached exhibit)

1. _____ Dollars ($_____) per square yard.

K. Unit-Price No. 11: Landscaping

1. _____ Dollars ($_____) per lump sum.

L. Unit-Price No. 12: Hardscaping Elements

1. _____ Dollars ($_____) per lump sum.

M. Unit-Price No. 13: Building Construction

1. _____ Dollars ($_____) per lump sum.

N. Unit-Price No. 14: Plumbing

1. _____ Dollars ($_____) per lump sum.

O. Unit-Price No. 15: Electrical

1. _____ Dollars ($_____) per lump sum.

P. Unit-Price No. 16: Dewatering

1. _____ Dollars ($_____) per lump sum.

Q. Unit-Price No. 17: Salvage Value

1. _____ Dollars ($_____) per lump sum.

1.4 UNIT PRICES – MASTER PLAN CONSTRUCTION ITEMS

A. Unit-Price No. 18: Remove and Reset Granite Curb

1. _____ Dollars ($_____) per lineal foot.

B. Unit-Price No. 19: New Granite Curb

1. _____ Dollars ($_____) per lineal foot.

C. Unit-Price No. 20: Concrete Sidewalks and Ramps (see attached exhibit)

1. _____ Dollars ($_____) per square yard.

D. Unit-Price No. 21: Seawall Reconstruction

1. _____ Dollars ($_____) per linear foot.

E. Unit-Price No. 22: Electrical Conduit

1. _____ Dollars ($_____) per lineal foot.

1.5 ADDITIONAL ALTERNATES TO CONTRACT

A. Alternate 1: Reduce extent of roof over walkway on East façade, as shown in structural and architectural drawings. Provide alternate lighting on East façade as indicated in electrical and architectural drawings and specifications.

1. _____ Dollars ($_____) per lump sum.

B. Alternate 2: Remove cupola and all related components as shown in structural and architectural drawings.

1. _____ Dollars ($_____) per lump sum.

C. Alternate 3: Remove (2) rolling overhead security doors as indicated on drawings.

1. _____ Dollars ($_____) per lump sum.

D. Alternate 4: Remove storage platforms as indicated on structural and architectural drawings.

1. _____ Dollars ($_____) per lump sum.

E. Alternate 5: Replace Drawing L1 Site Layout and Planting Plan, L2 Grading Plan, and L3 Detail Sheet – BASE BID with Drawing L1A Site Layout and Planting Plan, L2A Grading Plan, and L3 Detail Sheet – ALTERNATE BID. This alternate includes the modification of paving materials, on-site changing stalls, etc.

1. _____ Dollars ($_____) per lump sum.

1.6 SUBMISSION OF BID SUPPLEMENT

A. Respectfully submitted this ____ day of _____, 2016.

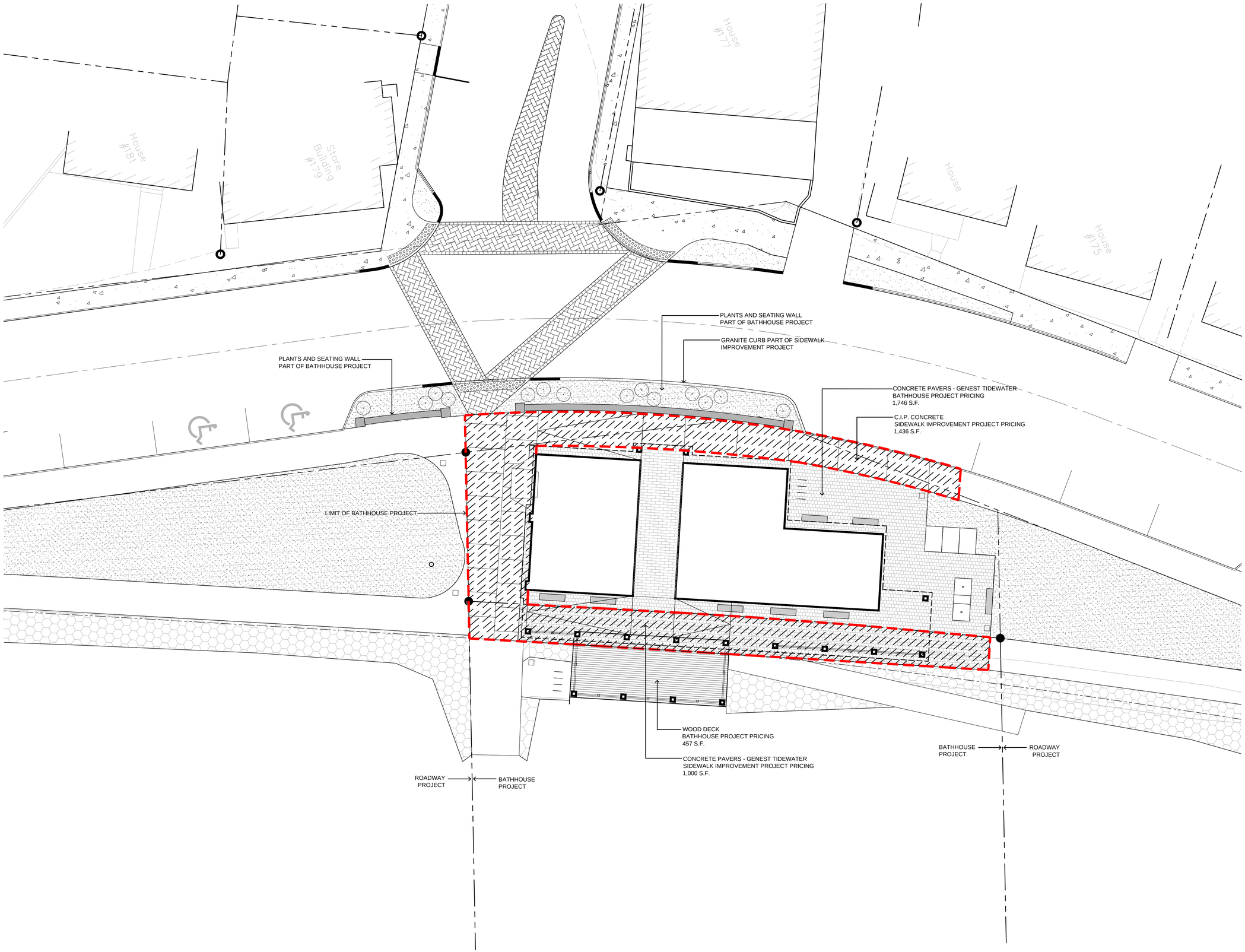
B. Submitted By:_____(Insert name of bidding firm or corporation).

C. Authorized Signature:_____(Handwritten signature).

D. Signed By:_____(Type or print name).

E. Title:_____.

END OF DOCUMENT 004322



Owner / Applicant:

Town of York
186 York Street
York, Maine 03909

Prepared By:

Mitchell & Associates
LANDSCAPE ARCHITECTS
The Staples School
70 Center Street
Portland, Maine 04101
P: 207.774.4427
F: 207.874-2460

LONG SANDS BEACH BATH HOUSE

Long Beach Ave.

York, Maine

Date:
JULY 7, 2016

Issued For:
REVIEW

Revisions:
FINAL PLAN REVIEW 8/11/16
0 - ISSUED FOR BID 10/04/16
ADDENDUM #2 10/13/16

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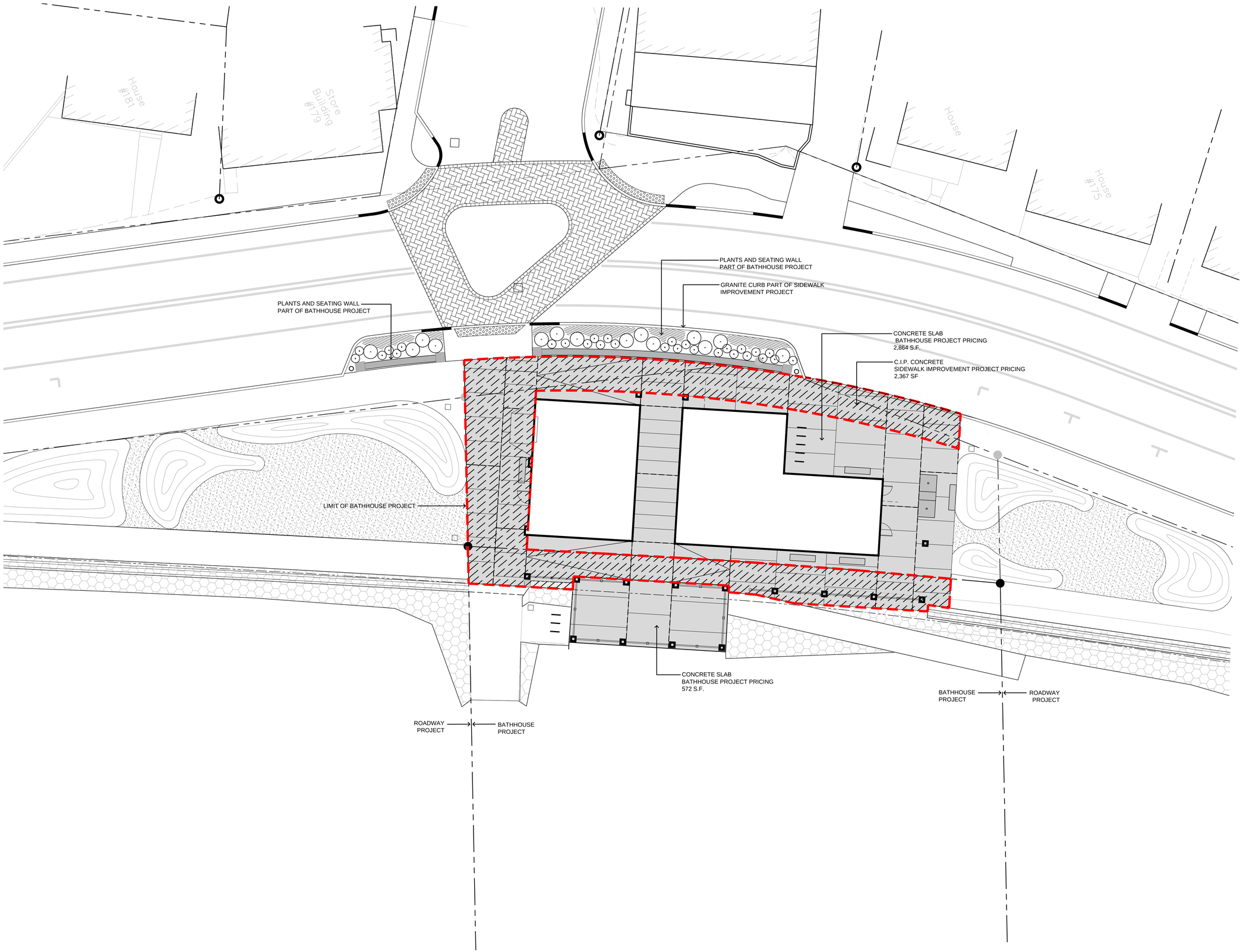
Title:
LANDSCAPE
SITE IMPROVEMENT

Scale: 1"=10'

0 5 10 20 ft.

North:

Sheet No.:
A1



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186 York Street
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LONG SANDS BEACH BATHHOUSE

Long Beach Ave.

York, Maine

Date:
JULY 7, 2016

Issued For:
REVIEW

Revisions:
FINAL PLAN REVIEW 8/11/16
0 - ISSUED FOR BID 10/04/16
ADDENDUM #2 10/13/16

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Title:
UNIT PRICING
SECTION 00 43 22

Scale:
0 5 10 20 ft.

North:

Sheet No.:
A2

DOCUMENT 004393 - BID SUBMITTAL CHECKLIST

1.1 BID INFORMATION

A. Bidder: _____.

B. Project Name: **Long Sands Beach Bathhouse**.

C. Project Location: **Long Beach Avenue**.

D. Owner: **Town of York, York, Maine**

E. Engineer: **Ransom Consulting, Inc., 400 Commercial Street, Suite 404, Portland, Maine**.

F. Engineer Project Number: **151.06011**.

1.2 BIDDER'S CHECKLIST

A. In an effort to assist the Bidder in properly completing all documentation required, the following checklist is provided for the Bidder's convenience. The Bidder is solely responsible for verifying compliance with bid submittal requirements.

B. Attach this completed checklist to the outside of the Submittal envelope.

1. Used the Bid Form provided in the Project Manual.
2. Prepared the Bid Form as required by the Instructions to Bidders.
3. Indicated on the Bid Form the Addenda received.
4. Attached to the Bid Form: Bid Supplement Form - Unit Prices.
5. Attached to the Bid Form: Bid Bond OR a certified check for the amount required.
6. Bid envelope shows name and address of the Bidder.
7. Bid envelope shows name of Project being bid.

C. The following items shall be provided prior to Contract Signing.

1. Executed Performance Bond and Labor and Material Bond.
2. Certificates of Insurance in the amounts indicated
3. List of subcontractors who provided bids.

END OF DOCUMENT 004393

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DOCUMENT 005100 - NOTICE OF AWARD

1.1 BID INFORMATION

A. Bidder: _____.

B. Bidder's Address: _____.

C. Project Name: **Long Sands Beach Bathhouse**.

D. Project Location: **Long Beach Avenue**.

E. Owner: **Town of York, York, Maine**.

F. Engineer: **Ransom Consulting, Inc., 400 Commercial Street, Suite 404, Portland, Maine**.

G. Engineer Project Number: **151.06011**.

1.2 NOTICE OF AWARD OF CONTRACT

A. Notice: The above Bidder is hereby notified that their bid, dated <**Insert date**>, for the above Contract has been considered and the Bidder is hereby awarded a contract for <**Insert brief description of Work or sections of Work awarded**>.

B. Contract Sum: The Contract Sum is <**Insert written amount**> dollars ($<**Insert numeric amount**>).

1.3 EXECUTION OF CONTRACT

A. Contract Documents: Copies of the Contract Documents will be made available to the Bidder immediately. The Bidder must comply with the following conditions precedent within 10 days of the above date of issuance of the Notice:

1. Deliver to Owner three sets of fully executed copies of the Contract Documents.
2. Deliver with the executed Contract Documents Bonds and Certificates of Insurance required by the Contract Documents.

B. Compliance: Failure to comply with conditions of this Notice within the time specified will entitle Owner to consider the Bidder in default, annul this Notice, and declare the Bidder's Bid security forfeited.

1. Within ten days after the Bidder complies with the conditions of this Notice, Owner will return to the Bidder one fully executed copy of the Contract Documents.

1.4 NOTIFICATION

A. This Notice is issued by:

1. Owner: Town of York, Maine

2. Authorized Signature :_____(Handwritten signature).

3. Signed By :_____(Type or print name).

4. Title :_____ _____

END OF DOCUMENT 005100

DOCUMENT 006000 - FORMS

1.1 FORM OF AGREEMENT AND GENERAL CONDITIONS

A. The following form of Owner/Contractor Agreement and form of the General Conditions shall be used for Project:

1. AIA Document A101, "Standard Form of Agreement between Owner and Contractor, Stipulated Sum."

1.2 ADMINISTRATIVE FORMS

A. Copies of AIA standard forms may be obtained from the American Institute of Architects; http://www.aia.org/contractdocs/purchase/index.htm; docspurchases@aia.org; (800) 942-7732. Selected representative forms have been attached to this Project Manual; remaining forms shall be incorporated by reference.

B. The General Conditions for Project are AIA Document A201, "General Conditions of the Contract for Construction."

C. Administrative Forms: Additional administrative forms are specified in Division 01 General Requirements.

D. Preconstruction Forms:

1. Form of Performance Bond and Labor and Material Bond: AIA Document A312, "Performance Bond and Payment Bond."
2. Form of Certificate of Insurance: AIA Document G715, "Supplemental Attachment for ACORD Certificate of Insurance 25-S."

E. Information and Modification Forms:

1. Form for Requests for Information (RFIs): AIA Document G716, "Request for Information (RFI)."
2. Form of Request for Proposal: AIA Document G709, "Work Changes Proposal Request."
3. Change Order Form: AIA Document G701, "Change Order."

F. Payment Forms:

1. Payment Application: AIA Document G702/703, "Application and Certificate for Payment and Continuation Sheet.".
2. Form of Contractor's Affidavit: AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims" or EJCDC Pay Requisition Form. Incorporated by Reference.
3. Form of Affidavit of Release of Liens: AIA Document G706A, "Contractor's Affidavit of Payment of Release of Liens."
4. Form of Consent of Surety: AIA Document G707, "Consent of Surety to Final Payment."

END OF DOCUMENT 006000

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SECTION 010000 - GENERAL REQUIREMENTS

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT – Prepared by the Engineers Joint Contract Documents Committee, EJCDC No. 1910-8-A-1 or 1910-8-A-2 (2013 Edition). A copy is bound in this project manual.

PART 1 - GENERAL (Not Used)

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 010000

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SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Phased construction.
4. Work under separate contracts.
5. Access to site.
6. Coordination with occupants.
7. Work restrictions.
8. Specification and Drawing conventions.

1.2 PROJECT INFORMATION

A. Project Identification: Long Sands Beach Bathhouse

1. Project Location: Long Beach Avenue, York Maine

B. Owner:

Town of York
Dean Lessard
186 York Street
York, Maine 03909

1. Owner's Representative:

Ransom Consulting, Inc
Stephen J. Bradstreet, P.E.
400 Commercial Street, Suite 404
Portland, Maine 04101
Phone: 207-772-2891
Email: stephen.bradstreet@ransomenv.com

C. Architect:

CWS Architects
Ben Walters
434 Cumberland Ave
Portland, Maine 04101

D. Landscape Architect:

Mitchell & Associates
Robert Metcalf
70 Center Street
Portland, Maine 04101

E. Construction Manager:

Ransom Consulting, Inc
Stephen J. Bradstreet, P.E.
400 Commercial Street, Suite 404
Portland, Maine 04101
Phone: 207-772-2891
Email: stephen.bradstreet@ransomenv.com

1.3 WORK COVERED BY CONTRACT DOCUMENTS

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

1. Demolition of the existing bathhouse; construction of an expanded bathhouse; site amenities; re-alignment of the roadway; and other Work indicated in the Contract Documents.

B. Type of Contract:

1. Project will be constructed under a single prime contract.

1.4 WORK UNDER SEPARATE CONTRACTS

A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying Work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under separate contracts.

B. Concurrent Work: Owner will award a separate contract for construction of Roadway realignment project at Project site. Those operations may be conducted simultaneously with work under this Contract.

1.5 ACCESS TO SITE

A. 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.

1. Long Beach Avenue shall need to remain open for one-way local traffic during construction. Any road closures or traffic re-routing shall be coordinated ahead of time with the York Department of Public Works (DPW) and emergency dispatch.
2. Access to the beach for York DPW shall remain throughout construction.
3. Do not use these areas for parking or storage of materials. Nearby material storage areas shall be coordinated with the Owner prior to mobilization to the site.

1.6 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 on site to the hours of 7 a.m. to 7 p.m., Monday through Friday, unless otherwise indicated.

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 Construction Manager and Owner not less than two days in advance of proposed utility interruptions.
2. Obtain Owner's written permission before proceeding with utility interruptions.

1.7 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.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

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SECTION 012200 - UNIT PRICES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for unit prices.

1.2 DEFINITIONS

A. Unit price is a price per unit of measurement for materials, equipment, or services, or a portion of the Work, which may be added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

1.3 PROCEDURES

A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, overhead, and profit.

B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections, and in Part 3, below.

C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

D. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

1.4 INCIDENTAL ITEMS

A. Incidental work items for which separate payment is not measured include, but are not limited to, the following items:

1. Dust Control;
2. Traffic Control;
3. Decontamination of equipment, tools and personnel;
4. Proper disposal of decontamination byproducts;
5. Dewatering;
6. Clean-up;
7. Loaming, seeding and mulching of areas which are disturbed/cleared and no cover systems are installed;

8. Seeding and raking of areas disturbed by non-project specific items (i.e. truck parking, storage of materials, stockpiles, etc.);
9. Restoration of property;
10. Utility crossings and relocations;
11. Maintenance of material stockpiles;
12. Minor items such as replacement of fences, mailboxes, guard rails, signs, rock walls, steps, etc.;
13. Project record drawings;
14. Trench excavation protection to meet applicable safety standards;
15. Utility coordination;
16. Salvaging material as noted, and transporting salvaged materials to designated location;
17. Maintenance of stormwater, potable water, and sanitary sewer flows;
18. Maintenance and safeguarding of utility poles during construction;
19. Shoring, bracing, support and protection of utilities as required;
20. Maintenance, protection and reestablishment of property pins and survey markers disturbed by the Contractor;
21. Protection of utilities;
22. Protection of trees to remain;
23. Development and submission of site specific Health and Safety Plan (HASP);
24. Temporary facilities including sanitary conveniences; and
25. Required project funding signage.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES – BATHHOUSE CONSTRUCTION

A. Unit Price No. 1: Mobilization and Demobilization

1. Description: Mobilization and demobilization of the necessary labor and equipment to successfully complete Task 1, including Site cleanup. Obtain necessary permits from and submit required notifications to the City of Gardiner and the State of Maine. Establish temporary facilities and install a construction sign as specified in the Project Documents. The amount of this lump sum shall not exceed five percent of the total bid price of the contract, and no payment shall be made in excess of this amount.
2. Unit of Measurement: Per Lump Sum.
3. Anticipated Quantity: One

B. Unit Price No. 2: Traffic Control

1. Description: All labor, equipment, tools, and other materials required; for furnishing, installing, maintaining and removing traffic control devices, lights, barricades and warning signals; for maintenance and regulation of traffic; for flaggers and police officers; and for all other work and expense incidental thereto for which payment is not provided under other items.

2. Unit of Measurement: Per Lump Sum.
3. Anticipated Quantity: One

C. Unit Price No. 3: Erosion and Sedimentation Control

1. Description: All labor and erosion and sedimentation control devices, equipment, tools, materials, and other materials required for erosion control, as required by the Contract Documents and the Maine Department of Environmental Protection Erosion and Sedimentation Control BMP's Manual (latest edition); for ongoing maintenance and repair; inspection prior to and after precipitation events; upgrade; removal and restoration of BMP's as required; and for all other work and expense, incidental thereto, for which payment is not provided under other items. Contractor shall provide Erosion and Sedimentation Control Plan to Engineer for approval prior to start of work.
2. Unit of Measurement: Per Lump Sum.
3. Anticipated Quantity: One

D. Unit Price No. 4: Demolition

1. Description: All labor, equipment, tools and other materials required for the demolition of the existing structure and associated site as shown on Demolition Plan; removal and disposal or salvage of all demolition debris and associated fees; salvaging of signs as notes, demolition of basements, foundations, and utilities; management of lead-based paint coated materials in accordance with applicable regulations; backfilling of the foundation holes with common borrow or crushed demolition debris, and grading as needed; for dust control; and for all other work and expense incidental thereto for which payment is not provided under other items.
2. Unit of Measurement: Per Lump Sum.
3. Anticipated Quantity: One

E. Unit Price No. 5: Underground Electric Service

1. Description: All conduit, wiring, fittings, labor, equipment, tools and other materials required for the installation of the underground electric; for dewatering; for excavating earth; for transportation, storage, and disposal of excess material; for bedding; for laying, setting and jointing all pipes and fittings, for backfilling and compaction; for furnishing, transporting, grading and compacting base and subbase aggregates and reclaim course; for maintenance and regulation of traffic; for furnishing, placing and removing all temporary sheeting and bracing; for furnishing materials for and installing riprap outlets; for pipe cleaning and testing; and for all other work and expense incidental thereto for which payment is not provided under other items.
2. Unit of Measurement: Per Lump Sum.
3. Anticipated Quantity: One

F. Unit Price No. 6: 6" Sanitary Piping

1. Description: Furnishing all pipe, fittings, labor, equipment, tools and other materials required for the installation of the pipe; for dewatering; for maintaining existing flows; for excavating earth; for transportation, storage, and disposal of excess material; for bedding; for laying, setting and jointing all pipes and fittings, for

connecting existing drain lines; for backfilling and compaction; for furnishing, transporting, grading and compacting base and subbase aggregates and reclaim course; for maintenance and regulation of traffic; for furnishing, placing and removing all temporary sheeting and bracing; for furnishing materials for and installing riprap outlets; for pipe cleaning and testing; and for all other work and expense incidental thereto for which payment is not provided under other items.

2. Unit of Measurement: Per Lineal Foot.
3. Anticipated Quantity: **45 Linear Feet**

G. Unit Price No. 7: Sanitary Manhole

1. Description: Payment for furnishing and installing manholes complete in place shall be made at the contract unit price per each which shall be full compensation for furnishing all labor; for earth excavation, backfill, and compaction; for transportation, storage, and disposal of excess material; for traffic maintenance and regulation; for furnishing, transporting, and installing precast sections, frames and solid covers, pipe boots, bedding material, concrete, masonry and inverts as specified; for furnishing, transporting, grading and compacting aggregate base and subbase and bituminous concrete binder course; and for all other work and expense incidental thereto for which payment is not provided under other items.
2. Unit of Measurement: Per each.
3. Anticipated Quantity: One

H. Unit Price No. 8: 6” Tideflex Valve

1. Description: All valves, fittings, labor, equipment, tools and other materials required for the installation of the valve within the 6” PVC sanitary sewer; for adjustment of the valve to be true, plumb and to grade and for all other work and expense incidental thereto for which payment is not provided under other items.
2. Unit of Measurement: Per Each.
3. Anticipated Quantity: One

I. Unit Price No. 9: 2” Water Service

1. Description: All labor, equipment, tools and other materials required for the installation of the 2” water service; for furnishing and installing all piping, fittings, meter pits, as shown on the drawings; for furnishing all materials, equipment, tools, and labor required to make a connection to the existing water distribution system; for backfilling and compaction; for furnishing, transporting, grading and compacting base and subbase aggregates and reclaim course; for maintenance and regulation of traffic; for furnishing, placing and removing all temporary sheeting and bracing; for furnishing materials for and installing riprap outlets; for pipe cleaning and testing; and for all other work and expense incidental thereto for which payment is not provided under other items.
2. Unit of Measurement: Per Lump Sum.
3. Anticipated Quantity: One

J. Unit Price No. 10: Concrete Slabs adjacent to Building

1. Description: All the labor, equipment, tools, and other materials required; for excavation, transportation and disposal of existing material to the subgrade surface; for preparation including grading and compaction of the subgrade surface; for furnishing, transporting, placing, and compaction of aggregate, concrete, sand and bricks; and for all other work and expense incidental thereto for which payment is not provided under other items
2. Unit of Measurement: Per Square Yard.
3. Anticipated Quantity: **225 square yards**

K. Unit Price No. 11: Landscaping

1. Description:. All labor, tools, materials and equipment required for planting vegetation, complete in place as shown on the plans; for furnishing and installing plantings as shown on the landscape drawings; for maintenance and upkeep prior to final acceptance and for all other work and expense incidental thereto for which payment is not provided under other items.
2. Unit of Measurement: Per Lump Sum.
3. Anticipated Quantity: One

L. Unit Price No. 12: Hardscaping Elements

1. Description: All labor, tools, materials and equipment required for fabrication, furnishing and installing bike racks, complete in place as shown on the plans; for furnishing and installing granite benches, complete in place as shown on the plans; for furnishing and installing seating walls, complete in place as shown on the plans; for furnishing and installing wash stations; for furnishing and installing pay stations, complete in place as shown on the plans; for furnishing and installing Type F catch basin inlets for drainage adjacent to the hardscape areas, as shown on the drawings; for field adjustment; for all stainless steel fasteners and galvanized hardware and fittings as required; for drilling of concrete; for installation and transportation; for maintenance and cleaning prior to final acceptance and for all other work and expense incidental thereto for which payment is not provided under other items.
2. Unit of Measurement: Per Lump Sum.
3. Anticipated Quantity: One

M. Unit Price No. 13: Building Construction

1. Description: All labor, equipment, tools, personnel and all materials required for the installation of the building including foundations, footings, walls, interior partitions, windows and doors; for furnishing and providing labor for the installation of all paint, trim, and other interior finishes; for maintenance and cleaning prior to final acceptance and for all other work and expense incidental thereto for which payment is not provided under other items
2. Unit of Measurement: Per Lump Sum.
3. Anticipated Quantity: One

N. Unit Price No. 14: Plumbing

1. Description: All labor, equipment, tools, personnel and all materials required for furnishing and installing all piping and ductwork associated with the plumbing

interior to the building as shown on the architectural drawings; for furnishing and installing all fittings; for testing; and for all other work and expense incidental thereto for which payment is not provided under other items.

2. Unit of Measurement: Per Lump Sum.
3. Anticipated Quantity: One

O. Unit Price No. 15: Electrical

1. Description: All labor, equipment, tools, personnel and all materials required for furnishing and installing all conduit and wiring associated with the electrical work interior to the building as shown on the architectural drawings; for furnishing and installing all fittings and connections; for testing; and for all other work and expense incidental thereto for which payment is not provided under other items.
2. Unit of Measurement: Per Lump Sum.
3. Anticipated Quantity: One

P. Unit Price No. 16: Dewatering

1. Description: For furnishing all labor, tools, equipment and materials to provide dewatering as required for the safe and timely project construction and maintenance of excavations throughout the construction timeline; for furnishing, installing, dewatering, maintenance and removal of required sheet piling or coffer dams; furnish pumps, suction and discharge piping; maintenance of discharge area; furnishing and installation of well points if required; installation and maintenance of groundwater pumps as required; for base flow and storm water flow diversion; and for all other work and expense incidental thereto for which payment is not provided under other items.
2. Unit of Measurement: Per Lump Sum.
3. Anticipated Quantity: One

Q. Unit Price No. 17: Salvage Value

1. Description: Half (1/2) of the value of scrap metal salvaged and materials sold from the demolition of the building shall be applied as a credit to the overall project cost. Contractor to present this cost on Section 004322 “Unit Price Form” as a negative number and an overall reduction on the proposed project cost.
2. Unit of Measurement: Per Lump Sum.
3. Anticipated Quantity: One

3.2 SCHEDULE OF UNIT PRICES – MASTER PLAN CONSTRUCTION ITEMS

A. Unit Price No. 18: Remove and Reset Granite Curb

1. Description: All the granite curb, labor, equipment, tools, and other materials required; for removing existing curbing from the sidewalk, cutting, stockpiling, protecting, transporting, and resetting granite curb; for furnishing, transporting, grading, and compacting bedding material; for concrete joint material; for geotextile fabric; for furnishing, transporting, grading, and compacting subbase and base aggregates; for gravel backing behind the granite curb; for curb transitions and tip downs and for all other work and expense incidental thereto for which payment is not

provided under other items. Work in this item shall be in accordance with MeDOT Specification Section 609.08.

2. Unit of Measurement: Per Lineal Foot.
3. Anticipated Quantity: **120 Linear Feet**

B. Unit Price No. 19: New Granite Curb

1. Description: All the granite curb, labor, equipment, tools, and other materials required; for furnishing, cutting, stockpiling, protecting, transporting, and installing granite curb including radius curb; for furnishing, transporting, grading, and compacting bedding material; for concrete joint material; for geotextile fabric; for furnishing, transporting, grading, and compacting subbase and base aggregates; for gravel backing behind the granite curb; for curb transitions and tip downs and for all other work and expense incidental thereto for which payment is not provided under other items. Work in this item shall be in accordance with MeDOT Specification Section 609.03.
2. Unit of Measurement: Per Lineal Foot.
3. Anticipated Quantity: **120 Linear Feet**

C. Unit Price No. 20: Concrete Sidewalks and Ramps

1. Description: All the labor, equipment, tools, and other materials required; for excavation, transportation and disposal of existing material to the subgrade surface; for preparation including grading and compaction of the subgrade surface; for furnishing, transporting, placing, and compaction of aggregate, concrete, sand and bricks; and for all other work and expense incidental thereto for which payment is not provided under other items
2. Unit of Measurement: Per Square Yard.
3. Anticipated Quantity: **315 square yards**

D. Unit Price No. 21: Seawall Reconstruction

1. Description: All labor, tools, materials and equipment required to reconstruct the seawall as shown on the drawings; shall include all pedestals for reinforcement, anchors, sleeves for safety fence posts, grout for adhering fieldstone Installing and stripping concrete forms, for furnishing, placing and finishing concrete; and for all other work and expense incidental thereto for which payment is not provided under other items.
2. Unit of Measurement: Per Lineal Foot.
3. Anticipated Quantity: **150 Linear Feet**

E. Unit Price No. 22: Electrical Conduit

1. Description: Furnishing all pipe, fittings, labor, equipment, tools and other materials required for the installation of the conduit; for transportation, storage, and disposal of excess material; for bedding; for laying, setting and jointing all pipes and fittings; for backfilling and compaction;; and for all other work and expense incidental thereto for which payment is not provided under other items.
2. Unit of Measurement: Per Lineal Foot.
3. Anticipated Quantity: **300 Linear Feet**

END OF SECTION 012200

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

B. Related Requirements:

1. Section 016000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.2 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.

1.3 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. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

a. Statement indicating why specified product or fabrication or installation method 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 substitutions 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 as well as 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. Detailed comparison of Contractor's construction schedule using proposed substitutions 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.
j. Cost information, including a proposal of change, if any, in the Contract Sum.
k. 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.
l. 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.

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

a. Forms of Acceptance: Change Order, Construction Change Directive, 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.

1.4 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.

1.5 PROCEDURES

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

1.6 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 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. Substitution request is fully documented and properly submitted.
    c. Requested substitution will not adversely affect Contractor's construction schedule.
    d. Requested substitution has received necessary approvals of authorities having jurisdiction.
    e. Requested substitution is compatible with other portions of the Work.
    f. Requested substitution has been coordinated with other portions of the Work.
    g. Requested substitution provides specified warranty.
    h. 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 30 days after the 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.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 MINOR CHANGES IN THE WORK

A. Architect will issue through Construction Manager supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on form included in Project Manual.

1.3 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Construction Manager 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 Construction Manager 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 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 Construction Manager.

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 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 012500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.

1.4 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Work Change Proposal Request, Construction Manager will issue a Change Order for signatures of Owner and Contractor.

1.5 WORK CHANGE DIRECTIVE

A. Work Change Directive: Construction Manager may issue a Work Change Directive. Work Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. 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 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 012600

SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 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 items required to be indicated as separate activities in Contractor's construction schedule.
2. Submit the schedule of values to Construction Manager at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.

1.3 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 Construction Manager and paid for by Owner.

B. Payment Application Times: Submit Application for Payment to Construction Manager by the end of the month. The period covered by each Application for Payment is one month, ending on the last day of the month

1. Submit draft copy of Application for Payment seven days prior to due date for review by Construction Manager.

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. Construction Manager 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. Transmittal: Submit one signed and notarized original copies of each Application for Payment to Construction Manager by a method ensuring receipt within 24 hours. One copy shall 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.

F. 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. Products list (preliminary if not final).
5. Sustainable design action plans, including preliminary project materials cost data.
6. Schedule of unit prices.
7. Submittal schedule (preliminary if not final).
8. List of Contractor's staff assignments.
9. List of Contractor's principal consultants.
10. Copies of building permits.
11. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
12. Initial progress report.
13. Report of preconstruction conference.
14. Certificates of insurance and insurance policies.
15. Performance and payment bonds, as required.
16. Data needed to acquire Owner's insurance.

G. 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.

H. 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.
5. AIA Document G706A.
6. AIA Document G707.
7. Evidence that claims have been settled.

8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
9. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

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SECTION 013100 - 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. Coordination drawings.
3. RFIs.
4. Digital project management procedures.
5. Project meetings.

B. Related Requirements:
1. Section 017300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.

1.3 DEFINITIONS

A. RFI: Request for Information. Request from Owner, Construction Manager, 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. Include the following information in tabular form:

1. Name, address, telephone number, and email address 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.

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. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and scheduled activities of other contractors 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.

1.6 REQUEST FOR INFORMATION (RFI)

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

1. Architect will return without response those RFIs submitted to Architect by other entities controlled by Contractor.
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 Construction Manager.
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.

C. RFI Forms: AIA Document G716 or form with substantially the same content as indicated above, acceptable to Construction Manager.

D. Construction Manager’s Action: Construction Manager will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Construction Managerafter 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.

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

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

F. On receipt of Construction Manager’s action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify the Construction Manager within seven days if Contractor disagrees with response.

1.7 PROJECT MEETINGS

A. General: Construction Manager will schedule and conduct meetings and conferences at Project site unless otherwise indicated.

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

1. Attendees: Authorized representatives of Owner**,** Construction Manager, 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.

2. Agenda: Discuss items of significance that could affect progress, including the following:

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

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

C. Progress Meetings: Construction Manager will conduct progress meetings at weekly intervals.

1. Coordinate dates of meetings with preparation of payment requests.
2. Attendees: In addition to representatives of Owner, Construction Manager 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) Status of sustainable design documentation.
5) Deliveries.
6) Off-site fabrication.
7) Access.
8) Site use.
9) Temporary facilities and controls.
10) Progress cleaning.
11) Quality and work standards.
12) Status of correction of deficient items.
13) Field observations.
14) Status of RFIs.
15) Status of Proposal Requests.
16) Pending changes.
17) Status of Change Orders.
18) Pending claims and disputes.
19) 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.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

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SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 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.

1.2 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. 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.

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

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

E. Float: The measure of leeway in starting and completing an activity.
1. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
2. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

1.3 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.
3. One paper copy, of sufficient size to display entire period or schedule, as required.

B. Startup Network Diagram: Of size required to display entire network for entire construction period. Show logic ties for activities.

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

1. Submit a working digital copy of schedule, using software indicated, and labeled to comply with requirements for submittals.

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

E.

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

1.4 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.

1.5 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.

B. Time Frame: Extend schedule from date established for the Notice of Award 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.

C. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion

D. 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 the Contract Time.

E. Contractor's Construction Schedule Updating: At weekly intervals, update schedule to reflect actual construction progress and activities. Issue schedule at 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. 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, equipment required to achieve compliance, and date by which recovery will be accomplished.

G. Distribution: Distribute copies of approved schedule to Architect**,** Construction Manager**,** 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.
2. 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.

1.6 CPM SCHEDULE REQUIREMENTS

A. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:

1. Identification of activities that have changed.
2. Changes in early and late start dates.
3. Changes in early and late finish dates.
4. Changes in activity durations in workdays.
5. Changes in the critical path.
6. Changes in total float or slack time.
7. Changes in the Contract Time.

B. Value Summaries: Prepare two cumulative value lists, sorted by finish dates.

1. In first list, tabulate activity number, early finish date, dollar value, and cumulative dollar value.
2. In second list, tabulate activity number, late finish date, dollar value, and cumulative dollar value.
3. In subsequent issues of both lists, substitute actual finish dates for activities completed as of list date.
4. Prepare list for ease of comparison with payment requests; coordinate timing with progress meetings.

a. In both value summary lists, tabulate "actual percent complete" and "cumulative value completed" with total at bottom.
b. Submit value summary printouts [**one week**] <**Insert time**> before each regularly scheduled progress meeting.

1.7 REPORTS

A. Weekly Construction Reports: Prepare a weekly 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. Stoppages, delays, shortages, and losses.
11. Emergency procedures.
12. Orders and requests of authorities having jurisdiction.
13. Change Orders received and implemented.
14. Work Change Directives received and implemented.
15. Equipment or system tests and startups.
16. 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.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013200

SECTION 013233 - PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

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

1. Preconstruction photographs.
2. Periodic construction photographs.
3. Final completion construction photographs.

B. Related Requirements:

1. Section 017700 "Closeout Procedures" for submitting photographic documentation as Project Record Documents at Project closeout.
2. Section 024116 "Structure Demolition" for photographic documentation before building demolition operations commence.

1.2 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 at the end of the contract.

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

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

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

1.4 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 starting construction, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points.

1. Flag construction limits before taking construction photographs.
2. Take photographs to show existing conditions adjacent to property before starting the Work.
3. Take 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. Periodic Construction Photographs: Take photographs daily during construction. Select vantage points to show status of construction and progress since last photographs were taken.

D. Final Completion Construction Photographs: Take photographs after date of Substantial Completion for submission as Project Record Documents.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013233

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

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

1.2 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Construction manager's[**and Construction Manager'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 Construction Manager's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

1.3 SUBMITTAL FORMATS

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

1. Project name.
2. Date.
3. Name of Construction Manager.
4. Name of Contractor.
5. Name of firm or entity that prepared submittal.
6. Names of subcontractor, manufacturer, and supplier.
7. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier; and alphanumeric suffix for resubmittals.
8. Category and type of submittal.
9. Submittal purpose and description.
10. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
11. Drawing number and detail references, as appropriate.
12. Indication of full or partial submittal.
13. Location(s) where product is to be installed, as appropriate.
14. Other necessary identification.
15. Remarks.
16. Signature of transmitter.

B. Options: Identify options requiring selection by Construction Manager.

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 Construction Manager on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.

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

E. Submittals for Web-Based Project Software: Prepare submittals as PDF files, or other format indicated by Project software website.

1.4 SUBMITTAL PROCEDURES

A. 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 Construction manager by sending via email. Include PDF transmittal form. Include information in email subject line as requested by Construction manager.
2. Paper: Prepare submittals in paper form, and deliver to Construction manager.

B. 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.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Construction Manager'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 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Construction Manager will advise Contractor when a submittal being processed must be delayed for coordination.
2. Resubmittal Review: Allow 15 days for review of each resubmittal.

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

E. 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.

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

1.5 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.
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.

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 concurrent with Samples.

B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base

a. Two copies of each submittal. Construction Manager one copy.

C. Samples: Submit Samples for review of kind, 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. Paper Transmittal: Include paper transmittal including complete submittal information indicated.
5. 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.

D. 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.

1.6 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 Construction manager.

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.

1.7 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 Construction Manager.

B. Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp. 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. Construction Manager will not review submittals received from Contractor that do not have Contractor's review and approval.

1.8 CONSTRUCTION MANAGER'S REVIEW

A. Action Submittals: Construction Manager will review each submittal, indicate corrections or revisions required and return it.

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

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

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

C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Construction Manager.

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

E. Construction Manager will discard submittals received from sources other than Contractor.

F. Submittals not required by the Contract Documents will be returned by Construction manager without action.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013300

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SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

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

B. Testing and inspection 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. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
2. Requirements for Contractor to provide quality-assurance and quality-control services required by Owner and Construction Manager or authorities having jurisdiction are not limited by provisions of this Section.

1.2 DEFINITIONS

A. Experienced: When used with an entity or individual, "experienced" unless otherwise further described means having successfully completed a minimum of [**five**] <**Insert number**> 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.

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

C. 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, assembly, 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).

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 Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by 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 Tests: Tests and inspections that are performed at the source; for example, plant, mill, factory, or shop.

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

H. 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.

I. 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. Contractor's quality-control services do not include contract administration activities performed by Architect[**or Construction Manager**].

1.3 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.

1.4 CONFLICTING REQUIREMENTS

A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements are specified and the standards or requirements 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 direction 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.

1.5 ACTION SUBMITTALS

A. 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, 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.

1.6 INFORMATIONAL SUBMITTALS

A. 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.

B. 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.

C. 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.

1.7 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, telephone number, and email address 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 inspection.
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. Statement on condition of substrates and their acceptability for installation of product.
2. Statement that products at Project site comply with requirements.
3. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.

4. Results of operational and other tests and a statement of whether observed performance complies with requirements.
5. 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. Statement that equipment complies with requirements.
2. Results of operational and other tests and a statement of whether observed performance complies with requirements.
3. Other required items indicated in individual Specification Sections.

1.8 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. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.

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, applying, 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 inspection indicated and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

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.

J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:

1. Contractor responsibilities include the following:

a. Provide test specimens representative of proposed products and construction.
b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.

2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Construction Manager, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

1.9 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.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.
2. 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. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.

1. Engage a qualified testing agency to perform quality-control services.

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

2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspection will be performed.
3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.

4. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
5. 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 Construction Manager and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Construction Manager**,** and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the locations 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 duties of Contractor.

E. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 013300 "Submittal Procedures."

F. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

G. Associated Contractor Services: Cooperate with agencies and representatives 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 inspection. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Preliminary design mix proposed for use for material mixes that require control by testing agency.
6. Security and protection for samples and for testing and inspection equipment at Project site.

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

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 Construction Manager's reference during normal working hours.

1. Submit log at Project closeout as part of Project Record Documents.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspection, 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 017300 "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 014000

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SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 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 engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Owner's forces, Architect, Construction Manager, testing agencies, and authorities having jurisdiction.

B. Water and Sewer Service 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.

C. 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.

1.3 INFORMATIONAL SUBMITTALS

A. Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.

B. Project Identification and Temporary Signs: Show fabrication and installation details, including plans, elevations, details, layouts, typestyles, graphic elements, and message content.

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

D. Moisture-and Mold-Protection Plan: Describe procedures and controls for protecting materials

1.4 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.

C. Accessible Temporary Egress: To the extent practicable, public beach access shall remain. Access to the beach for the Owner's maintenance forces and emergency personnel must be maintained.

PART 2 - PRODUCTS

2.1 TEMPORARY FACILITIES

A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

B. Common-Use Field Office: Of sufficient size to accommodate needs of Owner, Construction Manager, and construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly. Furnish and equip offices as follows:
   1. Conference room of sufficient size to accommodate meetings of 5-individuals. Provide electrical power service and 120-V ac duplex receptacles, with no fewer than one receptacle on each wall. Furnish room with conference table and chairs
   2. Drinking water and private toilet.
   3. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F.

2.2 EQUIPMENT

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

B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, 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 TEMPORARY FACILITIES, GENERAL

A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

3.2 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.

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.

3.3 TEMPORARY UTILITY INSTALLATION

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

B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.

C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.

D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type,

3.4 SUPPORT FACILITIES INSTALLATION

A. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas as indicated on Drawings.

1. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.

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: Provide temporary parking areas for construction personnel.

D. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.

1. Identification Signs: Provide Project identification signs as indicated on Drawings.
2. 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.

E. 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 017300 "Execution."

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

3.5 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.

1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.

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.

C. 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 erosion- and sedimentation-control Drawings.

1. Verify that flows of water redirected from construction areas or generated by construction activity do not discharge onto the beach.
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.

D. 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.

E. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people from easily entering site except by entrance gates.

1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.

F. 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 workday.

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

H. Temporary Fire Protection: Install 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.

1. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.

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.
4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.6 MOISTURE AND MOLD CONTROL

A. Contractor's Moisture-Protection Plan: Describe delivery, handling, storage, installation, and protection provisions for materials subject to water absorption or water damage.

1. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
2. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
3. Indicate methods to be used to avoid trapping water in finished work.

B. Exposed Construction Period: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:

1. Protect porous materials from water damage.
2. Protect stored and installed material from flowing or standing water.
3. Keep porous and organic materials from coming into prolonged contact with concrete.
4. Remove standing water from decks.
5. Keep deck openings covered or dammed.

C. Partially Enclosed Construction Period: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:

1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
2. Keep interior spaces reasonably clean and protected from water damage.
3. Periodically collect and remove waste containing cellulose or other organic matter.
4. Discard or replace water-damaged material.
5. Do not install material that is wet.
6. Discard and replace stored or installed material that begins to grow mold.
7. Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.

D. Controlled Construction Period: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:

1. Control moisture and humidity inside building by maintaining effective dry-in conditions.

2. Use temporary or permanent HVAC system to control humidity within ranges specified for installed and stored materials.
3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.

3.7 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.

1. Maintain operation of temporary enclosures, heating, cooling, humidity control, 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. Owner reserves right to take possession of Project identification signs.
2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION 015000

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 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.

1.2 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 by Construction Manager 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 single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.3 ACTION SUBMITTALS

A. Comparable Product Request Submittal: 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

B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 013300 "Submittal Procedures." Show compliance with requirements.

1.4 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.

1.5 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.

1.6 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.

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.

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 012500 "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 012500 "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: Construction Manager will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Construction Manager 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. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
4. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

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SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 SUMMARY

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

1. Salvaging nonhazardous demolition and construction waste.
2. Recycling nonhazardous demolition and construction] waste.
3. Disposing of nonhazardous demolition and construction waste.

1.2 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 off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

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.

1.3 ACTION SUBMITTALS

A. Waste Management Plan: Submit plan within 10 days of date established for the Notice of Award.

1.4 WASTE MANAGEMENT PLAN

A. General: Develop a waste management plan according to ASTM E 1609 and requirements in this Section. Plan shall consist of waste identification, waste reduction work plan, and cost/revenue analysis. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.

B. Waste Identification: Indicate anticipated types and quantities of waste generated by the Work. Include estimated quantities and assumptions for estimates.

C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.

1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
2. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

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. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
2. Comply with Section 015000 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.2 SALVAGING DEMOLITION WASTE

A. Salvaged Items for Reuse in the Work:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until installation.
4. Protect items from damage during transport and 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: Not permitted on Project site.

C. Salvaged Items for Owner's Use:

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 designated by Owner.
5. Protect items from damage during transport and storage.

3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

A. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall be shared equally by Owner and Contractor.

B. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.

1. Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.

    a. Inspect containers and bins for contamination and remove contaminated materials if found.

2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
4. Store components off the ground and protect from the weather.
5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor.

C. Include recycling of demolition and construction waste in Waste Management Plan.

3.4 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged, recycled, or 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.

C. Disposal: Remove waste materials from Owner's property and legally dispose of them.

END OF SECTION 017419

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SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 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.

1.2 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.

B. Certificate of Insurance: For continuing coverage.

C. Field Report: For pest control inspection.

1.3 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), indicating the value of each item on the list and reasons why the Work is incomplete.

B. Submittals Prior to Substantial Completion: Complete the following a minimum 10 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, operation and maintenance manuals, damage or settlement surveys, property 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.
4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Construction Manager. Label with manufacturer's name and model number.
5. Submit testing, adjusting, and balancing records.

C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 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 startup and testing of systems and equipment.
4. Perform preventive maintenance on equipment used prior to Substantial Completion.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 017900 "Demonstration and Training."
6. Advise Owner of changeover in utility services.
7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
9. Complete final cleaning requirements.
10. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Construction Manager 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.

1.4 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 012900 "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, Construction Manager 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.

1.5 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.

1. Organize list of spaces in sequential order, starting with exterior areas first.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Submit list of incomplete items in the following format:
   a. PDF electronic file. Construction Manager will return annotated file.

1.6 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.

B. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.

C. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

PART 2 - PRODUCTS (not used)

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.

   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. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
   c. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
   d. Sweep concrete floors broom clean in unoccupied spaces.

e. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
f. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
g. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
h. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
i. Leave Project clean and ready for occupancy.

B. Construction Waste Disposal: Comply with waste disposal requirements in Section 017419 "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.

B. Repair, or remove and replace, defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

END OF SECTION 017700

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 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.

1.2 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:

1. Number of Copies: Submit one set(s) of marked-up record prints.

1.3 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 Work Change Directive.
k. Changes made following Construction Manager'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 Construction Manager. 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, 2013 Version or later .

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.
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.

1.4 MAINTENANCE OF RECORD DOCUMENTS

A. 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[**and Construction Manager's**] reference during normal working hours.

PART 2 - PRODUCTS

PART 3 - EXECUTION

END OF SECTION 017839

SECTION 024116 - STRUCTURE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Demolition and removal of buildings and site improvements.
2. Abandoning in-place below-grade construction.
3. Disconnecting, capping or sealing, and abandoning in-place or removing site utilities.

1.2 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.

1.3 INFORMATIONAL SUBMITTALS

A. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property for environmental protection and for dust control. Indicate proposed locations and construction of barriers.

B. Schedule of building demolition activities with starting and ending dates for each activity.

C. Predemolition photographs or video.

1.4 CLOSEOUT SUBMITTALS

A. Inventory of items that have been removed and salvaged.

1.5 QUALITY ASSURANCE

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

1.6 FIELD CONDITIONS

A. Buildings to be demolished will be vacated and their use discontinued before start of the Work.

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

C. On-site storage or sale of removed items or materials is not permitted.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ASSE A10.6 and NFPA 241.

2.2 SOIL MATERIALS

A. Satisfactory Soils: Comply with requirements in Section 312000 "Earth Moving."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting demolition operations.

B. Inventory and record the condition of items to be removed and salvaged.

3.2 PREPARATION

A. Salvaged Items: Comply with the following:

1. Clean salvaged items of dirt and demolition debris.
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 storage area designated by Owner.
5. Protect items from damage during transport and storage.

3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Utilities to be Disconnected: Locate, identify, disconnect, and seal or cap off utilities serving buildings and structures to be demolished.
   1. Arrange to shut off utilities with utility companies.
   2. If removal, relocation, or abandonment of utility services will affect adjacent occupied buildings, then provide temporary utilities that bypass buildings and structures to be demolished and that maintain continuity of service to other buildings and structures.

3. Cut off pipe or conduit a minimum of 24 inches (below grade. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing according to requirements of authorities having jurisdiction.
4. Do not start demolition work until utility disconnecting and sealing have been completed and verified in writing.

3.4 PROTECTION

A. Existing Facilities: Protect adjacent walkways, loading docks, building entries, and other building facilities during demolition operations. Maintain exits from existing buildings.

B. Temporary Shoring: Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent unexpected movement or collapse of construction being demolished.

C. Existing Utilities to Remain: Maintain utility services to remain and protect from damage during demolition operations. Do not interrupt existing utilities serving adjacent occupied or operating facilities unless authorized in writing by Owner and authorities having jurisdiction.

D. Temporary Protection: Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction and as indicated. Comply with requirements in Section 015000 "Temporary Facilities and Controls."

1. Protect adjacent buildings and facilities from damage due to demolition activities.
2. Protect existing site improvements, appurtenances, and landscaping to remain.
3. Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.
4. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
5. Provide protection to ensure safe passage of people around building demolition area and to and from occupied portions of adjacent buildings and structures.
6. Protect walls, windows, roofs, and other adjacent exterior construction that are to remain and that are exposed to building demolition operations.
7. Erect and maintain dustproof partitions and temporary enclosures to limit dust, noise, and dirt migration to occupied portions of adjacent buildings.

E. Remove temporary barriers and protections where hazards no longer exist. Where open excavations or other hazardous conditions remain, leave temporary barriers and protections in place.

3.5 DEMOLITION

A. General: Demolish indicated buildings and site improvements completely. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Do not use cutting torches until work area is cleared of flammable materials. Maintain portable fire-suppression devices during flame-cutting operations.
2. Maintain fire watch during and for at least 6 hours after flame-cutting operations.
3. Maintain adequate ventilation when using cutting torches.

4. Locate building demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

B. Site Access and Temporary Controls: Conduct building demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed trafficways if required by authorities having jurisdiction.
2. Use water mist and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations.

C. Explosives: Use of explosives is not permitted.

D. Proceed with demolition of structural framing members systematically, from higher to lower level. Complete building demolition operations above each floor or tier before disturbing supporting members on the next lower level.

E. Remove debris from elevated portions of the building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

F. Existing Utilities: Remove existing utilities and below-grade utility structures that are within 5 feet outside footprint indicated for new construction. Abandon utilities outside this area.

G. Below-Grade Areas: Completely fill below-grade areas and voids resulting from building demolition operations with satisfactory soil materials according to backfill requirements in Section 312000 "Earth Moving."

H. Site Grading: Uniformly rough grade area of demolished construction to a smooth surface, free from irregular surface changes. Provide a smooth transition between adjacent existing grades and new grades.

I. Promptly repair damage to adjacent buildings caused by demolition operations.

3.6 CLEANING

A. Remove demolition waste materials from Project site and recycle or dispose of them according to Section 017419 "Construction Waste Management and Disposal.

B. Do not burn demolished materials.

C. Clean adjacent structures and improvements of dust, dirt, and debris caused by building demolition operations. Return adjacent areas to condition existing before building demolition operations began.

END OF SECTION 024116

SECTION 03 30 00 – CAST -IN-PLACE CONCRETE

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. The drawings and general conditions of the contract including Standard General Conditions of the Construction Contract and other Division 1 Specification sections apply to work of this section.

B. Examine all other sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.

C. Coordinate work with that of all trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.02 DESCRIPTION OF WORK:

A. Work included: Provide labor, materials, and equipment necessary to complete the work of this Section and, without limiting the generality thereof, furnish and include the following:

1. The extent of cast-in-place concrete work is shown on drawings and includes (but not by way of limitation) formwork, reinforcing, cast-in-place concrete, accessories, finishing, and casting in of items specified under other Sections of the Specifications or furnished by Owner that are required to be built-in with the concrete.

2. Equipment support pads indicated on mechanical drawings to be installed by the Building Contractor.

3. Cast-in-place retaining walls, exterior slabs on grade and other concrete shown on site drawings.

1.03 RELATED WORK:

A. Reinforced Unit Masonry: Division 4

B. Joint Sealants: Division 7

C. Underslab Vapor Retarders/Wall Waterproofing: Division 7

1.04 QUALITY ASSURANCE:

A. Codes and Standards: Comply with provisions of the latest edition of the following except where more stringent requirements are shown or specified:

1. ACI “Manual of Concrete Practice”.

2. ACI 117 “Standard Specifications for Tolerances for Concrete Construction and Materials”.

3. ACI 211.1 "Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete."

4. ACI 212.3R "Chemical Admixtures for Concrete."

5. ACI 301 "Specifications for Structural Concrete for Buildings."

6. ACI 302.1R "Guide for Concrete Floor and Slab Construction."

7. ACI 304R "Guide for Measuring, Mixing, Transporting and Placing Concrete."

8. ACI 304.2R "Placing Concrete by Pumping Methods."

9. ACI 306 R "Cold Weather Concreting."

10. ACI 308 “Standard Practice for Curing Concrete."

11. ACI 309R "Guide for Consolidation of Concrete."

12. ACI 315 "ACI Detailing Manual."

13. ACI 318 "Building Code Requirements for Reinforced Concrete."

14. ACI 347R "Guide to Formwork for Concrete."

15. Concrete Reinforcing Steel Institute, "Placing Reinforcing Bars."

16. AISC “Code of Standard Practice for Steel Buildings and Bridges.”

17. “Code of Federal Regulations, Part 1926” per the Occupational Safety and Health Administration (OSHA), Department of Labor (Latest Revision).

B. Materials and installed work may require testing and retesting, as directed by the Architect, at any time during progress of work. Allow free access to material stockpiles and facilities. Tests not specifically indicated to be done at Owner's expense, including retesting of rejected materials and installed work, shall be done at Contractor's expense.

1.05 SUBMITTALS:

A. Unless otherwise specified, submittals required in this section shall be submitted for review. Submittals shall be prepared and submitted in accordance with Division 1.

B. General Contractor shall submit a Submittal Schedule to the engineer within 30 days after they have received the Owner’s Notice to Proceed.

C. All submittals shall be reviewed and returned to the Architect within 10 working days.

D. Incomplete submittals will not be reviewed.

E. Submittals not reviewed by the General Contractor prior to submission to the Engineer will not be reviewed. Include on the submittal statement or stamp of approval by Contractor, representing that the Contractor has seen and examined the submittal and that all requirements listed in this Section and Division 1 have been complied with.

F. Engineer will review submittals a maximum of two review cycles as part of their normal services. If submittals are incomplete or otherwise unacceptable and re-submitted, General Contractor shall compensate Engineer for additional review cycles.

G. Hardcopy Submittals: Submit three prints. Prints will be reviewed by the Engineer, and then the Architect. One marked print will be returned to Contractor for printing and distribution. Multiple copies will not be marked by the Engineer.

H. Electronic Submittals:

1. Contractor shall include in the submittal schedule an indication of submittals that are intended to be submitted electronically. Upon receipt of the submittal schedule, the Engineer reserves the right to indicate submittals that will not be accepted electronically. Paper copies of such submittals shall be furnished as referenced in this specification.

2. The Engineer reserves the right to require paper copies of submittals that are received electronically. Provide Engineer one (1) paper copies in addition to the electronic submittal. Paper copy will be retained and electronic copy will be returned. Review cycle for such submittals shall not commence until such time that the paper copies are received.

3. Electronic Submittals shall be submitted in Protected Document Format (PDF) compatible with Bluebeam version 12 or later. Electronic files shall not be broken into smaller individual files. File sizes too large to process email or within a file transfer protocol (FTP) site shall be provided on a CD.

4. The submission of submittals electronically does not relieve the contractor of their responsibility to review the submittal prior to transmission to the Engineer. Electronic Submittals shall include contractor comments, and a statement and/or stamp of approval by Contractor, representing that the Contractor has seen and examined the submittal and that all requirements listed in this Section and Division 1 have been complied with. Electronic submittals without the Contractor's approval will be rejected and returned.

5. The Engineer assumes no responsibility for the printed reproduction of submittals reviewed electronically, transmission errors or returned electronic submittals that become corrupted or are otherwise not accessible by the Contractor's or Subcontractor's computer hardware and/or software.

I. Product Data: Submit producer's or manufacturer's specifications and installation instructions for the following products. Include laboratory test reports and other data to show compliance with specifications (including specified standards).

1. Reinforcement certified mill reports covering chemical and physical properties and yield strength.

2. Patching products.

3. Non-shrink grout.

4. Curing compounds, where applicable.

5. Admixtures.

6. Expansion/Adhesive Anchors.

J. Shop Drawings:

1. Shop Drawing Preparation: Electronic files of structural drawings will not be provided to the contractor for preparation of shop drawings. Reproduction of any portion of the Construction Documents for use as Shop drawings is prohibited. Shop drawings created from reproduced Construction Documents will be returned without review. Submit shop drawings for fabrication, bending and placement of concrete reinforcement. Comply with ACI 315, showing bar schedules, stirrup and tie spacing, diagrams of bent bars, and arrangement of concrete reinforcement. Include special reinforcement required at openings through concrete elements. Include supplemental reinforcing and bar supports necessary to support reinforcing steel at proper location within forms or slabs.

    a. Review of the shop drawings will be made for the size and arrangement of reinforcement. Conformance of the Shop Drawings to the Contract Drawings remains the responsibility of the General Contractor. Engineer's review in no way relieves the General Contractor of this responsibility.

    b. Shop drawings will not be reviewed as partial submittals. A complete submittal shall be provided all items listed prior. **Incomplete submittals will not be reviewed.**

K. Mix designs: Submit all laboratory test reports and materials for each mix design listed within. Prepare mixes by the field experience method and/or trial mixtures per the requirements of chapter 5 of ACI 318. Include the calculation of average strength and standard deviation. Proportioning by water cement ratio method will not be permitted.

L. Samples: Submit samples of materials as specified and as otherwise requested by Architect, including names, sources and descriptions.

M. Curing Methods: Submit documentation of curing methods to be used for review. Account for anticipated project temperature ranges and conditions in curing methods.

N. Contraction/Construction Joints: Submit plan indicating proposed location of contraction and construction joints in walls and slabs.

O. Test Reports: Test reports shall be submitted to the Owner, Architect and Engineer within 48 hour after completion of each test.

PART 2 PRODUCTS

2.01 FORM MATERIALS:

A. 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.

1. 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 piece bearing legible inspection trademark.

B. 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.

C. 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.

2.02 REINFORCING MATERIALS:

A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.

B. Welded Wire Fabric: ASTM A 185, welded steel wire fabric. Provide welded wire fabric in flat sheets.

C. 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 plastic, wire bar type supports or concrete block supports complying with CRSI recommendations, unless otherwise specified. Wood, clay brick and other unspecified devices are not acceptable.

1. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs.

2. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs which are plastic protected (CRSI, Class I) or stainless steel protected (CRSI, Class 2).

2.03 CONCRETE MATERIALS:

A. Single-Source Supplier: Ready-mix concrete shall be from one supplier unless specific written approval is received from the Structural Engineer.

B. Portland Cement: ASTM C 150, Type I or Type II, unless otherwise approved Use one brand of cement throughout project, unless otherwise acceptable to Architect.

C. Normal Weight Aggregates: ASTM C 33. Provide from a single source for exposed concrete. Do not use aggregates containing soluble salts or other substances such as iron sulfides, pyrite, marcasite, or ochre which can cause stains on exposed concrete surfaces.

D. Water: Potable.

E. Air-Entraining Admixture: ASTM C 260.

F. High-Range Water-Reducing Admixture (Super Plasticizer): ASTM C 494, Type F or Type G containing not more than 1% chloride ions.

G. Normal range water reducing admixture: ASTM C 494 Type A containing no calcium chloride.

H. Accelerating Admixture: ASTM C 494, Type C or E.

I. Non-slip treatment / concrete sealer: Deck-O-Grip W/B manufactured by W.R. Meadows, installed per manufacturer's recommendations.

J. Blast Furnace Slag: ASTM C989

K. Fly Ash:ASTM C618, Class C or F

L. Calcium Chloride is not permitted.

2.04 RELATED MATERIALS:

A. Underslab Vapor Retarder: Provide vapor retarder over prepared sub base. Refer to architectural drawings, geotechnical report and/or division 7 specifications for additional requirements and vapor retarder location.

B. Non-Shrink Cement-based Grout: Provide grout consisting of pre-measured, prepackaged materials supplied by the manufacturer requiring only the addition of water. Manufacturer's instructions must be printed on the outside of each bag.

1. Non-shrink: No shrinkage (0.0%) and a maximum 4.0% expansion when tested in accordance with ASTM C-827. No shrinkage (0.0%) and a maximum of 0.3% expansion in the hardened state when tested in accordance with CRD-C-621.

2. Compressive strength: A minimum 28 day compressive strength of 5000 psi when tested in accordance with ASTM C-109.

3. Setting time: A minimum initial set time of 60 minutes when tested in accordance with ASTM C-191.

4. Composition: Shall not contain metallic particles or expansive cement.

C. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M182, Class 2.

D. Moisture-Retaining Cover: One of the following, complying with ANSI/ASTM C 171.

1. Waterproof paper.

2. Polyethylene film.

3. Polyethylene-coated burlap.

E. 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. Curing compound shall not impair bonding of any material, including floor finishes, to be applied directly to the concrete. Demonstrate the non-impairment prior to use.

F. Preformed Expansion Joint Formers:

1. Bituminous Fiber Type, ASTM D 1751.

2. Felt Void, Poly-Styrene Cap with removable top as manufactured by SUPERIOR.

G. Slab Joint Filler: Multi-component polyurethane sealant (self-leveling type) – coordinate with Division 7.

2.05 PROPORTIONING AND DESIGN OF MIXES:

A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 318. Use material, including all admixtures, proposed for use on the project. If trial batch method 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.

B. Submit written reports to Architect of each proposed mix for each class of concrete. Do not begin concrete production until mixes have been reviewed by Architect.

C. Proportion design mixes to provide concrete with the following properties:

1. Footings and foundation walls

    a. Strength: 3,500 psi at 28 days.

    b. Aggregate: 3/4"

    c. W/C Ratio: 0.55 maximum

    d. Entrained Air: 6% +/- 1.5%

    e. Slump: 4" maximum

2. Interior Slabs on grade:

    a. Strength: 3,000 psi at 28 days

    b. Aggregate: 3/4" minimum, 1 1/2" maximum.

    c. W/C Ratio: 0.54 maximum

    d. Entrapped Air only (no entrainment), 2.5% +/- 1%

    e. Slump: 4” maximum

3. Exterior Slabs and all other exposed Site Concrete not specified elsewhere:

    a. Strength: 5,000 psi at 28 days

    b. Aggregate: 3/4"

    c. W/C Ratio: 0.40 maximum

    d. Entrained Air: 6% +/- 1.5%

    e. Slump: 4" maximum

4. Add air entraining admixture at manufacturers prescribed rate to result in concrete at point of placement having the above noted air contents.

5. Additional slump may be achieved by the addition of a mid-range or high-range water reducing admixture. Maximum slump after the addition of admixture shall be 6 or 8 inches for mid-range or high range water reducing admixtures, respectively.

D. 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 Structural Engineer before using in work.

1. Water may be added at the project only if the maximum specified slump and design mix maximum water/cement ratio is not exceeded.

2. Additional dosages of superplastisizer should be used when delays occur and required slump has not been maintained. A maximum of two additional dosages will be permitted per ACI 212.3R recommendations.

2.06 CONCRETE MIXING:

A. Job-Site Mixing will not be permitted.

B. Ready-Mix Concrete: Must comply with the requirements of ASTM C 94, and as herein specified. Provide batch ticket for each batch discharged and used in work, indicating project name, mix type, mix time and quantity.

1. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C94 may be required by Structural Engineer.

2. When the air temperature is between 85 degrees F. and 90 degrees F., reduce the mixing and delivery time from 1 1/2 hours to 75 minutes, and when the air temperature is above 90 degrees F., reduce the mixing and delivery time to 60 minutes.

PART 3 EXECUTION

3.01 FORMS:

A. 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.

B. Design, construct, erect, maintain, and remove forms for cast-in-place concrete work in compliance with ACI 347.

C. Design formwork to be readily removable without impact, shock or damage to cast-in-place concrete surfaces and adjacent materials.

D. 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, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in work. Use selected materials to obtain required finishes. Solidly butt joints and provide backup at joints to prevent leakage of cement paste.

E. 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, dovetail slots, reglets, recesses, and the like to prevent swelling and for easy removal.

F. Provide temporary openings where interior area of formwork is inaccessible for clean out, for inspection before concrete placement and for placement of concrete. Securely brace temporary openings and set tightly to forms to prevent loss of concrete mortar. Locate temporary openings on forms at inconspicuous locations.

G. Chamfer exposed corners and edges as indicated, using wood, metal, PVC or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.

H. Form Ties: Factory-fabricated, adjustable-length, removable or snap-off metal form ties, designed to prevent form deflection, and to prevent spalling concrete surfaces upon removal.

1. Unless otherwise indicated, provide ties for concrete surfaces to be exposed to view in the final condition so portion remaining within concrete after removal is 1" (minimum) inside concrete.

2. Form ties shall not leave holes larger than 1" diameter in concrete surface. Repair holes left by form ties after removal of formwork.

I. Provision 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.

J. 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 as required to eliminate mortar leaks and maintain proper alignment.

3.02 PLACING REINFORCEMENT:

A. 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.

1. Subgrade tolerance shall conform to a tolerance of +0/-1 1/2". Base tolerance (fine grading) for slabs shall conform to a tolerance of +0”/-3/4” in. Confirm compliance of above tolerances with surveyed measurements taken at 20 ft. intervals in each direction.

2. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials which reduce or destroy bond with concrete.

3. 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.

4. Place reinforcement to obtain specified coverage for concrete protection within tolerances of ACI-318. 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.

5. Install welded wire fabric in flat sheets 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.

3.03 JOINTS:

A. Construction Joints: Locate and install construction joints, which are not shown on drawings, so as not to impair strength and appearance of the structure, as acceptable to Architect. Submit plan indicating proposed location of construction joints for review prior to beginning work.

1. Provide keyways at least 1-1/2" deep in construction joints in walls, and slabs; bulkheads reviewed by the Engineer, designed for this purpose may be used for slabs.

2. Roughened surfaces shall be used between walls and footings unless shown otherwise on the drawings. The footing surface shall be roughened to at least an amplitude of 1/4" for the width of the wall before placing the wall concrete.

3. Place construction joints perpendicular to the main reinforcement. Continue reinforcement across construction joints.

4. Joints in slabs on grade shall be located and detailed as indicated on the drawings. If saw-cut joints are required, the early-entry dry-cut process shall be used. Refer to ACI 302, section 8.3.12.

3.04 INSTALLATION OF EMBEDDED ITEMS:

A. General: Set, securely anchor and build into work prior to concrete placement all anchorage devices and all other embedded items, including but not by limitation reinforcement, reinforcing dowels, embedded plates, anchor rods, anchor inserts, sleeves, load transfer plates, diamond dowels and shelf bulk heads required for other work that is attached to, bear upon, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions and directions provided by suppliers of items to be attached thereto. Notify other trades to permit installation of their work. Templates to be utilized for setting of anchorage devices shall be constructed in a manner to allow mechanical consolidation of concrete without disturbance. Embedments shall be placed in a timely fashion to permit the inspection of embedments prior to concrete placement. **“Wet Setting” of embedded items into plastic concrete is strictly prohibited.**

B. 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.

C. Provide PVC sleeves where pipes and/or conduit pass through exterior concrete or slabs. Sleeves or penetrations shall not be placed through footings, piers, pedestals, drop caps, columns or pilasters unless specifically noted.

D. Tolerances: Tolerances for Anchor Bolts/Rods, other embedded items and bearing surfaces shall meet the requirement set forth in the latest edition of the American Institute of Steel Construction “Code of Standard Practice for Steel Buildings and Bridges,” and ACI 117. The more stringent criteria from these documents shall apply.

3.05 INSTALLATION OF GROUT

A. Place grout for base plates in accordance with manufacturer's recommendations.

B. Grout below setting plates as soon as practicable to facilitate erection of steel and prior to removal of temporary bracing and guys. If leveling bolts or shims are used for erection grout shall be installed prior to addition of any column load.

C. 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.

3.06 PREPARATION OF FORM SURFACES:

A. Coat contact surfaces of forms with a form-coating compound before reinforcement is placed.

B. Thin form-coating compounds only with thinning agent of type, and in amount, and under conditions of form-coating material manufacturer's directions. Do not allow excess form coating to accumulate in forms or to come into contact with concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions.

3.07 CONCRETE PLACEMENT:

A. Preplacement Review: Footing bottoms are subject to review by the Geotechnical Engineer. Reinforcement and all concrete preparation work shall be subject to review by the Structural Engineer. Verify that reinforcing, ducts, anchors, seats, plates and other items cast into concrete are placed and securely held. Notify Engineer/Project Special Inspector 48 hours prior to scheduled placement and obtain approval or waiver of review prior to placement. Be sure that all debris and foreign matter is removed from forms.

B. Concrete shall be placed in the presence of an approved testing agency.

C. General: Comply with ACI 304, and as herein specified.

1. 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 due to rehandling or flowing.

2. Concrete shall be handled from the mixer to the place of final deposit as rapidly as practicable by methods which will prevent segregation or loss of ingredients and in a manner which will assure that the required quality of the concrete is maintained.

3. Conveying equipment shall be approved and shall be of a size and design such that detectable setting of concrete shall not occur before adjacent concrete is placed. Conveying equipment shall be cleaned at the end of each operation or work day. Conveying equipment and operations shall conform to the following additional requirements:

    a. Belt conveyors shall be horizontal or at a slope which will not cause excessive segregation or loss of ingredients. Concrete shall be protected against undue drying or rise in temperature. An arrangement shall be used at the discharge end to prevent apparent segregation. Mortar shall not be allowed to adhere to the return length of the belt. Long runs shall be discharged into a hopper or through a baffle.

    b. Chutes shall be metal or metal-lined and shall have a slope not exceeding 1 vertical to 2 horizontal and not less than 1 vertical to 3 horizontal. Chutes more than 20 feet long, and chutes not meeting the slope requirements may be used provided they discharge into a hopper before distribution.

    c. Pumping or pneumatic conveying equipment shall be of suitable kind with adequate pumping capacity. Pneumatic placement shall be controlled so that segregation is not apparent in the discharged concrete.

    d. Concrete shall not be conveyed through pipe made of aluminum alloy. Standby equipment shall be provided on the site.

    e. Tined rakes are prohibited as a means of conveying fiber reinforced concrete.

4. Do not use reinforcement as bases for runways for concrete conveying equipment or other construction loads.

D. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers not deeper than 18 inches 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.

1. Consolidate placed concrete by mechanical vibrating equipment. Hand-spading, rodding or tamping as the sole means for the consolidation of concrete will only be permitted with special permission from the Engineer. Use equipment and procedures for consolidation of concrete in accordance with ACI recommended practices.

2. Use vibrators designed to operate with vibratory equipment submerged in concrete, maintaining a speed of not less than 8000 impulses per minute and of sufficient amplitude to consolidate the concrete effectively. 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, generally at points 18 inches maximum apart. Place vibrators to rapidly penetrate placed layer and at least 6 inches into the preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion maintain the duration of vibration for the time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix, generally from 5 to 15 seconds. A spare vibrator shall be kept on the job site during all concrete placing operation.

E. 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.

1. Consolidate concrete using internal vibrators during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.

2. Bring slab surfaces to correct level with straightedge and strike off. Use bull floats or darbies to smooth surface, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations. Do not sprinkle water on plastic surface.

3. Maintain reinforcing in proper position during concrete placement operations.

4. Slab thicknesses indicated on the drawings are minimums. Provide sufficient concrete to account for structure deflection, subgrade fluctuations, and to obtain the specified slab elevation at the flatness and levelness indicated here within.

5. Finish: See “Monolithic Slab Finishes” in this specification for slab finish requirements.

F. Cold Weather Placing: Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306 and as herein specified.

1. When air temperature has fallen to or is expected to fall below 40 degrees F (4 degrees C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 degrees F (10 degrees C), and not more than 80 degrees F (27degrees C) at point of placement.

2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

3. Do not use calcium chloride, salt and other materials containing antifreeze agents or chemical accelerators.

4. All temporary heat, form insulation, insulated blankets, coverings, hay or other equipment and materials necessary to protect the concrete work from physical damage caused by frost , freezing action, or low temperature shall be provided prior to start of placing operations.

5. When the air temperature has fallen to or is expected to fall below 40 degrees F, provide adequate means to maintain the temperature in the area where concrete is being placed between 50 and 70 degrees F.

G. Hot Weather Placing: When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305 and as herein specified.

1. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90 degrees F. Mixing water may be chilled, or chopped ice may be used to control the concrete temperature provided the water equivalent of the ice is calculated to the total amount of mixing water.

2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that the steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.

3. Wet forms thoroughly before placing concrete.

4. Do not use retarding admixtures without the written acceptance by the Architect.

3.08 FINISH OF FORMED SURFACES:

A. Rough Form Finish: For formed concrete surfaces not exposed-to-view in the finish work or by other construction, unless otherwise indicated. This concrete surface shall have texture imparted by form facing material, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/4 in. in height rubbed down or chipped off.

B. 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 as-cast concrete surface shall be 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.

C. Grout Cleaned Finish: Provide grout cleaned finish to scheduled concrete 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 closely match adjacent surfaces.

1. 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.

D. Related Unformed Surfaces: At tops of walls and grade beams, horizontal offset surfaces occurring adjacent to formed surfaces, strike-off, smooth and finish with a texture matching adjacent unformed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.09 FLOOR FLATNESS AND LEVELNESS

A. Floor flatness/levelness tolerances: Tolerances for various floor uses shall conform to the requirements set forth in ACI 117 and ACI 302 for “flat” floor profile.

1. Minimum Test Area Flatness/Levelness: F_F35/F_L25

2. Minimum Local F Number: F_F25/F_L15

B. Levelness criteria shall be applied to slabs-on-grade only.

C. Contractor shall measure floor finish within 72 hours after slab finishing and provide corrective measures for finishes not within tolerance. Corrective procedures shall be reviewed by the Architect prior to implementation.

3.10 MONOLITHIC SLAB FINISHES:

A. Scratch Finish: Apply scratch finish to monolithic slab surfaces that are to receive concrete floor topping or mortar setting beds, and as otherwise indicated.

1. After placing slabs, plane surface to a tolerance not exceeding 1/2 in. in 10 ft. when tested with a 10-ft. straightedge. Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set with stiff brushes, brooms or rakes.

B. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as hereinafter specified, and slab surfaces which are to be covered with membrane or elastic waterproofing, and as otherwise indicated.

C. Trowel Finish: Apply trowel finish to monolithic slab surfaces indicated, including slab surfaces to be covered with carpet, resilient flooring, paint or other thin-film finish coating system.

D. Non-Slip Broom Finish: Apply non-slip broom finish to exterior concrete platforms, steps and ramps, and elsewhere as indicated.

E. Slab finishes for floor coverings not indicated or exposed to view in the final condition shall be coordinated with the Architect prior to slab placement.

F. Slab Joints: Where indicated, sawn slab contraction joints shall be “soft cut”, immediately after concrete surface is firm enough not to be torn or damaged by the blade.

3.11 CONCRETE CURING AND PROTECTION:

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with the requirements of ACI 308 as herein specified.

B. Curing Methods: Perform curing of concrete by moist curing, by moisture-retaining cover curing, by curing compound, and by combinations thereof, as herein specified unless noted otherwise. Curing shall commence as soon as concrete surfaces are sufficiently hard as to withstand surface damage.

C. Curing of Slabs-on Grade:

1. Slabs-on-grade shall be cured by wet curing methods unless otherwise noted.

2. Slabs-on-grade to receive floor coverings with moisture sensitive adhesives shall be cured by means of a moisture retaining covering. Coordinate curing with flooring adhesive manufacturer and flooring installer. Submit curing methods to Architect for review and approval.

3. Slab-on Grade with Barrier 1 Admixture shall be cured by means of a moisture retaining covering in accordance with recommendations of Barrier 1 Admixture Manufacturer.

D. 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.

E. Protection From Mechanical Injury: During the curing period and duration of construction, the concrete shall be protected from damaging mechanical disturbances, such as load stresses, heavy shock, and excessive vibration. All finished concrete surfaces shall be protected from damage by construction equipment, materials, or methods, by application of curing procedures, and by rain or running water. Self-supporting structures shall not be loaded in such a way as to overstress the concrete.

3.12 REMOVAL OF FORMS:

A. 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 degrees F 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.

B. Formwork supporting weight of concrete, such as joints, slabs and other structural elements, may not be removed in fewer than 14 days or 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.

C. 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 support.

3.13 REUSE OF FORMS:

A. Clean and repair surfaces of forms to be reused in work. Split, frayed, delaminated or otherwise damaged form facing material will not be acceptable for exposed surfaces. Apply new form coating compound as specified for new formwork.

B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and latency, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use "patched" forms for exposed concrete surfaces, except as acceptable to Architect.

3.14 MISCELLANEOUS CONCRETE ITEMS:

A. 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.

3.15 CONCRETE SURFACE REPAIRS:

A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removal of forms, when acceptable to the Architect.

1. Cut out honeycomb, rock pockets, voids over 1/4 inch 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 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush coat the area to be patched with approved bonding agent. Place patching mortar after bonding compound has dried.

2. 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.

B. 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, form tie holes, cracks, spalls, air bubbles, honeycomb, rock pockets, fins, and other projections on surface and stains and other discolorations that cannot be removed by cleaning.

3.16 QUALITY CONTROL TESTING DURING CONSTRUCTION:

A. Testing Agency/Project Special Inspector shall verify reinforcement, including foundation reinforcement and slab reinforcement (WWF or reinforcing bar). Agent shall verify WWF or reinforcement has been chair/placed with proper clearances.

B. The Owner shall employ a Testing Laboratory to inspect, sample and test the materials and the production of concrete and to submit test reports. Concrete testing shall be performed by technicians certified by the Maine Concrete Technician Certification Board and/or ACI Concrete Field Testing Technician Grade I.

C. Concrete shall be sampled and tested for quality control during placement. Quality control testing shall include the following, unless otherwise directed by the Architect.

D. See Submittals section for report requirements.

E. Sampling Fresh Concrete: ASTM C 172.

1. Slump: ASTM C143; One test for each set of compressive strength test specimens. Sample shall be taken from middle third of the load per ASTM C172. A slump test must be run prior to the incorporation of the CFP fibers per recommendations of ACI 544. A slump test must be run prior to and following the addition of a water reducer (superplasticizer) per recommendations of ACI 301.

2. Air Content: ASTM C231 "Pressure method for normal weight concrete." One test for each set of compressive strength specimens measured at point of discharge.

3. Concrete Temperature: Per ASTM C-1064; One test each time a set of compression test specimens are made.

4. 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 except when field-cure test specimens are required.

a. An insulated Cure Box for specimen curing shall be supplied by Testing Agency for initial curing as defined in ACI C31.

b. Means of heating or cooling the Cure Box shall be provided by the Inspection Agency if required in order to maintain a temperature between 60 and 80 degrees F. Contractor shall provide an electrical source to the Testing Agency when required for temperature control.

c. A maximum-minimum thermometer shall be provided in the Cure Box by the Testing Agency to record the temperature range of the Cure Box during specimen curing. The Testing Agency shall record the maximum/minimum temperature of the Cure Box when transferring the specimens to the laboratory.

d. Test Specimens shall be moist cured.

e. Refer to ASTM C31 for additional requirements for Test Specimens.

5. Compressive Strength Tests: ASTM C39; one set for each 50 cu. yds. or fraction thereof, of each concrete class placed in any one day or for each 4,000 sq. ft. of surface area placed; 1 specimen tested at 7 days, 3 specimens tested at 28 days, 1 specimen retained in reserve for later testing if required.

6. Pumped concrete shall be tested at point of discharge per ACI 301.

F. 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 the 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

SECTION 033053 - MISCELLANEOUS CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes cast-in-place concrete, including reinforcement, concrete materials, mixture design, placement procedures, and finishes for exterior improvements.

1.2 QUALITY ASSURANCE

A. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

PART 2 - PRODUCTS

2.1 CONCRETE SLABS

A. Comply with ACI 301 (ACI 301M).

B. Formwork, ASTM C150 Normal Type I Portland Cement, grey color, ASTM C33 fine and coarse aggregates, ASTM C94 concrete mix, comprehensive strength of 4000 PSI at 28 days. Deformed welded wire fabric ANSI/ASTM A497, rebar; ASTM A613 grade 60.

2.2 CONCRETE SIDEWALKS

A. Comply with ACI 301 (ACI 301M).

B. Cementitious Materials:

1. Portland Cement: ASTM C 150/C 150M, Type I.

C. Normal-Weight Aggregate: ASTM C 33/C 33M.

D. Air-Entraining Admixture: ASTM C 260/C 260M.

E. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

F. Water: ASTM C 94/C 94M.

G. Compressive Strength: 4000 psi at 28 days.

2.3 STEEL REINFORCEMENT

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

B. Plain-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, plain, fabricated from as-drawn steel wire into flat sheets.

2.4 FIBER REINFORCEMENT

A. Synthetic Micro-Fiber: Monofilament polypropylene micro-fibers engineered and designed for use in concrete, complying with ASTM C 1116/C 1116M, Type III.

2.5 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 3, burlap cloth or cotton mats.

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

C. Water: Potable.

2.6 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.

2.7 DEICER PROTECTION (Exterior Concrete):

A. Saltgard as manufactured by Pro So Co, Inc. or approved equal.

PART 3 - EXECUTION

3.1 CONCRETE SLABS

A. After placement of the gravel base, the surface shall be brought to a smooth, uniform surface by grading and rolling the crushed aggregate base and re-rolled until the surface is true and even.

B. Slabs shall be from structure slab. Concrete slabs constructed adjacent to a building, fixed or other structures, a 1/2 inch thick preformed joint filler and sealant shall be used between the slab and the structure.

C. Broom Finish - Broom finish by drawing a stiff-bristled pushbroom with a long handle over a troweled surface. Concrete walks shall receive a medium broom finish. Direction of brooming shall be perpendicular to major direction of pedestrian movement or as directed by the Landscape Architect.

D. Concrete pavement shall be tooled after brooming to insure a well-defined and smooth border.

E. Finished concrete shall be properly cured using a waterproof material, such as Sisal Kraft orange label lapped 6 inch taped. The concrete shall be properly moistened before covering it, and shall be kept tight. Curing shall be a minimum of seven (7) days.

F. Apply Saltgard deicer per manufacturer's instructions.

3.2 CONCRETE SIDEWALK FORMWORK

A. Design, construct, erect, brace, and maintain formwork according to ACI 301 (ACI 301M).

3.3 STEEL REINFORCEMENT INSTALLATION

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

3.4 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated on drawings. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness

C. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.

3.5 CONCRETE PLACEMENT

A. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.

3.6 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections exceeding 1/2 inch.

1. Apply to concrete surfaces not exposed to public view.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Remove fins and other projections exceeding 1/8 inch.

C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.7 FINISHING UNFORMED SURFACES

A. General: Comply with ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Screed surfaces with a straightedge and strike off. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane before excess moisture or bleedwater appears on surface.

1. Do not further disturb surfaces before starting finishing operations.

C. Scratch Finish: Apply scratch finish to surfaces indicated and surfaces to receive concrete floor topping or mortar setting beds for ceramic or quarry tile, portland cement terrazzo, and other bonded cementitious floor finishes unless otherwise indicated.

D. Float Finish: Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied or sheet waterproofing, fluid-applied or direct-to-deck-applied membrane roofing, or sand-bed terrazzo.

E. Trowel Finish: Apply a hard trowel finish to surfaces indicated and to floor and slab surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin film-finish coating system.

F. Trowel and Fine-Broom Finish: Apply a partial trowel finish, stopping after second troweling, to surfaces indicated and to surfaces where ceramic or quarry tile is to be installed by either thickset or thinset methods. Immediately after second troweling, and when concrete is still plastic, slightly scarify surface with a fine broom.

G. Slip-Resistive Broom Finish: Apply a slip-resistive finish to surfaces indicated and to exterior concrete platforms, steps, and ramps. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.

3.8 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and with ACI 301 (ACI 301M) for hot-weather protection during curing.

B. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

C. Curing Methods: Cure formed and unformed concrete for at least seven days by one or a combination of the following methods:

D. Apply Saltgard deicer per manufacturer’s instructions.

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

    a. Water.
    b. Continuous water-fog spray.
    c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.
2. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

END OF SECTION 033053

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SECTION 03 45 00

ARCHITECTURAL PRECAST CONCRETE

1 PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. 04 23 00 Reinforced Unit Masonry

1.2 SUMMARY

A. Section Includes: Provide plant-precast architectural concrete Work shown and specified.

B. Substitutions: Reference 'Standard General Conditions of the Construction Contract'.

1.3 REFERENCES

A. American Association of State Highway and Transportation Officials (AASHTO).

B. American Concrete Institute (ACI).

1. ACI 318 - "Building Code Requirements for Reinforced Concrete."
2. ACI 533 - "Guide for Precast Concrete Wall Panels."

C. Architectural Precast Association (APA).

D. American Society for Testing and Materials (ASTM).

1. A 36 - "Specification for Carbon Structural Steel."
2. A 47 - "Specification for Ferritic Malleable Iron Castings."
3. A 123 - "Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products."
4. A 153 - "Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware."
5. A 185 - "Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement."
6. A 283 - "Specification for Low and Intermediate Tensile Strength Carbon Steel Plates."
7. A 307 - "Specification for Carbon Steel Bolts and Studs 60,000 PSI Tensile Strength."
8. A 325 - "Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength."
9. A 416 - "Specification for Steel Strand, Uncoated Seven-Wire for Prestressed Concrete."
10. A 496 - "Specification for Steel Wire, Deformed, for Concrete."
11. A 500 - "Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes."
12. A 563 - "Specification for Carbon and alloy Steel Nuts."
13. A 572 - "Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel."
14. A 615 - "Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement."

15. A 666 - Specification for Austenitic Stainless Steel, Sheet, Strip, Plate, and Flat Bar."
16. A 767 - "Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement."
17. A 934 - "Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars."
18. C 33 - "Specification for Concrete Aggregates."
19. C 150 - "Specification for Portland Cement."
20. C 260 - "Specification for Air-Entraining Admixtures for Concrete."
21. C 330 - "Specification for Lightweight Aggregates for Structural Concrete."
22. C 404 - "Specification for Aggregates for Masonry Grout."
23. C 494 - "Specification for Chemical Admixtures for Concrete."
24. C 979 - "Specification for Pigments for Integrally Colored Concrete."
25. C 1107 - "Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)."
26. C 1240 - "Specification for Silica Fume for Use in Hydraulic-Cement Concrete and Mortar."
27. D 412 - "Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers - Tension."
28. F 593 - "Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs."

E. American Welding Society (AWS).

1. AWS D1.1 - "Structural Welding Code."

F. Cement and Concrete Reference Laboratory (CCRL).

G. Concrete Reinforcing Steel Institute (CRSI).

1. "Manual of Standard Practice."

H. Precast/Prestressed Concrete Institute (PCI).

1. MNL 117 - "Manual for Quality Control."
2. MNL 120 - "Design Handbook."

I. Steel Structures Painting Council (SSPC).

1. "Painting Manual."

J. American Institute of Steel Construction (AISC)

1. "Manual of Steel Construction

1.4 SYSTEM DESCRIPTION

A. Performance Requirements: Comply with International Building Code, (IBC), municipal building codes, regulations of other governing agencies having jurisdiction and as follows as they may apply to the application:

1. Wind Loads
2. Seismic forces.
3. Building dynamics: thermal, live, impact or concentrated loads, structural deflection, story drift.

1.5 SUBMITTALS

A. Product Data: (May include color pigments, admixtures, steel primer and galvanized touch-up material).

B. Shop Drawings

1. Show in-place location, fabrication details, plans, elevations, anchorages, reinforcement, connection details and methods, dimensions, finishes, relationships to adjacent materials, and erection and placement.
2. Show identification marks, coordinated to Shop Drawings, and date of manufacture on all units to facilitate hauling and erection.
3. Setting diagrams, templates, instructions and directions as required for installation.

C. Engineering Calculations: Engineering calculations sealed by an engineer licensed to practice in project state.

D. Samples: Nominal size 12 inch by 12 inch by appropriate thickness, of each type of unit and finished facing shown and specified for approval of quality, color, and tex-ture of surface finish. Submit prior to fabrication.

E. Mix Design(s): Proposed concrete mix design for each type and color of concrete mix required including backup mix.

F. Test Reports: (May include materials, compressive strength, and water absorption).

G. Certifications:

1. Fabricator's certification from APA and PCI, or applicable municipal certification.
2. Welders' AWS certification.

1.6 QUALITY ASSURANCE

A. Fabricator's Qualifications: Firm shall have a minimum of five (5) years experience in producing units similar to those required for this Project, with sufficient production capacity to produce and deliver required units without causing delay in the Work.

1. Fabricating plant shall be certified by one of the following:

a. Architectural Precast Association (APA).
b. Precast/Prestressed Concrete Institute (PCI), Group A1.
c. Applicable municipal building department.
d. Firms not certified by APA or PCI shall submit a written Quality Assurance/Quality Control program for approval.

B. Installer's Qualifications: Installer shall have a record of at least five (5) years of successful installation of units similar to those required for this Project.

C. Welder's Qualifications: Provide certification that welders to be employed in the Work are certified by AWS and applicable local building officials, and have been re-certified in the last 12 months.

D. Depending upon the nature of units required and type of Project, some or all Quality Assurance qualifications may apply, as follows:

1. Testing Agency.
2. Professional Engineer.
3. Pre-Construction Testing Service.

E. Applicable Standards: As specified under Paragraph 1.3 References.

F. Production Samples or Mock-ups:

1. Provide color and texture range samples for approval prior to production start; OR
2. Obtain Architect's approval of initial production units of each type listed.
3. Supply initial production units for job site assembly with other materials, for approval, as noted in this Section and in Division 1.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver units to the Project site in such quantities and at such times to ensure continuity of installation.

B. Avoid job site storage. When job site storage is required store in a manner to prevent physical damage and so that markings are visible.

C. Lift and support only at designated lifting or supporting points as shown on reviewed Shop Drawings.

D. Provide anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, templates, instructions, and directions as required for installation.

1.8 PROJECT CONDITIONS PROJECT CONDITIONS

A. Field Dimensions: General Contractor to furnish field measurements, if required, to precast fabricator.

2 PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Approved Fabricators:

1. Fabricators not listed as approved shall request approval, as specified in Section 01630.

2.2 MATERIALS

A. Concrete Materials:

1. Portland Cement: ASTM C 150, Type I or III, white or gray colors to achieve desired finish colors. Use only one brand, type, and color from the same mill.

Gray cement maybe used for non-exposed backup mixes.

2. Aggregates: ASTM C 33, gradation may differ to achieve desired finish characteristics. Select coarse and fine aggregate colors and screen sizes to match approved sample(s). Verify that adequate supply, from one pit or quarry, for each type of aggregate is available for the entire Project. If possible obtain entire aggregate supply prior to starting Work, or have aggregate supply held in reserve by aggregate supplier.

3. Lightweight aggregate: ASTM C 330.

4. Water: Potable. Clean, clear, and free from deleterious amounts of salts, acids, alkalis, organic materials, oils, detergents, or other matter that may interfere with color, curing, or strength of concrete.

5. Admixtures: Select to be compatible in specified mix.

   a. Air Entraining: ASTM C 260.
   b. Water Reducing: ASTM C 494, Type A, B, C, F, or G.
   c. Silica Fume: ASTM C 1240, for cement replacement for high performance concrete.
   d. Coloring Agent: ASTM C 979, compatible with other concrete materials.

B. Formwork:

1. Provide forms with acceptable form facing materials that are non-reactive with concrete or form release agents and will produce required finish surfaces.

2. Construct and maintain forms to produce precast concrete units of shapes, lines, and dimensions indicated, within specified tolerances.

C. Reinforcing Materials:

1. Reinforcing Bars: ASTM A 615, Grade 40 or 60, unless otherwise required to meet structural requirements. (Use galvanized reinforcing bars; ASTM A 767, hot-dip galvanized where concrete cover is less than 1-1/2 inches). (Epoxy coated reinforcing bars, ASTM A 934, may be used in special applications).

2. Steel Welded Wire Fabric: ASTM A 185, plain, cold drawn.

3. Pre-stressing Tendons: ASTM A 416, Grade 250 or 270, un-coated, 7 wire, low relaxation strand.

D. Connection Materials:

1. Steel Shapes and Plates: ASTM A 36.
2. Malleable Iron Castings: ASTM A 47.
3. Carbon Steel Plates: ASTM A 283.
4. High Strength, Low Alloy Structural Steel: ASTM A 572.
5. Carbon Steel Structural Tubing: ASTM A 500, Grade B.
6. Anchor Bolts: ASTM A 307, carbon steel or ASTM A 325, high strength; bolts, nuts, and washers.
7. Welded Headed Studs: AWS D1.1, Type B.
8. Deformed Steel Wire Bar Anchors: ASTM A 496.

9. Stainless Steel Plate: ASTM F 593, Type 304 or Type 316; bolts and studs, nuts and washers.
10. Finish for Steel Connection Materials:

    a. Hot-dip galvanize (ASTM A 123 or A 153) steel exposed to weather in final assembly.
    b. Shop Prime Remaining Steel Shapes: SSPC-Paint 25.
    c. Anchor Bolts, Nuts, Washers, Cadmium Plated: ASTM A 563, Grade C.
    d. Hot-dip galvanize (ASTM A 153) setting bolts or projecting steel in masonry applications.
    e. Galvanizing Repair Paint: DOD-P-21035A or SSPC-Paint 20.
    f. Welding Electrodes: Comply with AWS Standards.

E. Bearing Pads: Elastomeric pads, AASHTO M251; ASTM D 412.

F. Grout Materials:

1. Cement Grout: Cement ASTM C 150; sand ASTM C 404; proportions 1:2.5 by volume, minimum water for placement and hydration.
2. Non-Shrink Grout: ASTM C 1107.
3. Epoxy Grout: Consult suppliers.

2.3 MIXES

A. Design mixes for each type of concrete specified may be prepared by an independent testing agency or by b architectural precast manufacturing plant personnel at precast fabricator's option.

B. Proportion mixes by either testing agency trial batch or field test data methods in accordance with ACI 211.1, using materials to be used on the Project, to provide normal weight concrete with properties as follows:

1. Compressive Strength: 5,000 psi when tested in accordance with ASTM C 39.
2. Maximum water cement ratio 0.40 at point of placement.
3. Add air-entrainment admixture to result in air content at point of placement complying with ACI 533 requirements.
4. Water absorption maximum 6% (by weight) when tested in accordance with ASTM C 642.

C. Follow procedures similar to paragraph 2.3.B for lightweight concrete mixes.

2.4 FABRICATION

A. General:

1. Fabricate precast concrete units with manufacturing and testing procedures, quality control recommendations, and dimensional tolerances as specified in ACI 533, unless more stringent requirements are shown or specified.

2. Fabricate units straight, smooth and true to size and shape, with exposed edges and corners precise and square, unless otherwise indicated.

B. Cast openings larger than 10 inches in any dimension according to locations shown on Shop Drawings. Smaller holes may be field cut when approved by Architect.

C. Reinforcement: Comply with CRSI “Manual of Standard Practice” and ACI 318 recommendations. Reinforce architectural precast concrete units to resist handling, transportation, and erection stresses, and to comply with specified performance criteria.

D. Pre-tension tendons for units in compliance with ACI-533.

E. Cast-In Items: Provide embedded anchors, inserts, steel shapes, and lifting devices as shown on reviewed Shop Drawings. Window connections are best made by field drilled inserts. Firmly hold cast items in place by jigs, strongbacks, or other approved means.

F. Comply with ACI-533 requirements for measuring, mixing, transporting, and placing concrete. Place facing mix to a thickness of the greater of 1 inch or 1.5 times the maximum aggregate size. Place back-up concrete to ensure bond with face concrete.

G. Consolidate concrete using equipment and procedures complying with ACI 533.

H. Permanently mark units with pick-up points as shown on reviewed Shop Drawings. Imprint casting date and piece mark on a surface to be concealed from view in the finished structure.

I. Cure concrete in accordance with ACI 533 requirements.

J. Discard units that are warped, cracked, broken, spalled, stained, or otherwise defective unless repairs are approved by the Architect and meet specified requirements. Refer to ACI 533 for product finish requirements unless otherwise shown or specified.

K. Fabrication Tolerances: Fabricate to tolerances listed in ACI 533.

2.5 FINISHES

A. Light Acidwash # 224650

2.6 SOURCE QUALITY CONTROL

A. Inspect and test architectural precast concrete in accordance with ACI 533.

B. Producers certified by APA or PCI may conduct their own Quality Control operations with reports to designated authorities.

C. Non-certified producers shall furnish and pay for reports by an independent Testing Laboratory, approved by the Owner as specified in paragraph 2.6.D.

D. The Owner may retain an independent Testing Laboratory to evaluate fabricator’s quality control and testing methods. Testing Laboratory shall be certified by CCRL or similar National authority. Fabricator shall allow Testing Laboratory access to all operations pertinent to the Project.

E. Defective Work: Discard units that do not conform to requirements as shown or specified. Replace with units which meet requirements.

3 PART 3 EXECUTION

3.1 EXAMINATION

A. Field Dimensions: Furnish field dimensions to fabricator as required.

B. Examine substrates and conditions for compliance with requirements for installation, tolerances, true and level bearing surfaces, and other conditions affecting performance of architectural precast concrete units. Do not proceed with installation until unsatisfactory conditions have been corrected.

C. Do not install units until supporting structure has been completed (has attained minimum allowable design compressive strength).

3.2 ERECTION

A. Erection shall be by persons experienced and trained in placement and securing of architectural precast concrete units.

B. Erect level, plumb, and true to line. Do not allow cumulative dimensional errors to develop. Adjustments such as shimming which would place additional stress on units will not be permitted. Adhere to dimensional tolerances in accordance with PCI recommendations. Erect and secure in a manner to prevent damage to units or units in place. Replace any damaged units.

C. Lift and handle precast using lift points and embeds as shown on precast shop drawings.

D. Erection Tolerances:

1. Erect within tolerances listed in ACI-533.
2. Erect to conform with structure tolerances listed in ACI-533.
3. Where two stage joint seal is required, sequence with sealant applicator to ensure that sealant, gaskets, and similar items required for interior side seal are installed concurrently with installation of precast units.

E. Joint Sealants: As specified in Section 07900.

3.3 REPAIR

A. When approved by Architect, repair exposed surfaces of units to match color, texture, and uniformity of surrounding units.

B. Remove and replace damaged units when repairs do not meet requirements.

3.4 CLEANING

A. Clean exposed surfaces of units after erection if soiled or stained.

1. Wash and rinse according to architectural precast concrete fabricator's recommendations. Protect other Work from damage while cleaning.
2. Do not use cleaning materials or methods that change the appearance of architectural precast concrete finishes. Test clean a small area to verify adequacy and safety of materials and methods.
3. Leave in condition for application of water repellents specified in Section 07190.

3.5 PROTECTION

A. Protect finished surfaces from soiling or damage.

…END OF SECTION 03 45 00

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SECTION 04 23 00 - REINFORCED UNIT MASONRY

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. The drawings and general conditions of the contract including Standard General Conditions of the Construction Contract and other Division 1 Specification sections apply to work of this section.

B. Examine all other sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.

C. Coordinate work with that of all trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.02 DESCRIPTION OF WORK:

A. Reinforced masonry work includes all labor, materials, and equipment necessary and required for reinforced concrete masonry.

B. Extent of work to be performed and/or coordinated shown on the drawings and indicated in the specifications including, but not limited to masonry units, reinforcing, accessories, and grout.

C. Coordinate work with all other trades, including but not limited to concrete reinforcement and structural steel.

1.03 RELATED WORK

A. Cast-in-Place Concrete: Section 03 30 00

1.04 QUALITY ASSURANCE:

A. Codes and Standards: Comply with provisions of the latest edition of the following except where more stringent requirements are shown or specified:

1. ACI 530 “Building Code Requirements for Masonry Structures”.

2. ACI 530.1 “Specification for Masonry Structures”.

3. ACI “Detailing Manual for Reinforced Concrete” (SP-66).

4. CRSI “Manual of Standard Practice”

5. CRSI “Placing Reinforcing Bars”

6. “Code of Federal Regulations, Part 1926” per the Occupational Safety and Health Administration (OSHA), Department of Labor (Latest Revision).

B. Fire Performance Characteristics: Where indicated, provide materials and construction identical to those of assemblies whose fire resistance has been determined by ASTM E119, by a testing and inspecting organization, by equivalent concrete masonry thickness, or by another means, as acceptable to authorities having jurisdiction.

C. Materials and installed work may require testing and retesting, as directed by the Architect, at any time during progress of work. Allow free access to material stockpiles and facilities. Tests not specifically indicated to be done at Owner's expense, including retesting of rejected materials and installed work, shall be done at Contractor's expense.

1.05 SUBMITTALS:

A. Unless otherwise specified, submittals required in this section shall be submitted for review.

B. General Contractor shall submit a Submittal Schedule to the engineer within 30 days after they have received the Owner's Notice to Proceed.

C. All submittals shall be reviewed and returned to the Architect within 10 working days.

D. Incomplete submittals will not be reviewed.

E. Submittals not reviewed by the General Contractor prior to submission to the Engineer will not be reviewed. Include on the submittal statement or stamp of approval by Contractor, representing that the Contractor has seen and examined the submittal and that all requirements listed in this Section and Section 01000 have been complied with.

F. Engineer will review submittals a maximum of two review cycles as part of their normal services. If submittals are incomplete or otherwise unacceptable and re-submitted, General Contractor shall compensate Engineer for additional review cycles.

G. Product Data: Submit producer's or manufacturer's specifications and installation instructions for the following products. Include laboratory test reports and other data to show compliance with specifications (including specified standards).

1. Reinforcement certified mill reports covering chemical and physical properties and yield strength.

2. Masonry sizes, shapes, weights, densities, strengths, material composition, admixtures, colors, and manufacturing processes and procedures.

3. Mortar and/or Grout.

4. Accessories, Ties, and Joint Reinforcement

5. Admixtures.

6. Expansion/Adhesive Anchors.

H. Shop Drawings:

1. Shop Drawing Review: Electronic files of structural drawings will not be provided to the contractor for preparation of shop drawings. Submit shop drawings for fabrication, bending and placement of masonry reinforcement. Comply with ACI 315, showing bar schedules, stirrup and tie spacing, diagrams of bent bars, and arrangement of masonry reinforcement. Include special reinforcement required at openings through masonry. Include supplemental reinforcing and bar

supports necessary to support reinforcing steel at proper location within masonry units and bond beams. Coordinate masonry reinforcement with concrete reinforcement.

2. Review of the shop drawings will be made for the size and arrangement of reinforcement. Conformance of the Shop Drawings to the Contract Drawings remains the responsibility of the General Contractor. Engineer's review in no way relieves the General Contractor of this responsibility. Submit one print and one reproducible. Print will be reviewed and a reproducible will be returned to Contractor for printing and distribution. Multiple copies will not be marked by Engineer.

3. Shop drawings will not be reviewed as partial submittals. A complete submittal shall be provided all items listed prior. Incomplete submittals will not be reviewed.

4. Mix designs: Submit all laboratory test reports and materials for each mix design listed within. Prepare mixes by the field experience method and/or trial mixtures per the requirements of chapter 5 of ACI 318. Proportioning by water cement ratio method will not be permitted.

5. Samples: Submit samples of materials as specified and as otherwise requested by Architect, including names, sources and descriptions.

6. Contraction/Construction Joints: Submit plan indicating proposed location of contraction and construction joints in masonry walls.

PART 2 PRODUCTS

2.01 MASONRY MATERIALS

A. Load Bearing Units:

1. Hollow Load Bearing Units: ASTM C-90

a. Normal weight units

b. Minimum average net area compressive strength = 1,900 psi.

2. Nominal Dimensions:

a. 6" units: 15-5/8"x5-5/8"x7-5/8" actual

b. 8" units: 15-5/8x7-5/8"x7-5/8" actual

c. 12" column units: 11-5/8x11-5/8"x7-5/8" actual

d. Provide other nominal sizes as indicated on the Architectural Drawings or in related specifications.

e. Construct lintels using reinforced concrete masonry units formed for lintel construction (closed bottom lintel blocks) with height matching lintel depth and with grouted joints.

3. Single Source for Masonry Units: Obtain masonry units of uniform texture and color as specified from single manufacturer.

B. Fire Rating Requirements: Concrete masonry units shall have a U.L. listed fire rating of as indicated on the Architectural Drawings or in related specifications.

C. Admixture: DRY-BLOCK Block Admixture manufactured by Grace Masonry Products incorporated into the block production per manufacturer's requirements.

2.02 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150, Type I, except Type III may be used for cold weather construction. Provide natural color unless otherwise indicated.

B. Ready-Mixed Mortar: Cementitious materials, water, and aggregate complying with requirements specified here within, combined with set-controlling admixtures to produce ready-mixed mortar complying with ASTM C1142.

C. Aggregate for Mortar: ASTM C144, except for joints less than 1/4" thick, use aggregate graded with 100 percent passing No. 16 Sieve.

D. Aggregate for Grout: ASTM C 404.

E. Water: Clean and potable

F. Admixture: DRY-BLOCK Mortar Admixture manufactured by Grace Masonry Products incorporated into the mortar per manufacturer's requirements.

2.03 MORTAR AND GROUT MIXES:

A. General: Do not add admixtures including coloring pigments, air-entraining agents, accelerators, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.

B. Mortar:

1. Job mixed mortar: Comply with ASTM C270, Proportion Specification for job mixed mortar
2. Ready-mixed mortar: ASTM C 1142
3. Masonry cement shall consist of portland-cement lime; mortar cement is acceptable, masonry cement is not acceptable.
4. Mortar shall be Type S, unless otherwise noted.
5. Mortar compressive stress when tested per ASTM C270 at 28-days shall be a minimum of 1,800 psi.
6. Single Source for Mortar Units: Obtain mortar materials of uniform texture and color as specified from single manufacturer.

C. Grout:

1. Comply with ASTM C476.

2.04 MASONRY REINFORCEMENT:

A. General: Comply with this specification for placing reinforcement. Comply with Division 3, Section 03 30 00 for other requirements. Shop fabricate, whenever possible, reinforcing bars shown as bent or hooked.

B. Deformed Bars: Provide ASTM A615 Grade 60 deformed bars. Except provide ASTM A615 Grade 60s where field bending of reinforcement is required or intended.

C. Smooth Steel Wire: Provide ASTM A675 Grade 80 for all #2 bars of smooth, round stock, where noted on the drawings for use in columns or pilasters as ties.

2.05 MASONRY ACCESSORIES:

A. General: Provide accessories and other items as required herein and in related specification sections and as indicated on the drawings. For all types of accessories, hot-dip galvanize after fabrication with 1.5 oz. zinc coating, ASTM A-153, Class B2.

B. Prefabricated Joint Reinforcing: Provide continuous welded wire units prefabricated in straight lengths of not less than 10', with matching corner and tee units. Fabricate from cold-drawn steel wire complying with ASTM A-82, deformed continuous side rods with 3/16" diameter and plain 9 gage cross-rods, unit width of 1-1/2" less than thickness of wall/partition. Subject to compliance, provide products manufactured by "Dur-O-Wal", "AA Wire Products Company", or approved equal.

a. Single Width Walls: Truss type fabricated with single pair 3/16 gauge side rods and 9 gage continuous diagonal cross-rods.

C. Reinforcing Bar Positioners: Provide reinforcing bar supports/positioners for accurate positioning of horizontal and vertical reinforcement in walls, bond beams, and lintels. Fabricate from cold-drawn plain 9 gage steel wire complying with ASTM A-82. Subject to compliance, provide products manufactured by "Dur-O-Wal", "AA Wire Products Company", or approved equal.

D. Masonry Anchors and Ties: Provide straps, bars, bolts, rods, dovetail slots, metal fasteners indicated and other required accessory items of type, size, spacing, and at locations as required in related specification sections as identified on the drawings. Where masonry is indicated to be anchored to structural framework with flexible anchors, provide 2-piece anchors which will permit horizontal and vertical movement but will provide lateral restraint out of plane of wall.

E. Related Masonry Items: Provide joint fillers, insulation, flashings, weepholes, and other items related to masonry work as required in related specification sections and as identified on the drawings.

PART 3 EXECUTION

3.01 INSTALLATION:

A. General: Build masonry construction as required in related specification sections and as identified on the drawings. Build masonry construction to full thickness shown, except, single-wythe walls to actual thickness of masonry units, using units of nominal thickness shown or specified.

B. Do not use frozen materials or materials mixed/coated with ice or frost. Do not build on frozen work. Remove and replace masonry work damaged by frost or freezing. Do not wet concrete masonry units (CMU).

C. Protect all masonry construction from effects of hot and cold weather in accordance with ACI 530 provisions for hot and cold weather construction.

D. Mortar: Provide full mortar coverage on all horizontal and vertical surfaces including face shells and webs.

E. Reinforced Concrete Masonry Unit Walls: Lay CMU wall units in running bond with vertical joints in

each course centered on units above and below, unless otherwise indicated. Bond and interlock each course at corners and intersections. Use special shaped units where shown, and/or as required for corners, jambs, sash, control joints, lintels, bond beams, and other special conditions.

1. Maintain vertical continuity of core or cell cavities. Keep cavities free of mortar. Solidly bed webs of masonry with mortar.

2. Use special units or modify standard units, where horizontal reinforcing is shown to provide for continuous placement of reinforcing and grout. Provide open end bond beam units where horizontal and vertical reinforcing pass through same units.

3.02 PLACING REINFORCEMENT:

A. General: Clean reinforcement of loose rust, mill scale, earth, ice, or other materials which will reduce bond to mortar or grout. Do not use reinforcement with kinks or bends not shown on drawings or final shop drawings, or bars with reduced cross-section due to excessive rusting or other causes. Position reinforcement accurately at spacing shown on contract drawings.

B. Vertical Reinforcing: Support and secure vertical reinforcing against displacement. Vertical reinforcing shall be held in position at the top and bottom and at intervals not exceeding 192 bar diameters nor 10'-0" with a minimum clearance of ¼" from the face of the masonry and not less than one bar diameter or 1", whichever is greater, between adjacent bars.

1. For columns, piers, and pilasters, provide a clear distance between vertical bars as indicated, but not less than 1-1/2 times the nominal bar diameter or 1-1/2", whichever is greater. Provide lateral ties as indicated in the details.

2. All dowels shall be grouted even if the dowel is in a cell adjacent to the vertical reinforcing. Unless detailed otherwise on the drawings, dowels shall be the same size, number, and spacing as the vertical reinforcing. Provide lap length of dowels to vertical reinforcing equal to forty-eight (48) times nominal diameter of dowel, unless indicated otherwise on the drawings. Dowels for columns and pilasters shall be installed using steel or wood templates to accurately position dowels as indicated on the drawings.

C. Horizontal Reinforcing: Support and secure horizontal reinforcing against displacement. Horizontal reinforcing shall be held in position at intervals not exceeding 100 bar diameters with a minimum clearance of ¼" from the face of the masonry and not less than one bar diameter or 1", whichever is greater, between adjacent bars. Provide laps or dowels around corners and across intersections as indicated on the drawings.

1. Horizontal reinforcing shall be placed in continuous bond beam or lintel block units and shall be solidly grouted in place. Horizontal reinforcement shall be CONTINUOUS THROUGH CONTROL JOINTS, but shall be DISCONTINOUS AT EXPANSION JOINTS. Horizontal reinforcement may be placed as masonry work progresses.

D. Splices: Splice reinforcement where shown or indicated on the drawings. Do not splice at other locations unless acceptable to the Structural Engineer. Minimum lap splice length shall be 48 bar diameters, of the smaller bar diameter, unless indicated otherwise on the drawings. Stagger adjacent splices at least one full lap length so that no more than 25% of the number of bars are spliced at any one location. Where splicing at vertical bars or at dowels, provide full contact, lap ends of bars, and wire tie.

E. Reinforcing Bar Positioners: Provide where required and at required spacing to support and secure horizontal and vertical reinforcing against displacement and to accurately align and position splices in reinforcement.

F. Prefabricated Joint Reinforcing: Provide continuous horizontal joint reinforcing as shown/specified. Fully embed longitudinal side rods in mortar for entire length with minimum cover of 5/8" on exterior side of walls and ½" at other locations. Lap reinforcement a minimum of 6" at ends of units. Do not bridge control/expansion joints with joint reinforcing. Provide continuity at corners/wall intersections by the use of prefabricated "L" and "T" sections. Cut/bend units as directed by manufacturer for continuity at returns/offsets/column fireproofing, pipe enclosures, and/or special conditions. Space continuous horizontal reinforcing as follows:

1. For single-wythe walls, space 16" o.c. vertically, unless indicated.

G. Metal Ties: Where indicate, install in mortar joints as work progresses, with a minimum mortar cover of at least 5/8" on exterior faces and ½" on interior faces of masonry work.

H. Anchors: Install anchors for reinforced masonry elements to supporting structure as indicated on the drawings or required in the specifications.

3.03 FORMWORK AND SHORING:

A. General: Provide temporary formwork and/or shoring as required for temporary support of reinforced masonry work. Refer to Division 3, Section 03 30 00 for additional requirements.

B. Removal: Formwork and/or shoring shall not be removed until the reinforced masonry element has cured sufficiently to carry its own weight and any other loads that may be placed on it during construction. It is the contractor's sole responsibility to determine formwork and shoring requirements and durations. In no case shall formwork or shores be removed before the following periods:

1.	Lintels and beams:	10 days
2.	Masonry soffits:	7 days
3.	Columns and pilasters:	7 days

3.04 GROUTING

A. General: Grout mix and grout materials shall conform to ASTM C 476. Refer to Division 3, Section 03 30 00, "Cast-In-Place Concrete" for requirements.

1. Use "Fine Grout" for filling spaces less than 2" in either horizontal dimension. Where shown solid, use mortar for cavities less than ¾" in width or spaces less than 1-1/2" x 2" in horizontal dimensions.

2. Use "Coarse Grout" for filling cavities 2" or larger in width or cells 2"x3" or larger in horizontal dimensions.

3. Use "Concrete", 3000 psi normal weight, for filling spaces ten (10) inches or larger in both horizontal dimensions.

B. Preparation: Prior to grouting, inspect and clean grout spaces. Remove dust, dirt, mortar droppings, loose pieces of masonry, and other foreign materials. Clean and position reinforcing. Clean top surface of structural members to ensure bond. After final cleaning and

inspection, close and brace clean out holes.

1. Do not grout until entire height of masonry to be grouted has attained sufficient strength to resist forces and pressures of grouting operation. Install shores and braces, if required, before beginning grouting.

C. Grouting Method: Grouting shall conform to low-lift or high-lift grouting, at Contractor's option, subject to following requirements.

1. Low-Lift Grouting:

a. Low-Lift Grouting SHALL NOT exceed a pour of more than five (5) feet in height not the "Maximum Grout Pour Height" identified below.

b. Provide minimum clear dimension of two (2) inches and minimum clear area of eight (8) sq. inches in vertical cavities, cells, or cores to be grouted.

c. Place vertical reinforcement prior to laying of masonry units. Extend above elevation of maximum pour height as required to allow for splicing. Support and secure reinforcing as masonry is built.

d. Lay masonry to maximum pour height. Do not exceed five feet (5 ft.) or if bond beam occurs below five feet (5 ft.) height, stop pour or course below bond beam.

2. High-Lift Grouting:

a. High-Lift Grouting SHALL NOT exceed a pour of one story, but in no case more than twenty-four (24) feet in height nor the "Maximum Grout Pour Height" identified below.

b. High-Lift Grouting is NOT PERMITTED unless minimum cavity dimension exceeds three (3) inches and minimum cavity area exceeds ten (10) sq. inches.

c. Cleanout holes ARE REQUIRED where high-lift grouting will be employed. Provide cleanouts at the bottom course of masonry at each cell to be grouted for each pour. For solid grouted masonry space cleanouts at 32 in. o.c.

d. Cleanout holes shall have minimum width of 3 inches and a minimum height of 6 inches. After cleaning, close cleanouts and brace closures to resist hydrostatic grout pressure.

e. Prior to grouting, construct masonry elements and place and secure reinforcing to full height of maximum grout pour. Place horizontal bond beam reinforcing as masonry units are laid.

f. Where lateral tie reinforcing is shown, embed in mortar joints at vertical spacing indicated as units are laid. Where lateral ties wrap vertical reinforcing, embed additional lateral tie reinforcing in mortar joints to resist hydrostatic rupture of masonry face shells. Provide not less than No. 2 bars or 8 gage wire ties spaced at 16 in. o.c. for members with side dimensions of 20 in. or less and at 8 in. o.c. where side dimensions exceed 20 in.

D. Maximum Grout Pour Height: In no case shall total grout pour height exceed the following heights regardless of grouting method used.

Grout Type	Max. Height	Min. Cavity	Min. Cell
Fine	1'-0"	¾"	1-1/2" x 2"
Fine	5'-0"	2"	2" x 3"
Fine	12'-0"	2-1/2"	2-1/2" x 3"
Fine	24'-0"	3"	3" x 3"
Coarse	1'-0"	2"	2" x 3"
Coarse	5'-0"	2"	2-1/2" x 3"
Coarse	12'-0"	2-1/2"	3" x 3"
Coarse	24'-0"	3"	3" x 4"

Min. Cavity applies to grouting between wythes of cavity walls. Min. Cell applies to grouting of masonry cells where dimension shown equals grout space width minus horizontal reinforcing bar diameter.

E. Grout Placement: Limit grout pours to sections which can be completed in one working day with not more than one (1) hour of interruption of pouring operation. Allow not less than thirty (30) minutes, nor more than one (1) hour between lifts of given pour. Rod or vibrate each lift during pouring operation.

1. Place grout in lifts not to exceed a maximum height of five (5) feet each, regardless of the maximum height of the pour.

2. Place grout in lintels and beams over openings in one continuous pour.

3. Pour grout using chute or container with spout. Terminate pour 1-1/2" below top course to form key for next pour.

4. Where bond beams occur, terminate grouting of vertical cells 1-1/2" below bond beam course. After placing horizontal reinforcing and prior to filling vertical cells above bond beam, pour grout into bond beam and strike off flush with top of bond beam course.

F. Lintels: Provide masonry lintels where shown and wherever openings of more than 1'-0" are shown without structural steel or other supporting lintels. Provide formed-in-place masonry lintels. Provide minimum bearing at each jamb, of 4" at openings less than 4'-0" wide and 8" for wider openings.

G. Other Items: Provide vertical expansion, control and isolation joints, and provide concealed flashing and weep holes in masonry where shown. Build-in related masonry accessory items as the masonry work progresses. Refer to Section 04200, "Unit Masonry" and related specifications sections and to drawings.

1. Comply with requirements for repair, pointing and cleaning in accordance with Section 04200, "Unit Masonry".

H. Construction Tolerances: Variations in reinforced masonry work from plumb and level, locations of built-in or embedded items, and other required tolerances shall be as required in related specification sections or as identified on the drawings.

I. Protection of Work: Do not apply uniform loading for at least 12 hours after building masonry walls or columns. Do not apply concentrated loads for at least 3 days after building masonry walls, lintels, beams, columns, pilasters, and piers.

J. Responsibility for Errors: Contractor shall bear all costs associated with corrective work resulting from errors or poor workmanship, including costs of architectural and engineering services associated with required correction.

3.05 QUALITY CONTROL TESTING DURING CONSTRUCTION:

A. Testing Agency/Project Special Inspector shall verify reinforcement, including all masonry reinforcement and slab reinforcement (WWF or reinforcing bar). Agent shall verify reinforcement has been chair/placed with proper clearances.

B. The Owner shall employ a Testing Laboratory to inspect, sample and test the materials and the production of concrete and to submit test reports. Masonry testing shall be performed by technicians certified by the Maine Concrete Technician Certification Board and/or ACI Concrete Field Testing Technician Grade I.

1. Verify that grouting operations are performed and grout is placed and consolidated in accordance with the specifications.

2. Verify that contractor is using approved admixtures for grout.

3. Sample Fresh Grout: ASTM C-172, except modified for slump to comply with ASTM C-94.

a. Slump: ASTM C-143; one (1) test for each grout load at point of discharge; one (1) test for each set of compressive strength test specimens.

b. Air Content: ASTM C-173; volumetric method or ASTM C-231 pressure method for normal weight concrete; one (1) for each of compressive strength test specimens.

c. Grout Temperature; For each load, at time of arrival, at point of discharge test hourly when air temperature is 40 degree F and above; and each time a set of compression test specimens are made.

d. Compression Test Specimens: ASTM C-31; one (1) set of four (4) standard cylinders for each truck or mixer load of grout taken when load is 50% discharged from truck, unless other wise directed. Mold/store cylinders for laboratory cured test specimens except when field-cure test specimens are required.

e. Refer to Section 03 30 00, “Cast-In-Place Concrete” for remaining test requirements. Substitute therein the work “grout” for the word “concrete”.

END OF SECTION

SECTION 05 50 00

METAL FABRICATIONS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Shop fabricated ferrous metal items, galvanized (exterior) and primed (interior), painted.
2. Balusters, posts, bracket supports and hand-railing.
3. Related sections:
   a. 04 20 00 - Unit Masonry Assemblies
   b. 03 30 00 - Cast In Place Concrete
   c. 06 10 53 - Miscellaneous Rough Carpentry
   d. 07 46 10 - Exterior Wood Siding

1.2 SYSTEM DESCRIPTION

A. Design handrail, guardrail, and attachments to resist forces as required by applicable building code. Apply loads non-simultaneously to produce maximum stresses.
1. Guard Top Rail and Handrail Concentrated Load: 200 pounds applied at any point in any direction.
2. Guard Top Rail Uniform Load: 50 plf applied in any direction.
3. Intermediate Rails, Panels, and Baluster Concentrated Load: 50 pounds applied to 1 sf area.

1.3 SUBMITTALS

A. Reference ‘Standard General Conditions of the Construction Contract’.

B. Shop Drawings: Match the design intent indicated on the drawings. Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

1.4 QUALITY ASSURANCE

A. Finish joints in accordance with NOMMA Guideline 1.

B. Design stair handrail and guardrail components in accordance with the drawings under direct supervision of Professional Engineer experienced in design of this Work and licensed at Project location.

PART 2 PRODUCTS

2.1 COMPONENTS

A. Steel Sections: ASTM A36/A36M.

B. Steel Plate: ASTM A36/A36M.

C. Tubing: ASTM A513, Type 5, minimum 50 ksi yield strength.

D. Hollow Structural Sections: ASTM A500, Grade B.

E. Steel Pipe: ASTM A53/A53M, Grade B Schedule 40.

F. Sheet Steel: ASTM A653/A653M, Grade 33 Structural Quality with galvanized coating.

G. Bolts: ASTM A307; Grade A or B; ASTM A325; Type 1.
   1. Finish: Unfinished at interior applications. Hot dipped galvanized at exterior applications.

H. Nuts: ASTM A563 heavy hex type.
   1. Finish: Unfinished at interior applications. Hot dipped galvanized at exterior applications.

I. Washers: ASTM F436; Type 1.
   1. Finish: Unfinished at interior applications. Hot dipped galvanized at exterior applications.

J. Handrail Fittings: Elbows, T-shapes, wall brackets, escutcheons; cast or machined steel.

K. Anchor Rods: ASTM F1554; Grade 55, weldable.

2.2 ACCESSORIES

A. Welding Materials: AWS D1.1.

B. Shop and Touch-Up Primer: SSPC Paint 15, Type 1, red oxide.

C. Touch-Up Primer for Galvanized Surfaces: SSPC Paint 20 Type I Inorganic.

2.3 FABRICATION

A. General:
   1. Fit and shop assemble items in largest practical sections, for delivery to site.
   2. Continuously seal joined members by continuous welds.
   3. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
   4. Exposed Mechanical Fastenings: Flush countersunk screws or bolts, consistent with design of component.
   5. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication.
   6. Accurately form components required for anchorage of stairs and landings and railings to each other and to building structure.
   7. Exposed Welded Joints: NOMMA Guideline 1 Joint Finish 1.

B. Handrails:
   1. Fit and shop assemble components in largest practical sizes, for delivery to site.
   2. Grind exposed joints flush and smooth with adjacent finish surface.
   3. Accurately form components to suit stairs and landings, to each other and to building structure.
   4. Form balusters with ½ inch diameter square steel sections, welded to stringers.

2.4 FINISHES

A. Prepare surfaces in accordance with SSPC SP 2

B. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

C. Interior Components: Shop prime items with one coat. Do not prime surfaces in direct contact with concrete or where field welding is required.

D. Exterior Components: Galvanizing for Components: ASTM A123/A123M; minimum 2.0 oz/sq ft coating thickness; galvanize after fabrication. Shop prime galvanized components with one coat. Do not prime surfaces in direct contact with concrete or where field welding is required.

E. Galvanizing for Fasteners, Connectors, and Anchors:
   1. Hot-Dipped Galvanizing: ASTM A153/A153M.
   2. Mechanical Galvanizing: ASTM B695; Class 50 minimum.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify field conditions are acceptable and are ready to receive Work.

3.2 PREPARATION

A. Make provisions for erection stresses. Install temporary bracing to maintain alignment, until permanent bracing and attachments are installed.

B. Supply items required to be cast into concrete or embedded in masonry with setting templates, to appropriate sections.

3.3 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Provide for erection loads and provide temporary bracing to maintain indicated alignment until completion of erection and installation of permanent attachments.

C. Field weld components indicated on shop drawings. Perform field welding in accordance with AWS D1.1.

D. Obtain approval prior to site cutting.

E. After erection, touch up welds, abrasions, and damaged finishes with prime paint or galvanizing repair paint to match shop finishes.

3.4 FIELD QUALITY CONTROL

A. Welding: Inspect welds in accordance with AWS D1.1.

END OF SECTION

SECTION 06 10 00 - ROUGH CARPENTRY

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. The drawings and general conditions of the contract including Standard General Conditions of the Construction Contract and other Division 1 Specification sections apply to work of this section.

B. Examine all other sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.

C. Coordinate work with that of all trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.02 DESCRIPTION OF WORK:

A. Work Included: Provide labor, materials, and equipment necessary to complete the work of this Section, and without limiting the generality thereof furnish and install the following:

1. Wood framing, including joists, rafters, outriggers, scab-ons, headers, stringers, posts, studs, plates, truss bracing and similar members.

2. Wood grounds, nailers, blocking and sleepers.

3. Wood furring.

4. Floor and roof sheathing.

5. Miscellaneous carpentry as indicated or required and not specified under other Sections of the Specifications.

6. Fasteners and accessories as indicated and required for rough carpentry.

7. Treated wood as specified.

B. Related Work Specified Elsewhere:

1. Finish carpentry: Section 06 20 00.

2. Furnishing and installing of doors and frames: Division 8.

1.03 QUALITY ASSURANCE:

A. Codes and Standards: Comply with provisions of the latest edition of the following except where more stringent requirements are shown or specified:

1. International Building Code, 2009 Edition – International Code Council

2. ANSI/AF&PA (American Forest & Paper Association) – NDS National Design Specification for Wood Construction – Latest Edition

3. AHA (American Hardboard Association) A135.4 – Basic Hardboard.

4. ALSC (American Lumber Standards Committee) – Softwood Lumber Standards.

5. ANSI A208.1 – Mat-Formed Wood Particleboard.

6. APA (American Plywood Association).

7. AWPA (American Wood Preservers Association) C1-All Timber Products – Preservative Treatment by Pressure Process.

8. AWPA (American Wood Preservers Association) C20-Structural Lumber Fire Retardant Treatment by Pressure Process.

9. NELMA (New England Lumber Manufacturer's Association).

10. NLGA (National Lumber Grades Authority)

11. NIST (National Institute of Standards and Technology, U. S. Department of Commerce [DOC])

12. NFPA (National Forest Products Association)

13. NFPA (National Fire Protection Association)

14. SPIB (Southern Pine Inspection Bureau).

15. WCLIB (West Coast Lumber Inspection Bureau).

16. WWPA (Western Wood Products Association).

17. "Code of Federal Regulations, Part 1926" per the Occupational Safety and Health Administration (OSHA), Department of Labor (Latest Revision).

B. Lumber shall be supplied in accordance with the following agencies:

1. Lumber Grading Agency: Certified by NLGA for structural framing.

2. Sheathing Grading Agency: Certified by APA or ICBO approved certification agency. For non-APA rated plywood, provide ICC ES Evaluation report.

3. Grading stamp shall be on lumber and plywood.

4. Submit manufacturer's certificate certifying that products meet or exceed specified requirements.

1.04 SUBMITTALS

A. Unless otherwise specified, submittals required in this section shall be submitted for review. Submittals shall be prepared and submitted in accordance with Division 1.

B. General Contractor shall submit a Submittal Schedule to the engineer within 30 days after they have received the Owner's Notice to Proceed.

C. All submittals shall be reviewed and returned to the Architect within 10 working days.

D. Incomplete submittals will not be reviewed.

E. Submittals not reviewed by the General Contractor prior to submission to the Engineer will not be reviewed. Include on the submittal statement or stamp of approval by Contractor, representing that the Contractor has seen and examined the submittal and that all requirements listed in sections Division 1have been complied with.

F. Engineer will review submittals a maximum of two review cycles as part of their normal services. If submittals are incomplete or otherwise unacceptable and re-submitted, General Contractor shall compensate Engineer for additional review cycles.

G. Hardcopy Submittals: Submit three prints. Prints will be reviewed by the Engineer, and then the Architect. One marked print will be returned to Contractor for printing and distribution. Multiple copies will not be marked by the Engineer.

H. Electronic Submittals:

1. Contractor shall include in the submittal schedule an indication of submittals that are intended to be submitted electronically. Upon receipt of the submittal schedule, the Engineer reserves the right to indicate submittals that will not be accepted electronically. Paper copies of such submittals shall be furnished as referenced in this specification.

2. The Engineer reserves the right to require paper copies of submittals that are received electronically. Provide Engineer one (1) paper copies in addition to the electronic submittal. Paper copy will be retained and electronic copy will be returned. Review cycle for such submittals shall not commence until such time that the paper copies are received.

3. Electronic Submittals shall be submitted in Protected Document Format (PDF) compatible with Adobe Acrobat Professional version 7.0 or later. Electronic files shall not be broken into smaller individual files. File sizes too large to process email or within a file transfer protocol (FTP) site shall be provided on a CD.

4. The submission of submittals electronically does not relieve the contractor of their responsibility to review the submittal prior to transmission to the Engineer. Electronic Submittals shall include contractor comments, and a statement and/or stamp of approval by Contractor, representing that the Contractor has seen and examined the submittal and that all requirements listed in this Section and Division 1 have been complied with. Electronic submittals without the Contractor's approval will be rejected and returned.

5. The Engineer assumes no responsibility for the printed reproduction of submittals reviewed electronically, transmission errors or returned electronic submittals that become corrupted or are otherwise not accessible by the Contractor's or Subcontractor's computer hardware and/or software.

I. Product Data: Submit producer's or manufacturer's specifications and installation instructions for the following products. Include laboratory test reports and other data to show compliance with specifications (including specified standards). Product data shall include ICC/ICBO Evaluation Reports indicating conformance to standards specified here within.

1. Engineered Wood Products

2. Pressure Treated Lumber

3. Sheathing

4. Samples of Exposed to View Wood Members: Submit two samples, 6 inches long, illustrating wood grain, stain, and finish.

5. Hangers, Hardware and Accessories

1.05 DELIVERY, STORAGE, AND PROTECTION

A. Protect materials from warping or other distortion by stacking to resist movement.

B. Follow manufacturer's recommendations for storage of Engineered Wood Products and connection hardware.

PART 2 PRODUCTS

2.01 LUMBER MATERIALS

A. Lumber, General: Factory-mark each piece of lumber with type, grade, mill and grading agency, except omit marking from surfaces to be exposed with transparent finish or without finish (Note: exception is architectural grade glulams and decking exposed to view).

B. Nominal sizes are indicated, except as shown by detail dimensions. Provide actual sizes as required by PS 20, for moisture content specified for each use.

1. Provide dressed lumber, S4S, unless otherwise indicated.

2. Provide seasoned lumber with 19% maximum moisture content at time of dressing.

C. For structural framing (4" and wider and from 2" to 4" thick), provide the following grade and species:

1. Spruce-Pine-Fir (SPF) #1/2 or better, NLGA Graded, unless noted otherwise on Structural Drawings, Minimum Design Stresses:

a. Fb: 875 psi

b. Ft: 450 psi

c. Fv: 135 psi

d. $Fc_{\perp}$: 425 psi

e. Fc: 1,150 psi

f. E: 1,400,000 psi

2. Pressure treated lumber: Southern Yellow Pine #2 or better. Minimum Design Stresses:

a. Fb: 1,300 psi

b. Ft: 775 psi

c. Fv: 175 psi

d. Fc⊥: 565 psi

e. Fc: 1,650 psi

f. E: 1,400,000 psi

3. See structural drawings for grades and bending stress at specific locations.

D. Miscellaneous Lumber: Provide wood for support or attachment of other work including cant strips, bucks, nails, blocking, furring, grounds, stripping and similar members. Provide lumber of sizes indicated, worked into shapes shown, and as follows:

1. Moisture content: 19% maximum for lumber items not specified to receive wood preservative treatment.

2. Grade: Construction Grade light framing size lumber of any species or board size lumber as required. Provide construction grade boards (NELMA, NLGA or WCLB) or No.2 boards (SPIB, NLGA, NELMA, or WWPA).

2.02 SHEATHING AND DECKING LOCATIONS

A. Roof Decking (Exposed Timber T&G): Exposed tongue and groove timber decking manufactured by Lock Deck (or pre-approved equivalent). Douglas Fir / Larch, 6” width, nominal thickness as noted on drawings (3” / 2” nominal, 2 3/16” / 1 7/16” actual), decorative grade. Minimum structural properties: Fb: 2640 psi, Fv 165 psi, E: 1,800,000 psi.

B. Roof Plywood Sheathing installed over Timber Decking at Main Building: NIST/DOC PS-1 or PS-2 rated, Exposure 1, ½” inch thick, 48 x 96 inch sized sheets, square edges, unless noted.

C. Roof Plywood Sheathing at Covered Walkway: NIST/DOC PS-1 or PS-2 rated, Exposure 1, 5/8” inch thick, 48 x 96 inch sized sheets, square edges with H clips or tongue and groove, unless noted.

D. Floor Sheathing: NIST/DOC PS-1 or PS-2 rated, Exposure 1, 3/4 inch thick, 48 x 96 inch sized sheets, tongue and groove.

E. Wall Sheathing at Cupola: NIST/DOC PS-1 or PS-2 rated, Exposure 1, 1/2 inch thick, 48 x 96 inch sized sheets, square edges.

F. Wall Sheathing over CMU walls and gable stud walls: NIST/DOC PS-1 or PS-2 rated (minimum), Exposure 1 (minimum), 3/4 inch thick, 48 x 96 inch sized sheets, square edges. Coordinate pressure treatment and product with architect.

G. Thicknesses indicated are nominal.

H. Sheathing shall be stamped with grading agency stamp (Exception is architectural grade decking at exposed areas).

I. Backing Panels: For mounting electrical or telephone equipment, provide fire-retardant-treated plywood panels where required per Code requirements. Paint as required by electrical code.

2.03 ENGINEERED WOOD PRODUCTS

A. General: Provide engineered wood products acceptable to authorities having jurisdiction and for which, current model code research or evaluation reports exist that evidence compliance with building code in effect for Project. Provide depths and widths as indicated.

1. Allowable Design Stresses: Provide engineered wood products with allowable design stresses, as published by manufacturer that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis, and demonstrated by comprehensive testing performed by a qualified independent testing agency.

2. Source and Species: Unless otherwise indicated, lumber sources in Engineered Wood Products shall be of single source and species.

3. Adhesives shall be exterior type, complying with ASTM D2559.

4. Substitutions: Substitutions of Engineered Wood Products other than those specified will be permitted only with written certification from the manufacturer that the substituted items “meets or exceeds” all properties of the specified product, including engineering, serviceability, aesthetic and durability characteristics. Substitutions shall not be made without written approval of the Architect and Engineer.

B. Laminated-Veneer Lumber (LVL): Lumber manufactured by laminating wood veneers in a continuous press using an exterior-type adhesive complying with ASTM D 2559 to produce members with grain of veneers parallel to their lengths and complying with the following requirements:

Boise Cascade F_b = 3080 psi, E = 2.0×10^6
I-Level: F_b = 2600 psi, E = 1.9×10^6

C. Parallel-Strand Lumber (PSL): Lumber manufactured by laying up wood strands using an exterior-type adhesive complying with ASTM D 2559, and cured under pressure to produce members with grain of strands parallel to their lengths and complying with the following requirements:

I-Level : Fc_{II} = 2,900 psi, , F_b=2900 psi, E = 2.0×10^6

D. Treated Glulam (X Beam): Lumber manufactured by laying up wood laminations using an exterior-type adhesive complying with ASTM D 2559, treated with Hi-Clear II, and cured under pressure to produce members with laminations complying with the following requirements:

Rosoboro: (DF. 24F-V4, Unbalanced or 24F-V8 Balanced)
F_b = 2,400 psi tension, E = 1.9×10^6

2.04 ACCESSORIES

A. Fasteners, Anchors, Connectors and Hardware:

1. Fasteners (for wood framing): Nail fasteners shall meet requirements of ASTM F1667.

Unless noted otherwise, nails referenced on drawings are to be Common Nails with dimensions as follows:

a. 8d: 2 1/2" long by 0.131" diameter shank with 0.281" diameter head

b. 10d: 3" long by 0.148" diameter shank with 0.312" diameter head

c. 12d: 3 1/4" long by 0.148" diameter shank with 0.312" diameter head

d. 16d: 3 1/2" long by 0.162" diameter shank with 0.344" diameter head

2. Anchor Bolts: ASTM A307 headed and SSTB Anchor Bolts by Simpson StrongTie, unless noted otherwise. "J" or "L" type anchor bolts shall not be substituted.

3. Screw fasteners (where indicated on drawings or required to install connection hardware):

a. SD & SDS Screws by Simpson Strong Tie

b. RSS Screws by GRK Fasteners, (800) 263-0463

c. Timberlok Screws by Fasten Master.

d. Wood Screws: ANSI/ASME Standard B18.6.1

4. Lag Screws: ANSI/ASME Standard B18.2.1. Provide lead hole per NDS Chapter 11.

5. Through Bolts: ANSI/ASME Standard B18.2.1:

a. Holes for through bolts shall be a minimum of 1/32nd and a maximum of 1/16th larger than bolt diameter.

b. A standard cut washer shall be provided between the wood and bolt head, and wood and nut, unless noted otherwise.

B. Structural Framing Connectors, Hardware or Joist Hangers: As indicated on the drawings or sized to suit framing conditions, manufactured by Simpson or approved alternate.

1. Unless noted, fill all nail holes to achieve manufacturer's maximum reaction rating.

2. Use nail diameter and length as specified by connector manufacturer. Substitutions of pneumatic nails or "joist hanger" (non standard length) nails shall not be made without written authorization of the Engineer.

C. Construction Adhesive: APA AFG-01, approved for use with type of construction panel indicated by both adhesive and panel manufacturer.

D. ALL ANCHORS, CONNECTORS AND FASTENERS IN CONTACT WITH PRESSURE TREATED LUMBER, AND/OR AT EXTERIOR EXPOSURE SHALL HAVE COATINGS AS FOLLOWS, UNLESS NOTED OTHERWISE:

1. Anchor Bolts/Bolts/Lag Bolts: Hot Dipped Galvanized, ASTM A123

2. Connection Hardware, unless otherwise noted: Simpson Strongtie Z-Max (G185 per ASTM A653) or Hot Dipped Galvanized (HDG, ASTM A123). Use hot dipped galvanized

fasteners, ASTM A153 with these hangers.

3. Nails and Fasteners, unless otherwise noted: Hot Dipped Galvanized, ASTM A153.

4. Proprietary coatings used in conjunction with pressure treated fastener coatings will be permitted with written permission from the Architect and Engineer.

2.05 FACTORY WOOD TREATMENT

A. PRESSURE TREATED LUMBER (P. T.)

1. Wood Preservative (Pressure Treatment): AWPA Treatment, ACQ-C (amine formulated), ACQ-D or CA-B, ammonia free, U.N.O. (See specific requirements for PT Plywood on exterior of CMU walls. Treatment on X Beams is per Manufacturer).

2. The use of ACZA and CCA treated lumber is strictly prohibited.

3. Retention:

a. Above Ground Use: ACQ: 0.25 pcf, CA-B: 0.10 pcf

b. Ground Contact Use: ACQ: 0.40 pcf, CA-B: 0.21 pcf.

4. See Section the “Fasteners, Anchors, Connectors and Hardware” portion of this specification for fastener, anchor and hardware requirements for use with pressure treated lumber.

5. Pressure treated lumber shall not contain ammonia unless authorized by the Architect and Engineer. Ammonia content shall be verified with the Pressure Treatment manufacturer.

PART 3 EXECUTION

3.01 FRAMING

A. Set members level and plumb, in correct position.

B. Unless noted otherwise, wall top plates shall be doubled. Install top plates with overlapping corners and at intersections with adjoining partitions. End joints in double top plates shall be offset at least 48 inches.

C. Make provisions for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing.

D. Place horizontal members, crown side up, or as specifically directed on glulam products.

E. Construct load bearing framing members full length without splices.

F. Posts and columns shall be blocked at floor and/or roof levels with framing matching or exceeding post dimensions down to supporting foundation.

G. Place sill gasket directly on cementitious foundation. Puncture gasket clean and fit tight to protruding foundation anchor bolts.

H. Coordinate installation of wood decking, joist members, rafter members.

I. Coordinate curb installation with installation of decking and support of deck openings, and roofing vapor retardant.

J. Rough Carpentry Fastening Schedule: Unless otherwise indicated on the drawings, provide minimum nailing and fastening per IBC Table 2304.9.1.

3.02 SHEATHING

A. Secure roof sheathing with longer edge perpendicular to framing members and with ends staggered and sheet ends over bearing provide gap between panels as recommended by manufacturer. Utilize H-clips at panel edges per manufacturer's recommendations or as indicated. Provide blocking where indicated on the Drawings.

B. Secure floor sheathing with longer edge perpendicular to framing members and with ends staggered and sheet ends over bearing. Secure tongue in groove per manufacturers instructions. Glue and nail/screw as indicated. Provide blocking where indicated on the Drawings. Floor sheathing shall be laid out in a manner to prevent squeaks.

C. Secure wall sheathing with long dimension perpendicular to wall studs, with ends over firm bearing and staggered.

D. Install telephone and electrical panel backboards with plywood sheathing material where required. Size as indicated, 6 inch larger than panel space required or per local Code requirements.

3.03 TOLERANCES

A. Framing Members: 1/4 inch from true position, maximum.

B. Fasteners Driving Tolerance: Unless noted otherwise, fastener heads shall be driven flush with attached framing member or sheathing. Maximum indentation tolerance from flush shall be 1/16 inch.

END OF SECTION

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SECTION 06 10 53

MISCELLANEOUS ROUGH CARPENTRY

PART 1 GENERAL

1.1 SUMMARY

A. Section includes nailers; blocking in wall and roof openings; wood furring and grounds; concealed wood blocking for support of accessories wood trim; miscellaneous sheathing and underlayment; telephone and electrical panel back boards; and preservative treatment of wood.

B. Related Sections:
   1. Drawings and general provisions of Contract including 'Standard General Conditions of the Construction Contract'.
   2. Section 06 01 00, Sheathing

1.2 REFERENCES

A. American National Standards Institute:
   1. ANSI A208.1 - Mat-Formed Wood Particleboard.

B. American Wood-Preservers' Association:
   1. AWPA M4 - Standard for the Care of Preservative-Treated Wood Products.
   2. AWPA U1 - Use Category System: User Specification for Treated Wood.

C. ASTM International:
   1. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
   2. ASTM B695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel
   3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
   4. ASTM F1667 - Standard Specification for Driven Fasteners: Nails, Spikes, and Staples.

D. Forest Stewardship Council:
   1. FSC Guidelines - Forest Stewardship Council Guidelines.

E. The Redwood Inspection Service:
   1. RIS - Standard Specifications for Grades of California Redwood Lumber.

F. Southern Pine Inspection Bureau:
   1. SPIB - Standard Grading Rules for Southern Pine Lumber.

G. National Lumber Grades Authority:
   1. NLGA - Standard Grading Rules for Canadian Lumber.

H. Northeastern Lumber Manufacturers Association:
   1. NELMA - Standard Grading Rules for Northeastern Lumber.

I. U.S. Department of Commerce National Institute of Standards and Technology:
   1. DOC PS 1 - Construction and Industrial Plywood.
   2. DOC PS 2 - Performance Standard for Wood-Based Structural-Use Panels.
   3. DOC PS 20 - American Softwood Lumber Standard.

J. West Coast Lumber Inspection Bureau:
   1. WCLIB - Standard Grading Rules for West Coast Lumber.

K. Western Wood Products Association:
   1. WWPA G-5 - Western Lumber Grading Rules.

1.3 SUBMITTALS

A. Reference ‘Standard General Conditions of the Construction Contract’.

B. Product Data: Submit technical data on wood preservative and fire retardant treatment materials and application instructions.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with the following:
   1. Lumber Grading Agency: Certified by DOC PS 20.
   2. Wood Structural Panel Grading Agency: Certified by EWA - The Engineered Wood Association.
   3. Lumber: DOC PS 20.
   4. Wood Structural Panels: DOC PS 1 or DOC PS 2.

B. Surface Burning Characteristics:
   1. Fire Retardant Treated Materials: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.

C. Apply label from agency approved by authority having jurisdiction to identify each preservative treated and fire retardant treated material.

Maintain one copy of each document on site.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Reference ‘Standard General Conditions of the Construction Contract’.

PART 2 PRODUCTS

2.1 MATERIALS

A. Lumber Grading Rules: AP&PA. RIS. SPIB. WCLIB. WWPA G-5.

B. Miscellaneous Framing: Stress Group D, species, grade 19 percent maximum moisture content after treatment, pressure preservative treated where in contact with concrete based materials for painting.

C. Plywood: APA/EWA Rated Sheathing Structural I, Grade C-D; Exposure Durability 1; unsanded.

1. Interior Composite Wood and Agrifiber Products: Contain no added urea-formaldehyde resins.
2. Exterior Wood Structural Panel Wall Sheathing: EWA Rated Sheathing, Plywood; Exposure Durability: Exterior; unsanded. treated sheathing for contact with ground, thicknesses indicated.

2.2 ACCESSORIES

A. Fasteners and Anchors:
1. Fasteners: ASTM A153/A153M, hot dipped galvanized ASTM B695, Class 55 mechanically galvanized steel for high humidity and treated wood locations, unfinished steel elsewhere.
2. Nails and Staples: ASTM F1667.
3. Anchors: Toggle bolt type for anchorage to hollow masonry. Expansion shield and lag bolt type for anchorage to solid masonry or concrete. Bolt or ballistic fastener for anchorages to steel.

2.3 FACTORY WOOD TREATMENT

A. Wood Preservative (Pressure Treatment): AWPA U1, Commodity Specification for:
1. Sawn Products: water-borne ACQ SBX preservative.
2. Wood Composites Products: Preservative for contact with ground, 0.40 lb/CF Type ACZA, ACA, ACC, CCA (A, B or C), ACQ (B or D), or CC borate, creosote, penta-chlorophenol and linseed oil free Waterborne Preservatives. Confirm compatibility for painting and adhesion by specified 07 19 50 Air and Vapor Barrier including Self Adhered Flashing.

B. Moisture Content after Treatment: Redried Kiln dried (KDAT).
1. Lumber: Maximum 19 percent.
2. Structural Panels: Maximum 15 percent.

2.4 SHEATHING LOCATIONS

A. Wall Sheathing: ¾” panels secured to exterior mason wall for attachment of exterior siding and trim where indicated.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify substrate conditions are ready to receive blocking, curbing and framing.

3.2 PREPARATION

A. Coordinate placement of blocking, curbing and framing items.

3.3 INSTALLATION

A. Set members level and plumb, in correct position.

B. Place horizontal members, crown side up.

C. Construct curb members of solid wood sections.

D. Curb roof openings except where prefabricated curbs are provided. Form corners by alternating lapping side members.

E. Coordinate curb installation with installation of decking and support of deck openings, roofing vapor retardant, and parapet construction.

F. Space framing and furring as indicated.

G. Secure sheathing to framing members with ends over firm bearing and staggered.

H. Install telephone and electrical panel back boards with wood structural panel sheathing material where required. Size back boards 12 inches beyond size of electrical panel.

3.4 SITE APPLIED WOOD TREATMENT

A. Brush apply one two coats of preservative treatment on wood in contact with cementitious materials roofing and related metal flashings and.

B. Treat site-sawn cuts. Apply preservative to site-sawn cuts in accordance with AWPA M4.

C. Allow preservative to dry prior to erecting members.

3.5 SHEATHING UNDERLAYMENT

A. Fasten sheathing in accordance with applicable code.

B. Install flooring underlayment after dust and dirt generating activities have ceased and prior to application of finished flooring. Apply perpendicular to subflooring, stagger joints of underlayment. Secure with deformed shank type fasteners.

3.6 SCHEDULES

A. Roof Blocking: S/P/F species, 19 percent maximum moisture content, pressure preservative treatment.

B. Telephone and Electrical Panel Boards: 3/4 inch thick, square edges, site brush applied preservative treated.

C. Sheathing Underlayment: Refer to Schedule in Drawings.

END OF SECTION

SECTION 06 20 00

FINISH CARPENTRY

PART 1 GENERAL

1.1 SUMMARY

A. Section INCLUDES all new finish carpentry items; wood casings and moldings; and hardware and attachment accessories. Coordinate Scope of Work with Contractor.

B. Related Sections:
1. Drawings and general provisions of Contract including 'Standard General Conditions of the Construction Contract'.
2. Section 06 10 53 - Miscellaneous Rough Carpentry: Grounds and support framing.
3. Section 09 91 23 - Painting
4. Section 06 10 53 - Miscellaneous Rough Carpentry: Execution requirements for recessed wood blocking specified by this section.

1.2 REFERENCES

A. American National Standards Institute:
1. ANSI A135.4 - Basic Hardboard.
2. ANSI A156.9 - Cabinet Hardware.
3. ANSI A208.1 - Mat-Formed Wood Particleboard.

B. APA-The Engineered Wood Association:
1. APA/EWA PS 1 - Voluntary Product Standard for Construction and Industrial Plywood.

C. ASTM International:
1. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
2. ASTM B695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel
3. ASTM C1036 - Standard Specification for Flat Glass.
4. ASTM C1048 - Standard Specification for Heat-Treated Flat Glass-Kind HS, Kind FT Coated and Uncoated Glass.
5. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
6. ASTM F1667 - Standard Specification for Driven Fasteners: Nails, Spikes, and Staples.

D. Architectural Woodwork Institute:
1. AWI - Quality Standards Illustrated.

E. American Wood-Preservers' Association:
1. AWPA M4 - Standard for the Care of Preservative-Treated Wood Products.
2. AWPA U1 - Use Category System: User Specification for Treated Wood.

F. Federal Specification Unit:
1. FS A-A-1936 - Adhesive, Contact, Neoprene Rubber.

G. Forest Stewardship Council:
1. FSC Guidelines - Forest Stewardship Council Guidelines.

H. Green Seal:
   1. GS-11 - Product Specific Environmental Requirements.
   2. GS-36 - Aerosol Adhesives.

I. Hardwood Plywood and Veneer Association:
   1. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood.

J. National Electrical Manufacturers Association:
   1. NEMA LD 3 - High Pressure Decorative Laminates.
   2. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth.

K. South Coast Air Quality Management District:
   1. SCAQMD Rule 1113 - Architectural Coatings. SCAQMD Rule 1168 - Adhesive and Sealant Applications.

L. U.S. Department of Commerce National Institute of Standards and Technology:
   1. DOC PS 1 - Construction and Industrial Plywood.
   2. DOC PS 2 - Performance Standard for Wood-Based Structural-Use Panels.
   3. DOC PS 20 - American Softwood Lumber Standard.

M. Window and Door Manufacturers Association:
   1. WDMA I.S.4 - Water-Repellent Treatment for Millwork.

N. Woodwork Institute:
   1. WI - Manual of Millwork.

1.3 SUBMITTALS

A. Reference ‘Standard General Conditions of the Construction Contract’.

B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories, to minimum scale of 1-1/2 inch to 1 ft.

C. Product Data:
   1. Submit data on fire retardant treatment materials and application instructions.
   2. Submit data on attachment hardware and finish hardware.

D. Samples:
   1. Submit two samples of finish plywood, 8 x 10 inch in size illustrating wood grain and specified finish.
   2. Submit two samples of wood trim 10 inch long.
   3. Submit two samples of laminates, prefinished paneling, synthetic surfacing, hardware items, shop finishes.

E. Certification: Submit copy of fabricator’s authorization to use AWI Grade Stamps.

1.4 QUALITY ASSURANCE

A. Perform work in accordance with AWI (Architectural Woodwork Institute) Architectural Woodwork Quality Standards Illustrated, Custom Grade.

B. Surface Burning Characteristics: Comply with the following when tested in accordance with NFPA 286.
   1. During 40 kW Exposure: No flame spread to ceiling.
   2. During 160 kW Exposure: No flame spread to perimeter of tested sample and no flashover.
   3. Total Smoke Release: Maximum 1,000 cu m.

C. Apply label from agency approved by authority having jurisdiction to identify each preservative treated and fire retardant treated material.

D. Perform Work in accordance with State and Municipality of project location standard.

1.5 QUALIFICATIONS

A. Fabricator: Company specializing in fabricating Products specified in this section with minimum three years documented experience.

1.6 PRE-INSTALLATION MEETINGS

A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.

B. Convene minimum one week prior to commencing work of this section.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Reference ‘Standard General Conditions of the Construction Contract’.

B. Verify field measurements prior to fabrication.

C. Protect work from moisture damage.

1.8 FIELD MEASUREMENTS

1.9 SEQUENCING

A. Reference ‘Standard General Conditions of the Construction Contract’.

B. Sequence work to ensure utility connections are achieved in orderly and expeditious manner.

1.10 COORDINATION

A. Reference ‘Standard General Conditions of the Construction Contract’.

B. Coordinate work with plumbing rough-in, electrical rough-in, and installation of associated and adjacent components.

PART 2 PRODUCTS

2.1 FINISH CARPENTRY

A. Manufacturers and Products
   1. Provide listed products by listed manufacturers and/or custom profiles indicated on drawings

2. Substitutions: Section 01 60 00 - Product Requirements Not Permitted.

2.2 COMPONENTS

A. Softwood Lumber: DOC PS 20. AWI Grade II Custom Grade; maximum moisture content of 6-8 percent; and the following:
1. Species of Wood: Poplar or pine (refer to finish schedules), prepare for painting.
2. Cut or Slicing of Wood: Plain.
3. Matching of Individual Leaves to Each Other: book matching.

B. Softwood Plywood: APA/EWA PS 1 Grade B-C softwood plywood. Custom veneer; with lumber core; type of glue recommended for application; and the following:
1. Species of Veneer: Birch, prepare for painting.
2. Cut or Slicing of Veneer: Plain.
3. Matching of Individual Leaves to Each Other: book
4. Matching Across Panel Face: balanced matching.
5. Matching or Relationship of Panels to Each Other: pre-manufactured sets matching.

2.3 ACCESSORIES

A. Adhesive for High Pressure Decorative Laminates: Type recommended by laminate manufacturer to suit application.
1. Interior Adhesives: Maximum volatile organic compound content in accordance with SCAQMD Rule 1168.
2. Interior Aerosol Adhesives: Maximum volatile organic compound content in accordance with GS-36.
3. Interior Adhesives: Maximum volatile organic compound content in accordance with SCAQMD Rule 1168.
4. Interior Aerosol Adhesives: Maximum volatile organic compound content in accordance with GS-36.

B. Fasteners and Anchors:
1. Fasteners: ASTM A153/A153M, hot dipped galvanized ASTM B695, Class 55 mechanically galvanized steel for high humidity and treated wood locations, unfinished steel elsewhere.
2. Nails and Staples: ASTM F1667.

C. Concealed Joint Fasteners: Threaded steel.

D. Lumber for Shimming and Blocking: Softwood lumber of S-P-F species.

E. Veneer Edge Band: Standard wood veneer edge band matching face veneer or solid wood as indicated.

F. Plastic Edge Trim: Extruded convex shaped; smooth finish; self locking serrated tongue; of width to match component thickness; color as selected.

G. Primer: Alkyd primer sealer type.
1. Interior Flat and Non-Flat Paints: Maximum volatile organic compound content in accordance with GS-11.

H. Wood Filler: Solvent base, tinted to match surface finish color.

I. Cabinet Hardware, as indicated on Drawings, submitted and approved by Architect. Provide all components required for proper function of systems indicated.

J. Interior Handrail Bracket: Julius Blum model #315 aluminum handrail bracket as indicated. Provide adequate quantities to meet code stipulated loading requirements.

2.4 FABRICATION

A. Fabricate to AWI Custom standards.

B. Shop assemble work for delivery to site, permitting passage through building openings.

C. Fit exposed sheet material edges with matching edging. Use one piece for full length only.

D. Cap exposed high pressure decorative laminate finish edges with material of same finish and pattern.

E. Shop prepare and identify components for book match grain matching during site erection.

F. When necessary to cut and fit on site, fabricate materials with ample allowance for cutting. Furnish trim for scribing and site cutting.

G. Apply high pressure decorative laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet from sink cut-outs.

H. Apply laminate backing sheet to reverse face of high pressure decorative laminate finished surfaces.

2.5 SHOP FINISHING

A. Sand work smooth and set exposed nails and screws.

B. Apply wood filler in exposed nail and screw indentations.

C. On items to receive transparent finishes, use wood filler matching surrounding surfaces and of types recommended for applied finishes.

D. Stain, seal, and varnish exposed to view surfaces.

E. Seal internal surfaces and semi-concealed surfaces.

F. Seal surfaces in contact with cementitious materials.

2.6 SOURCE QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Testing, inspection and analysis requirements.

B. Inspect Work performed at fabricator's facility to verify conformance to Contract Documents.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify adequacy of backing and support framing.

C. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.

3.2 INSTALLATION

A. Install work in accordance with AWI Custom quality standard.

B. Set and secure materials and components in place, plumb and level.

C. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.

D. Install components with nails at 12 inch on center.

E. Install prefinished paneling with full bed contact adhesive applied to substrate.

F. Site Applied Wood Treatment:
1. Brush apply two coats of preservative treatment on wood in contact with cementitious materials, and roofing and related metal flashings.
2. Treat site-sawn cuts. Apply preservative to site-sawn cuts in accordance with AWPA M4.
3. Allow preservative to dry prior to erecting members.

G. Preparation For Site Finishing:
1. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth.
2. Before installation, prime paint surfaces of items or assemblies to be in contact with cementitious materials.

3.3 ERECTION TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.

B. Maximum Variation from Indicated Position: 1/16 inch.

C. Maximum Offset from Alignment with Abutting Materials: 1/32 inch.

3.4 SCHEDULES

A. Interior: (unless otherwise noted on drawings)
1. New Door and Door Frames Trim: Clear poplar; prepare for paint finish.
2. Window Sills and Apron: Clear poplar; prepare for paint finish.
3. Moldings, Casings, and Miscellaneous Trim: Clear poplar; prepare for paint finish.

END OF SECTION

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SECTION 06 60 00

PLASTIC FABRICATIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Cellular PVC Trim Boards for misc. exterior finish carpentry locations as indicated on the drawings.

1.2 RELATED SECTIONS

A. Drawings and general provisions of Contract including 'Standard General Conditions of the Construction Contract'.

B. Section 06 20 00 – Finish Carpentry.

C. Section 06 10 53 - Miscellaneous Rough Carpentry: Execution requirements for recessed wood blocking specified by this section.

D. Section 06 10 53 - Miscellaneous Rough Carpentry: Grounds and support framing.

E. Sections 07 4* ** - Cladding Systems.

F. Section 09 90 00 - Painting and Coating: Painting and finishing of finish carpentry items.

1.3 REFERENCES

A. ASTM D792 - Density and Specific Gravity of Plastics by Displacement.

B. ASTM D570 - Water Absorption of Plastics.

C. ASTM D638 - Tensile Properties of Plastics.

D. ASTM D790 - Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.

E. ASTM D1761 - Mechanical Fasteners in Wood.

F. ASTM D5420 - Standard Test Method for Impact Resistance of Flat, Rigid Plastic Specimen by means of a Striker Impacted by a Falling Weight.

G. ASTM D256 - Determining the Pendulum Impact Resistance of Plastics.

H. ASTM D696 - Coefficient of Linear Thermal Expansion of Plastics Between -30°C and 30°C with a Vitreous Silica Dilatometer.

I. ASTM D635 - Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position.

J. ASTM E84 - Surface Burning Characteristics of Building Materials.

K. ASTM D648 - Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position.

L. ASTM D3679 - Standard Specification for Rigid Poly Vinyl Chloride (PVC) Siding.

M. Green Seal:
   1. GS-11 - Product Specific Environmental Requirements.
   2. GS-36 - Aerosol Adhesives.

1.6 QUALITY ASSURANCE

A. Regulatory Requirements: Check with Local Building Code for installation requirements.

B. Allowable Tolerances:
   1. Variation in component length: -0.00 / +1.00”
   2. Variation in component width: ± 1/16”
   3. Variation in component thickness: ± 1/16”
   4. Variation in component edge cut: ± 2°
   5. Variation in Density -0% + 10%

C. Workmanship, Finish, and Appearance:
   1. Cellular PVC that is homogeneous and free of voids, holes, cracks, and foreign inclusions and other defects. Edges must be square, and top and bottom surfaces shall be flat with no convex or concave deviation.
   2. Uniform surface free from cupping, warping, and twisting.

1.6 DELIVERY, STORAGE AND HANDLING

A. Trim materials should be stored on a flat and level surface on a full shipping pallet. Handle materials to prevent damage to product edges and corners. Store materials under a protective covering to prevent jobsite dirt and residue from collecting on the boards.

1.7 WARRANTY

A. Provide manufacturer’s 25 year warranty against defects in manufacturing that cause the products to rot, corrode, delaminate, or excessively swell from moisture.

PART 2 PRODUCTS

2.1 MATERIALS

A. Acceptable products: Versatex® Trimboards and Beadboard soffits manufactured byWolfpac Technologies, Inc., 111 Leetsdale Industrial Drive, Unit 101, Leetsdale, PA, or equal.

B. Material: Expanded rigid poly vinyl chloride material with a small-cell microstructure and density of .55 grams/cm³.
   1. Shapes, sizes and profiles as indicated on Drawings.
   2. Material shall have a minimum physical and performance properties specified in the following Section C.

C. Performance and physical characteristic requirements:

Property	Units	Value	ASTM Method
PHYSICAL			
Density	g/cm3	0.55	D 792
Water Absorption	%	<0.70	D 570
MECHANICAL			
Tensile Strength	psi	1889	D 638
Tensile Modulus	psi	107,000	D 638
Flexural Strength	psi	4019	D 790
Flexural Modulus	psi	164,200	D 790
Nail Hold	Lbf/in of penetration	108	D 1761
Screw Hold	Lbf/in of penetration	442	D 1761
Staple Hold	Lbf/in of penetration	69	D 1761
Gardner Impact	in-lbs	98	D5420
Notched Izod Impact	ft-lbs/inch	0.250	D256
THERMAL			
Coefficient of Linear Expansion	in/in/°F	3.25 x 10-5	D 696
Burning Rate	In/min	Failed to Ignite	D 635
Flame Spread Index	--	25	E 84
Heat Deflection Temp (264 psi)	°F	153	D648
Oil Canning(@140°F)	°F	Passed	D 648

2.2 ACCESSORY PRODUCTS

A. Fasteners: Use only stainless steel fasteners recommended by manufacturer.
   1. Install stainless steel fasteners in accordance with manufacturer's recommendations.
   2. Countersink fasteners for flush plugs set and finishing. GastenMaster Cortex Hidden Fastening System for PVC Trim, or equal.
   2. Do not use staples, small brads, wire nails, fine threaded wood screws and ring-shank fasteners.

B. Adhesives:
   1. Bonding Versatex to Itself: Bond joints with PVC cement or cellular PVC adhesives approved by manufacturer.
   2. Bonding Versatex to Various Substrates: Bond with construction adhesives recommended by manufacturer.
   3. Use scarf joint cuts in running trim.
   4. Secure bonded joints with fasteners on each side of joint.

C. Sealants:

1. Use urethane, polyurethane or acrylic based sealants that do not contain silicone.

D. Flashing:
1. Provide .040 aluminum at head of all exposed trim pieces, color as approved by architect.

2.3 FINISHES

A. Preparation:
1. Clean, Dry surface
2. Finish nail holes with a polyurethane or acrylic based caulk.
3. Paine all exposed exterior surfaces, use only 100% acrylic latex paint system.

PART 3 EXECUTION

3.1 INSTALLATION

A. Manufacturers instructions: Comply with manufacturer's product catalog installation instructions and product technical bulletin instructions.

B. Conform to and account for manufacturer's recommended material expansion characteristics and provide expansion relief details for review and approval of Architect.

C. Cutting: Cut sheets and boards with standard saws and carbide tipped blades used for wood. Do not use fine tooth metal cutting blades.

D. Drilling: Drill using standard woodworking drill bits. Do not use drill bits made for rigid PVC.

E. Milling: Mill with standard woodworking milling or moulding machines of various types. Relief Angle 20° to 30°; Cutting speed to be optimized with the number of knives and feed rate.

F. Routing: Rout with standard carbide tipped routers used in woodworking.

G. Edge Finishing: Various sanding, grinding or filing tools. Do not allow excessive frictional heat to build up.

H. Fastener Location: Standard nailing patterns or as indicated. Use two fasteners at each framing member for trimboard applications. Use additional fasteners for trimboards wider than 10 inches and sheet. Install fasteners no more than two inches from the end of boards.

I. Linear Thermal Expansion and Contraction: When properly fastened, allow for 3/16" movement for each 18' board. When butting boards together it is recommended that the butt joint is glued with PVC cement. This will eliminate any separation at the joint. The gap can be accommodated at the ends of the run.

END OF SECTION

SECTION 06 60 20

PLASTIC WALL FURRING SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and 'Standard General Conditions of the Construction Contract'.

1.2 SUMMARY

A. Section Includes:

1. Non-load-bearing recycled plastic furring systems for interior gypsum board assemblies.

B. Related Requirements:

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: Screw pullout test from EcoStud LLC.

B. Construction detail: Detail drawings, 10-3670 through 10-3782.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Physical properties of the recycled plastic resin used to produce the non-structure recycled plastic furring elements: Tensile strength > 6,000 PSI ASTM D 638-08, Izod Impact 6 – 12 ASTM D 256, Flame Spread Log 1 ASTM E162, Limited Oxygen Index LOI 48 ASTM D2843, Maximum Smoke Density Dm 280 ASTM E662, Screw pull-out value >100 Lbs SPP Internal Standard, Thermal Conductivity .19 W/mK, Acoustical Velocity 1920 m.min, Impedance 3.27 MRayls, Attenuation 11.2 dB/cm, 5 MHz, Density 1.38 gm/cm^3

B. Bond characteristics of adhesive: Adhesive shall exhibit t-pull bond strength of >50 psi. Preferred failure mode is cohesive.

2.2 FURRING SYSTEMS

A. Recycled Content of Plastic Products: 100% post industrial recycled content with varying amounts of Post-consumer recycled content.

B. Flanged Furring Channel: With pre-punched web, typical profile thickness of .090 inch, wall attachment flange of .850 inch, screw face of 1.500 inch and 3.500 inch depth.

2.3 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards.

1. Fasteners for Recycled Plastic Furring: Of type, material, size, galvanized steel, holding power, and other properties required to fasten recycled plastic members to substrates.

2. Adhesives: OSI QB-300, Chemlink M-1, Chemlink Build Secure, Chemlink Wall Secure or architect approved equal

3. Sealants: 30 year Siliconized Arcylic Sealant, Chemlink M-1, 100% pure silicone or architect approved equal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present for compliance with requirements and other conditions affecting performance of the Work.

B. Clean by scraping any mortar or other protrusion from the substrate. Any surface dirt, dust or effervescence shall be removed through brushing or other acceptable means.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

B. Do not bridge building control and expansion joints with recycled plastic furring members. Fur both sides of joints independently.

C. Direct Furring with flanged furring channel:

1. Attach to concrete or masonry with a minimum of 10 square inch coverage of adhesive using either a continuous bead or evenly spaced deposit technique per 8 foot segment and stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 16 or 24 o.c. per design specification.
2. Interior corners shall be constructed using EPS foam in conjunction with EcoStud® as depicted in construction detail 10-3699 available though EcoStud LLC.

3. Exterior corners shall be constructed using EPS foam in conjunction with EcoStud® as detailed in construction detail 10-3677 available though EcoStud LLC.
4. Install insulation as specified in Division 07 Section “Thermal Insulation”. If 2 pound density spray foam is specified installer shall be trained in the application by EcoStud LLC and shall provide written proof of such training..

D. Direct Furring with Z-Furring Members:

1. Erect insulation, specified in Division 07 Section "Thermal Insulation," vertically and hold in place with Z-furring members spaced 16 or 24 o.c. per design specification.
2. Except at exterior corners, securely attach narrow flanges of furring members to wall with a minimum of 10 square inch coverage of adhesive per 8 foot section using either a continuous bead or evenly spaced deposit technique and concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 16 inches o.c.
3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel per detail 10-3671. At interior corners, space second member no more than 12 inches from corner and cut insulation to fit.

E. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8” 3.2 mm from the plane formed by faces of adjacent framing.

END OF SECTION

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SECTION 07 11 00

DAMPPROOFING

PART 1 GENERAL

1.1 SUMMARY

A. Section includes hot applied asphalt bituminous dampproofing; and protective cover.

B. Related Sections:

1.2 REFERENCES

A. Reference ‘Standard General Conditions of the Construction Contract’.

B. ASTM International:
1. ASTM D41 - Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
2. ASTM D43 - Standard Specification for Coal Tar Primer Used in Roofing, Dampproofing, and Waterproofing.
3. ASTM D449 - Standard Specification for Asphalt Used in Dampproofing and Waterproofing.
4. ASTM D450 - Standard Specification for Coal-Tar Pitch Used in Roofing, Dampproofing, and Waterproofing.
5. ASTM D1227 - Standard Specification for Emulsified Asphalt Used as a Protective Coating for Roofing.
6. ASTM D3747 - Standard Specification for Emulsified Asphalt Adhesive for Adhering Roof Insulation.
7. ASTM D4586 - Standard Specification for Asphalt Roof Cement, Asbestos-Free.
8. ASTM D5643 - Standard Specification for Coal Tar Roof Cement, Asbestos Free.

C. National Roofing Contractors Association:
1. NRCA - The NRCA Waterproofing and Dampproofing Manual.

1.3 SUBMITTALS

A. Reference ‘Standard General Conditions of the Construction Contract’.

B. Product Data: Submit properties of primer, bitumen, and mastics.

C. Manufacturer's Installation Instructions: Submit special procedures and perimeter conditions requiring special attention.

1.4 ENVIRONMENTAL REQUIREMENTS

A. Reference ‘Standard General Conditions of the Construction Contract’.

B. Maintain ambient temperatures above 40 degrees F for 24 hours before and during application until membrane has cured.

PART 2 PRODUCTS

2.1 BITUMINOUS DAMPPROOFING

A. Manufacturers:
1. Karnak Corp.
2. Lambert Corporation.
3. W.R. Meadows.
4. Substitutions: Not Permitted.

2.2 COMPONENTS

A. Cold Asphaltic Materials:
1. Asphalt Emulsion: Conforming to ASTM D3747.
2. Asphalt Primer: ASTM D41, compatible with substrate.

2.3 ACCESSORIES

A. Protection Board: 1/4 inch thick biodegradable hardboard.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify substrate surfaces are durable, free of matter detrimental to adhesion or application of dampproofing system.

C. Verify items penetrating surfaces to receive dampproofing are securely installed.

3.2 PREPARATION

A. Protect adjacent surfaces not designated to receive dampproofing.

B. Clean and prepare surfaces to receive dampproofing.

C. Do not apply dampproofing to surfaces unacceptable to manufacturer or applicator.

D. Apply mastic to seal penetrations, small cracks, or minor honeycomb in substrate.

3.3 INSTALLATION

A. Prime surfaces in accordance with NRCA - Waterproofing Manual.

B. Apply bitumen in one two coats, continuous and uniform, at rate recommended by manufacturer.

C. Apply from 2 inches below finish grade elevation to top of footings.

D. Seal items Projecting through dampproofing surface with mastic. Seal watertight.

E. Adhere protection board panel and drainage panel to substrate with mastic. Scribe and cut boards around Projections, penetrations, and interruptions.

F. Immediately backfill against dampproofing to protect from damage.

3.4 SCHEDULES

A. New Foundation Wall: Two coatings of asphalt dampproofing at frost wall areas [NOT opposite occupied areas].

END OF SECTION

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SECTION 07 19 50

AIR AND VAPOR BARRIER

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Materials and installation methods for fluid-applied, vapor permeable air barrier membrane system located in the non-accessible part of the wall.
2. Materials and installation methods to bridge and seal air leakage pathways in roof and foundation junctions, window and door openings, control and expansion joints, masonry ties, piping and other penetrations through the wall assembly.

B. Related Sections include the following:

1. Section 033000 – Cast-In-Place Concrete
2. Section 042300 – Reinforced Unit Masonry
3. Section 061053 – Miscellaneous Rough Carpentry
4. Section 071100 – Dampproofing
7. Section 076200 – Sheet Metal Flashing and Trim
8. Section 079000 – Joint Protection

1.2 DEFINITIONS

A. Air Barrier Assembly: The collection of air barrier materials and auxiliary materials applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.

1.3 PERFORMANCE REQUIREMENTS

A. General: Air barrier shall be capable of performing as a continuous vapor-permeable air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

B. The building envelope shall be designed and constructed with a continuous air barrier to control air leakage into, or out of the conditioned space. An air barrier shall also be provided for interior partitions between conditioned space and space designed to maintain temperature or humidity levels which differ from those in the conditioned space by more than 50% of the difference between the conditioned space and design ambient conditions. The air barrier shall have the following characteristics:

1. It must be continuous, with all joints made airtight.
2. It shall have an air permeability not to exceed 0.004 cfm/sq. ft. under a pressure differential of 0.3 in. water (1.57 psf) (equal to 0.02 L/s. x sq. m. @ 75 Pa), when tested in accordance with ASTM E2178.

3. It shall have an air permeability not to exceed 0.04 cfm/sq. ft. under a pressure differential of 0.3 in. water (1.57 psf) (equal to 0.2 L/s. x sq. m. @ 75 Pa), when tested in accordance with ASTM E2357.
3. It shall be capable of withstanding positive and negative combined design wind, fan and stack pressures on the envelope without damage or displacement, and shall transfer the load to the structure. It shall not displace adjacent materials under full load.
4. It shall be durable or maintainable.
5. The air barrier shall be joined in an airtight and flexible manner to the air barrier material of adjacent systems, allowing for the relative movement of systems due to thermal and moisture variations and creep. Connection shall be made between:

    a. Foundation and walls
    b. Walls and windows or doors
    c. Different wall systems
    d. Wall and roof
    e. Wall and roof over unconditioned space
    f. Walls, floor and roof across construction, control and expansion joints
    g. Walls, floors and roof to utility, pipe and duct penetrations

6. All penetrations of the air barrier and paths of air infiltration/exfiltration shall be made airtight.

1.4 REFERENCES

A. Reference ‘Standard General Conditions of the Construction Contract’.

B. The following standards and publications are applicable to the extent referenced in the text. The most recent version of these standards is implied unless otherwise stated.

C. American Society for Testing and Materials (ASTM)

1. ASTM C1193 Guide for Use of Joint Sealants
2. ASTM D412 Standard Test Methods for Rubber Properties in Tension
3. ASTM D570 Test Method for Water Absorption of Plastics
4. ASTM D903 Standard Test Method for Peel or Stripping Strength of Adhesive Bonds
5. ASTM D1004 Test Method for Initial Tear Resistance of Plastic Film and Sheeting
6. ASTM D1876 Test Method for Peel Resistance of Adhesives
7. ASTM D1938 Test Method for Tear Propagation Resistance of Plastic Film and Sheeting
8. ASTM D1970 Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection
9. ASTM D4258 Practice for Surface Cleaning Concrete for Coating
10. ASTM D4263 Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method
11. ASTM E96 Test Methods for Water Vapor Transmission of Materials
12. ASTM E154 Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover
13. ASTM E1186 Practice for Air Leakage Site Detection in Building Envelopes and Air Retarder Systems
14. ASTM E2178 Standard Test Method for Air Permeance of Building Materials

15. ASTM E2357 Standard Test Method for Determining Air Leakage of Air Barrier Assemblies

1.5 RELATED DOCUMENTS

A. Drawings and general provisions of Contract including 'Standard General Conditions of the Construction Contract'.

1.6 SUBMITTALS

B. Reference 'Standard General Conditions of the Construction Contract'.

C. Product Data: Submit data on product characteristics, performance criteria and limitations.

D. Manufacturer's Installation Instructions: Submit procedure for preparation and installation.

E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Comply with manufacturer's recommendations for storage and handling of each product.

1.9 WARRANTY

A. Standard Product Warranty:
1. Submit manufacturer's warranty that air & vapor barrier and accessories are free of defects at time of delivery, and are manufactured to meet manufacturer's published physical properties and material specifications.
2. Installer to warrant that air & vapor barrier and accessories have been installed in accordance with manufacturer's recommendations.

PART 2 PRODUCTS

2.01 FLUID-APPLIED, VAPOR PERMEABLE MEMBRANE AIR BARRIER

A. FLUID-APPLIED AIR BARRIER MEMBRANE: Fluid-applied, vapor permeable, acrylic membrane that cures to form a resilient, monolithic, fully bonded elastomeric membrane when applied to construction surfaces. The membrane provides superior protection against the damaging effects of air and liquid water ingress on the building structures. Perm-A-Barrier VP, as manufactured by Grace Construction Products, 62 Whittemore Avenue, Cambridge, MA, or equal. Product shall have the following minimum physical properties:

1. Substrate: Waterbourne Pressure Treated Plywood.
2. Membrane Air Permeance: ASTM E2178: Not to exceed 0.0004 cfm/sq. ft. under a pressure differential of 0.3 in. water (1.57 psf) (equal to 0.002 L/s. x sq. m. @ 75 Pa)
3. Assembly Performance: Provide a continuous air barrier assembly that has an air leakage not to exceed 0.0008 cfm/sq. ft. of surface area under a pressure differential of 0.3 in. water (1.57 psf) (equal to 0.004 L/s. x sq. m. of surface area at 75 Pa) when tested in accordance with ASTM E2357.
4. Membrane Vapor Permeance: ASTM E96, Method B: 11.2 perms
5. Peel Adhesion: ASTM D903: min. 5 pli or substrate failure to glass faced wall board, min. 20 pli to concrete/CMU

6. UV Exposure Limit: Not more than 180 calendar days

B. TRANSITION MEMBRANE: Perm-A-Barrier Detail Membrane manufactured by Grace Construction Product; a 0.9 mm (36 mils) of self-adhesive rubberized asphalt integrally bonded to 0.1 mm (4 mil) of cross-laminated, high-density polyethylene film to provide a min. 1.0 mm (40 mil) thick membrane. Membrane shall be interleaved with disposable silicone-coated release paper until installed, conforming with the following:

1. Water Vapor Transmission: ASTM E96, Method B: 0.05 perms (2.9 ng/Pa s. sq. m.) max.
2. Air Permeance at 75 Pa (0.3 in. water) pressure difference: 0.0006 L/s. sq. m (0.00012 cfm/ sq. ft.) max.
3. Puncture Resistance: ASTM E154: 178 N (40 lbs.) min.
4. Lap Adhesion at -4ºC (25ºF): ASTM D1876: 880 N/m (5.0 lbs./in.) of width
5. Low Temperature Flexibility: ASTM D1970: Unaffected to -43ºC (-45ºF)
6. Tensile Strength: ASTM D412, Die C Modified: min. 2.7 MPa (400 psi)
7. Elongation, Ultimate Failure of Rubberized Asphalt: ASTM D412, Die C: min. 200%

C. FLEXIBLE MEMBRANE WALL FLASHING: Perm-A-Barrier Wall Flashing manufactured by Grace Construction Products; a 0.8 mm (32 mils) of self-adhesive rubberized asphalt integrally bonded to 0.2 mm (8 mil) of cross-laminated, high-density polyethylene film to provide a min. 1.0 mm (40 mil) thick membrane. Membrane shall be interleaved with disposable silicone-coated release paper until installed, conforming with the following:

1. Water Vapor Transmission: ASTM E96, Method B: 0.05 perms (2.9 ng/ Pa s. sq. m.) max.
2. Water Absorption: ASTM D570: max. 0.1% by weight
3. Puncture Resistance: ASTM E154: 356 N (80 lbs.) min.
4. Tear Resistance

    a. Initiation ASTM D1004: min. 58 N (13.0 lbs.) M.D.
    b. Propagation ASTM D1938: min. 40 N (9.0 lbs.) M.D.

5. Lap Adhesion at -4ºC (25ºF): ASTM D1876: 880 N/m (5.0 lbs./in.) of width
6. Low Temperature Flexibility: ASTM D1970: Unaffected to -43ºC (-45ºF)
7. Tensile Strength: ASTM D412, Die C Modified: min. 5.5 MPa (800 psi)
8. Elongation, Ultimate Failure of Rubberized Asphalt: ASTM D412, Die C: min. 200%

D. FLEXIBLE MEMBRANE ALUMINUM FLASHING: Perm-A-Barrier Aluminum flashing manufactured by Grace Construction Products; a 0.9 mm (35 mils) of self-adhesive rubberized asphalt integrally bonded to 0.1 mm (5 mil) of aluminum film to provide a min. 1.0 mm (40 mil) thick membrane. Membrane shall be interleaved with disposable silicone-coated release paper until installed, conforming with the following:

1. Water Absorption: ASTM D570: max 0.1% by weight
2. Puncture Resistance: ASTM E154: 355N (80 lbs) min.
3. Lap Adhesion at -4ºC (25ºF): ASTM D1876 Modified: 880 N/m (5.0 lbs./in.) of width
4. Low Temperature Flexibility: ASTM D1970 Modified: Unaffected to -26ºC (-15ºF)
5. Tensile Strength: ASTM D412, Die C Modified: min. 4.1 MPa (600 Psi)
6. Elongation, Ultimate Failure of Rubberized Asphalt: ASTM D412, Die C Modified: min. 200%

2.02 PRIMERS

A. Wall Primer for Self-adhered transition membrane and Self-adhered flexible membrane wall flashing: Perm-A- Barrier WB Primer manufactured by Grace Construction Products; a water-based primer which imparts an aggressive, high tack finish on the indicated treated substrate.

1. Flash Point: No flash to boiling point
2. VOC Content: Not to exceed 10 g/L
3. Application Temperature: -4°C (25°F) and above
4. Freezing point (as packaged): -7°C (21°F)

2.03 PENETRATIONS & TERMINATION SEALANT

A. Liquid Membrane for Details and Terminations: Bituthene Liquid Membrane manufactured by Grace Construction Products; a two-part, elastomeric, trowel grade material designed for use with fluid-applied membranes, self-adhered membranes and tapes. 10 g/L max. VOC content.

B. Substrate Patching Membrane: Bituthene Liquid Membrane manufactured by Grace Construction Products; a two- part, elastomeric, trowel grade material designed for use with fluid-applied membranes, self-adhered membranes and tapes. 10 g/L max. VOC content.

C. Joint Sealant: Refer to sealant manufacturer's recommendations.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrates and conditions are ready to accept the Work of this section. Notify [engineer] [architect] [consultant] in writing of any discrepancies. Commencement of the Work or any parts thereof shall mean acceptance of the prepared substrates.

B. All surfaces must be sound, dry, clean and free of oil, grease, dirt, excess mortar or other contaminants detrimental to the adhesion of the membranes. Fill voids, gaps and spalled areas in substrate to provide an even plane. Strike masonry joints full-flush.
Curing compounds or release agents used in concrete construction must be resin based without oil, wax or pigments.

3.02 SURFACE PREPARATION

A. Refer to manufacturer's literature for requirements for preparation of substrates. Surfaces shall be sound and free of voids, spalled areas, loose aggregate and sharp protrusions. Remove contaminants such as grease, oil and wax from exposed surfaces. Remove dust, dirt, loose stone and debris. Use repair materials and methods that are acceptable to manufacturer of the fluid-applied air barrier assembly.

B. Exterior sheathing panels: Ensure that the boards are sufficiently stabilized with corners and edges fastened with appropriate screws. Pre-treat all board joints with 50 – 75 mm (2-3 in.) wide, manufacturer's recommended mesh-style wallboard tape. Gaps greater than 6 mm (1/4 in.) should be filled with mastic or caulk, allowing sufficient time to fully cure before application of the mesh-style wallboard tape and fluid applied air barrier system.

C. Masonry Substrates: Apply air and vapor barrier over concrete block and brick with smooth trowel-cut mortar joints, struck full and flush. Fill all voids and holes, particularly in the mortar joints, with a lean mortar mix, non-shrinking grout or parge coat.

D. Related Materials: Treat construction joints and install flashing as recommended by manufacturer.

E. Clean, prepare, treat, and seal substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for air barrier application.

F. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.

G. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.

H. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate patching membrane.

I. Remove excess mortar from masonry ties, shelf angles, and other obstructions.

J. At changes in substrate plane, apply sealant or Bituthene Liquid Membrane at sharp corners and edges to form a smooth transition from one plane to another.

K. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless-steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.

3.03 JOINT TREATMENT

A. Concrete and Masonry: Prepare, treat, rout, and fill joints and cracks in substrate according to ASTM C1193 and air barrier manufacturer's written instructions. Remove dust and dirt from joints and cracks complying with ASTM D4258 before coating surfaces.

1. Prime substrate as required.

B. Gypsum Sheathing: Fill joints greater than 1/4 inch (6 mm) with sealant according to ASTM C1193 and with air barrier manufacturer's written instructions. Apply mesh-style wallboard tape to joint prior to installing fluid air barrier membrane.

3.04 AIR BARRIER MEMBRANE INSTALLATION

A. Apply air barrier membrane to achieve a continuous air barrier according to air barrier manufacturer's written instructions.

B. Apply air barrier membrane within manufacturer's recommended application temperature ranges.

C. Apply a continuous unbroken air barrier to substrates according to the following minimum thickness. Apply membrane in full contact around protrusions such as masonry ties.

1. Vapor-Permeable Membrane Air Barrier: 90-mil (2.4-mm) wet film thickness, 42~45-mil (1.2-mm) dry film thickness.

D. Do not cover air barrier until it has been tested and inspected by Owner's testing agency.

E. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air barrier components.

3.05 TRANSITION MEMBRANE INSTALLATION

A. Install strips, transition membrane, and auxiliary materials according to air barrier manufacturer's written instructions to form a seal with adjacent construction and maintain a continuous air barrier.

B. Apply primer to substrates to receive transition membrane at required rate and allow to dry. Limit priming to areas that will be covered by transition tape in same day. Re-prime areas exposed for more than 24 hours.

    1. Prime glass-fiber-surfaced gypsum sheathing not covered with air membrane material with number of prime coats needed to achieve required bond, with adequate drying time between coats.

C. Connect and seal exterior wall air barrier membrane continuously to roofing membrane air barrier, concrete below-grade structures, floor-to floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.

D. At end of each working day, seal top edge of strips and transition membrane to substrate with termination sealant.

E. Apply joint sealants forming part of air barrier assembly within sealant manufacturer's recommended application temperature ranges. Consult sealant manufacturer when sealant cannot be applied within these temperature ranges.

F. Wall Openings: Prime concealed perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply transition membrane so that a minimum of 3 inches (75 mm) of coverage is achieved over both substrates.

    1. Transition Membrane: Roll firmly to enhance adhesion.

G. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, and doors, and miscellaneous penetrations of air barrier membrane with foam sealant.

H. Repair punctures, voids, and deficient lapped seams in strips and transition membrane. Slit and flatten fish-mouths and blisters. Patch with transition membrane extending 6 inches (150 mm) beyond repaired areas in strip direction.

3.06 FIELD QUALITY CONTROL

A. Testing Agency: Owner may engage a qualified testing agency to perform tests and inspections and prepare test reports.

B. Inspections: Air barrier materials and installation are subject to inspection for compliance with requirements. Inspections may include the following:

    1. Continuity of air barrier system has been achieved throughout the building envelope with no gaps or holes
    2. Continuous structural support of air barrier system has been provided
    3. Masonry and concrete surfaces are smooth, clean and free of cavities, protrusions, and mortar droppings
    4. Site conditions for application temperature and dryness of substrates have been maintained
    5. Maximum exposure time of materials to UV deterioration has not been exceeded

6. Surfaces have been primed, if applicable
7. Laps in strips and transition membrane have complied with minimum requirements and have been shingled in the correct direction (or mastic has been applied on exposed edges), with no fish-mouths
8. Termination sealant has been applied on cut edges
9. Strips and transition membrane have been firmly adhered to substrate
10. Compatible materials have been used
11. Transitions at changes in direction and structural support at gaps have been provided.
12. Connections between assemblies (membrane and sealants) have complied with requirements for cleanliness, preparation and priming of surfaces, structural support, integrity, and continuity of seal
13. All penetrations have been sealed

C. Tests: Testing to be performed will be determined by Owner's testing agency from among the following tests:

1. Qualitative Testing: Air barrier assemblies will be tested for evidence of air leakage according to ASTM E1186.

D. Remove and replace deficient air barrier components and retest as specified above.

3.07 CLEANING AND PROTECTION

A. Protect air barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.

B. Protect air barrier from exposure to UV light and harmful weather exposure as required by manufacturer. Remove and replace main air barrier material exposed for more than 180 days.

C. Clean spills, stains, and soiling from construction that would be exposed in the completed work using cleaning agents and procedures recommended by manufacturer of affected construction.

D. Remove masking materials after installation.

END OF SECTION

SECTION 07 21 00

MISCELLANEOUS BUILDING INSULATION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract including ‘Standard General Conditions of the Construction Contract’.

1.2 SUBMITTALS

A. Reference ‘Standard General Conditions of the Construction Contract’.

B. Product Data: Submit data on product characteristics, performance criteria, limitations, and adhesives.

C. Manufacturer's Installation Instructions: Submit special environmental conditions required for installation, and installation techniques,

D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.3 SECTION INCLUDES

A. Miscellaneous insulation materials not specified in other sections.

1.4 SYSTEM DESCRIPTION

A. System performance to provide continuity of thermal barrier and vapor retarder at building enclosure elements.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Install insulation adhesives in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 INSULATION MATERIALS

A. Non-Expansive Spray Foam Insulation: Spray applied high-performance non-expansive foam insulation system:
   1. Thermal Resistance: R-3 minimum per inch, provide to seal and fill gaps at all door and window jamb rough openings, between panelized wood framing and where indicated. Provide window and door manufacture acceptance of product.

B. Sill Seal Insulation: Between concrete/wood structural floor systems and sill plates where indicated, ¼” x 3 ½” or 5 ½” as indicated, Owens Corning FoamSealR Sill Plate Gasket, or equal. Seal to concrete and wood surface front and back.

C. Bond Breaker Insulation: Between concrete slab and concrete foundations where indicated, Non-crosslinked closed cell polyethylene foam, Foamtastic, or equal. Self-seals to concrete surfaces with a strip-off top.

A. Expanded Polystyrene Insulation: Between concrete slab and grade where indicated. ASTM C578 Type VI; cellular type, conforming to the following:
   1. Board Size: 24 inch width.
   2. Board Thickness: as indicated in listed construction assemblies.
   3. Thermal Resistance: R of 5.0 per inch.
   4. Water Absorption: In accordance with ASTM D2842; 0.3 percent by volume maximum.
   5. Compressive Strength: Minimum 25 psi.
   6. Board Edges: Square edges and lap joints as indicated.

2.2 ADHESIVES

A. Adhesive: Type recommended by insulation manufacturer for application.
B. XPS Adhesive: Adhesive Type 1: Type recommended by insulation manufacturer and for specific application (adhesive may change with application)

2.3 ACCESSORIES

A. Tape: Polyester self-adhering type.

PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Verify that substrate, adjacent materials, and insulation boards are dry and ready to receive insulation and adhesive. Install all products as per manufacturer's instructions.

END OF SECTION

SECTION 07 21 19

FOAMED-IN-PLACE INSULATION

PART 1 GENERAL

1.1 SUMMARY

A. Section includes foamed-in-place insulation in roof / ceiling assemblies as indicate on the drawings, wall and roof crevices requiring thermal seal, and; and at junctions of dissimilar wall and roof materials to achieve thermal and air seal, with protective overcoat.

B. Related Sections:
1. Drawings and general provisions of Contract including ‘Standard General Conditions of the Construction Contract’.
2. Provision of waste management: Section 01 74 19, Construction Waste Management and Disposal.
3. Section 07 26 00 - Vapor Retarders.
4. Section: 07 53 00/05 - Roof insulation.

1.2 REFERENCES

A. ASTM International:
1. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
2. ASTM C1029 - Standard Specification for Spray-Applied Rigid Cellular Polyurethane Thermal Insulation.
3. ASTM D1621 - Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
4. ASTM D1622 - Standard Test Method for Apparent Density of Rigid Cellular Plastics.
5. ASTM D2482 - Standard Test Method for Surface Strength of Paper (Wax Pick Method).
6. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
7. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials.

B. Green Seal:
1. GS-11 - Product Specific Environmental Requirements.

1.3 PERFORMANCE REQUIREMENTS

A. Conform to applicable code for flame and smoke, concealment, and over coat requirements.

1.4 SUBMITTALS

A. Reference ‘Standard General Conditions of the Construction Contract’..

B. Product Data: Submit product description, insulation properties, preparation requirements, and overcoat properties.

C. Manufacturer's Installation Instructions: Submit special procedures, and perimeter conditions requiring special attention.

D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

A. Insulation Installed in Concealed Locations Surface Burning Characteristics:
   1. Foam Plastic Insulation: Maximum 75/450 flame spread/smoke developed index when tested in accordance with ASTM E84.

B. Apply label from agency approved by authority having jurisdiction to identify each foam plastic component.

C. Perform Work in accordance with State and Municipality of project location standard.

1.6 QUALIFICATIONS

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

B. Installer: Company specializing in performing Work of this section with minimum three years documented experience approved by manufacturer, and with service facilities within 100 miles of project.

1.7 PRE-INSTALLATION MEETINGS

A. Reference ‘Standard General Conditions of the Construction Contract’.

B. Convene minimum one week prior to commencing work of this section.

1.8 ENVIRONMENTAL REQUIREMENTS

A. Reference ‘Standard General Conditions of the Construction Contract’.

B. Do not install insulation when ambient temperature is lower manufacturers required minimum installation temperature.

PART 2 PRODUCTS

2.1 FOAMED-IN-PLACE INSULATION

A. Products/Manufacturer:
   1. Polyurethane: Spray applied polyurethane, ASTM D 1622, closed cell insulation, 2.5 lbs./sf density, aged (180 days) R-value of 6.2 per inch, DEMILEC HeatLoc Soy, or equal.
   2. Thermal Resistance of new Foamed-in-Place Insulation as required to supplement existing insulation systems as indicated on drawings to achieve the following minimum R-values as indicated on listed assemblies (see Drawings).
   3. Substitutions: Section 01 60 00 - Product Requirements.

B. Furnish materials in accordance with State and Municipality of project location standards.

2.2 ACCESSORIES

A. Primer: As required by insulation manufacturer for adhesion to substrate.

1. Interior Flat and Non-Flat Paints: Maximum volatile organic compound content in accordance with GS-11.

B. Type 1 Overcoat: At all Habitable and Occupiable Spaces (as defined by IBC) where exposed foam insulation is installed, provide approved Thermal Barrier: spray applied, type approved by the State Fire Marshal to provide a 15 minute thermal barrier and to achieve required flame spread/smoke developed index to separate foam plastic from interior of the building.
   1. Acceptable products:
      a. .5” or greater gypsum wallboard
      b. Cafco TB-415
      c. Cacfo TB-15
      d. Flame Seal TB
      e. TPR2 Fireshell F10E
      f. TPR2 Fireshell F1 E
      g. International Fireproof Technology Inc. DC315
   2. Install as per manufacturer’s instructions.

C. Type 2 Overcoat: At all attics and crawlspaces accessed only for service of utilities where exposed foam insulation is installed, provide approved Ignition Barrier: spray applied, type approved by the State Fire Marshal to provide a 15 minute ignition barrier and to achieve required flame spread/smoke developed index.
   1. Acceptable products:
      a. 1.5” or greater mineral fiber insulation
      b. .25” thick wood structural panel
      c. .375” or greater gypsum wallboard
      d. .016” corrosion-resistant steel
      e. Cafco TB-415
      f. Cafco TB-15
      g. Flame Seal TB
      h. Flame Control 5050A
      i. TPR2 Fireshell 1B
      j. TPR2 Fireshell F10E
      k. TPR2 Fireshell F1 E
      l. International Fireproof Technology Inc. DC315
      m. BASF Spraycoat 1920
      n. Bayseal IC
   2. Install as per manufacturer’s instructions.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify Work within construction spaces or crevices are complete prior to insulation application.

C. Verify surfaces are clean, dry, and free of matter capable of inhibiting insulation or overcoat adhesion.

3.2 PREPARATION

A. Mask and protect adjacent surfaces from over spray or dusting.

B. Apply primer as required.

3.3 INSTALLATION

A. Prime delineated substrate to receive specified components if required by manufacturer.

B. Apply insulation by spray method, to uniform monolithic density without voids.

C. Apply to achieve thermal resistances as indicated in listed individual assemblies (see drawings).

D. Apply overcoat monolithically, without voids to fully cover foam insulation, to achieve fire rating required at exposed insulation locations.

E. Patch damaged areas.

3.4 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements

B. Section 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

C. Field inspection and testing will be performed under provisions of Section 01 40 00 - Quality Requirements.

D. Inspection will include verification of insulation and overcoat thickness and density.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

A. Section 01 70 00 - Execution and Closeout Requirements: Protecting installed construction.

B. Do not permit subsequent construction Work to disturb applied insulation.

END OF SECTION

SECTION 07 26 00

VAPOR RETARDERS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes sheet and sealant materials for controlling vapor diffusion.

B. Related Sections:
1. Drawings and general provisions of Contract including ‘Standard General Conditions of the Construction Contract’.
2. Section 06 10 00 - Rough Carpentry
3. Section 03 30 00 - Cast-in-Place Concrete.
4. Section 31 21 13 - Radon Mitigation.

1.2 REFERENCES

A. ASTM International:
1. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
2. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials.

B. Green Seal:
1. GS-36 - Aerosol Adhesives.

C. Sealant, Waterproofing and Restoration Institute:
1. SWRI - Sealant Specification.

1.3 PERFORMANCE REQUIREMENTS

A. Vapor Retarder Permeance: Maximum 1 perm perms when tested in accordance with ASTM E96/E96M, desiccant method.

1.4 SUBMITTALS

A. Reference ‘Standard General Conditions of the Construction Contract’.

B. Product Data: Submit data on product characteristics, performance criteria and limitations.

C. Manufacturer's Installation Instructions: Submit procedure for preparation and installation.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with SWRI - Sealant and Caulking Guide Specification requirements for materials and installation.

1.6 SEQUENCING

A. Reference ‘Standard General Conditions of the Construction Contract’.

B. Sequence Work to permit installation of materials in conjunction with other retardant materials and seals, and air barrier assemblies specified in Section 07 27 00.

C. Do not install vapor retarder until items penetrating vapor retarder are in place.

PART 2 PRODUCTS

2.1 VAPOR RETARDERS

A. Manufacturers:
1. Raven Industries Model Vapor Block 15, or equal
2. Alumiseal Corp.
3. Fiberweb Corp.
4. Griffolyn, Reef Industries
5. Substitutions: Section 01 60 00 - Product Requirements.

2.2 COMPONENTS

A. Sheet Retarder Type 1: polyethylene film, 15 mil thick.

2.3 ACCESSORIES

A. Seam Tape: Vapor Bond Tape, by Raven Industries or other 4” wide tape approved by vapor retarder manufacturer.

B. Pipe Boots: Raven VaporBoot or other manufacturer’s supplied pipe boot.

PART 3 EXECUTION

3.1 PREPARATION

A. Remove loose or foreign matter capable of impairing adhesion.

B. Clean and prime substrate surfaces to receive adhesive and sealants.

3.2 EXISTING WORK

A. Clean and repair existing construction to provide positive and continuous seal for vapor retarders.

3.3 INSTALLATION

A. Vapor Retarder For Below Grade Locations: Secure sheet retarder Type 1 in accordance with manufacturer’s instructions and ASTM E 1643.
1. Unroll Vapor Retarder with the longest dimension parallel with the direction of the pour.
2. Lap Vapor Retarder over footings and seal to foundation walls.
3. Overlap joints 6 inches and seal with Vapor Bond Tape or other 4” wide pressure sensitive tape.
4. Seal all penetrations (including pipes) with manufacturer’s pipe boot. Seal to all penetrations in attic ceiling for lighting, and electrical items.

5. No penetration of the Vapor Retarder is allowed except for reinforcing steel and permanent utilities.
6. Repair damaged areas by cutting patches of Vapor Retarder, overlapping damaged area 6 inches and taping all four sides with Vapor Bond Tape or other 4” wide pressure sensitive tape.
7. Coordinate installation of vapor barrier with requirements for installation of 31 21 13 Radon Mitigation system.

3.4 SCHEDULES

A. Provide at all locations indicated on Drawings.

B. Below Slab: Type 1 so as to provide a complete vapor seal between foundation walls.

END OF SECTION

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SECTION 07 31 13

ASPHALT SHINGLES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Asphalt shingles.
2. Ice dam membrane.
3. Underlayment.
4. Valley protection.
5. Ridge, eave, and roof vents.
6. Metal flashings and accessories.

B. Related Sections:
1. Drawings and general provisions of Contract including ‘Standard General Conditions of the Construction Contract’.
2. Section 04 20 00 - Unit Masonry: Flashing reglets placed at vertical surfaces of masonry.
3. Section 06 10 00 - Rough Carpentry 06 15 00 - Wood Decking: Roof sheathing and framed openings.
4. Section 07 62 00 - Sheet Metal Flashing and Trim: Edge and cap flashings.
5. Section: Plumbing work projecting through roof.
6. Section: HVAC work projecting through roof.
7. Section: Electrical work projecting through roof.

1.2 REFERENCES

A. ASTM International:
1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
2. ASTM A755/A755M - Standard Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products.
3. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
4. ASTM B370 - Standard Specification for Copper Sheet and Strip for Building Construction.
5. ASTM C1371 - Standard Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers.
6. ASTM C1549 - Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer.
7. ASTM D225 - Standard Specification for Asphalt Shingles (Organic Felt) Surfaced with Mineral Granules.
8. ASTM D226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
9. ASTM D1970 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
10. ASTM D2178 - Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing.
11. ASTM D3018 - Standard Specification for Class A Asphalt Shingles Surfaced with Mineral Granules.

12. ASTM D3161 - Standard Test Method for Wind-Resistance of Asphalt Shingles (Fan-Induced Method).
13. ASTM D3462 - Standard Specification for Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules.
14. ASTM D3909 - Standard Specification for Asphalt Roll Roofing (Glass Felt) Surfaced With Mineral Granules.
15. ASTM D4586 - Standard Specification for Asphalt Roof Cement, Asbestos-Free.
16. ASTM D4869 - Standard Specification for Asphalt-Saturated Organic Felt Underlayment Used in Steep Slope Roofing.
17. ASTM D6380 - Standard Specification for Asphalt Roll Roofing (Organic Felt).
18. ASTM E108 - Standard Test Methods for Fire Tests of Roof Coverings.
19. ASTM E408 - Standard Test Methods for Total Normal Emittance of Surfaces Using Inspection-Meter Techniques.
20. ASTM E903 - Standard Test Method for Solar Absorptance, Reflectance, and Transmittance of Materials Using Integrating Spheres.
21. ASTM E1918 - Standard Test Method for Measuring Solar Reflectance of Horizontal and Low-Sloped Surfaces in the Field.
22. ASTM E1980 - Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces.
23. ASTM F1667 - Standard Specification for Driven Fasteners: Nails, Spikes, and Staples.

B. National Roofing Contractors Association:
   1. NRCA - The NRCA Steep Roofing Manual.

C. Sheet Metal and Air Conditioning Contractors:
   1. SMACNA - Architectural Sheet Metal Manual.

D. Single Ply Roofing Institute:
   1. SPRI ES-1 - Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems.

E. Underwriters Laboratories Inc.:
   1. UL 580 - Tests for Uplift Resistance of Roof Assemblies.
   2. UL 790 - Tests for Fire Resistance of Roof Covering Materials.
   3. UL 997 - Wind Resistance of Prepared Roof Covering Materials.

F. U.S. Environmental Protection Agency:
   1. ENERGY STAR - ENERGY STAR Voluntary Labeling Program.

1.3 DESIGN REQUIREMENTS

A. Low Slope Membrane Roof Edge Securement: Conform to SPRI ES-1 for wind speeds determined from applicable code.

1.4 PERFORMANCE REQUIREMENTS

A. Wind Resistance: Conform to applicable code for UL 580 wind uplift and UL 997 Wind Resistance for shingle types specified and ASTM D3161 based on class based wind velocity for project location.

1.5 SUBMITTALS

A. Reference ‘Standard General Conditions of the Construction Contract’.

B. Shop Drawings: Indicate specially configured metal flashings, jointing methods and locations, fastening methods and locations, and installation details.

C. Product Data: Submit data indicating material characteristics, performance criteria, and limitations.

D. Samples: Submit two samples of each shingle color indicating color range and finish texture/pattern; for color and texture selection.

E. Manufacturer's Installation Instructions: Submit installation criteria and procedures.

F. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

G. Inspection Report: Submit report of roof inspection verifying shingles are sealed. Indicate extent of areas that did not properly self-seal and what corrective measures were required.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with NRCA Steep Roofing Manual.

B. Roof Covering Fire Classification: Minimum Class A when tested in accordance with ASTM E108 or UL 790.

C. Apply label from agency approved by authority having jurisdiction to identify each roof assembly component.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Reference ‘Standard General Conditions of the Construction Contract’.

B. Do not install ice dam membrane and shingles when surface, ambient air, or wind chill temperatures are below 45 degrees F and minimum temperature as required by manufacturer.

1.8 WARRANTY

A. Reference ‘Standard General Conditions of the Construction Contract’.- Execution and Closeout Requirements: Product warranties and product bonds.

B. Furnish Lifetime limited transferable warranty against manufacturing defects to the consumer and a 10-year SureStart™ Protection and a 15-year Limited Wind Warranty up to 110 mph.

1.9 EXTRA MATERIALS

A. Reference ‘Standard General Conditions of the Construction Contract’. - Execution and Closeout Requirements: Spare parts and maintenance products.

B. Supply 300 sq ft of extra shingles of each color selected.

PART 2 PRODUCTS

2.1 ASPHALT SHINGLES

A. Manufacturers:
1. Certain Teed Corporation, Model: “Hatteras” Premium Asphalt Roof Shingles, or equal.
2. Substitutions: Permitted if matching complete specification.

B. Asphalt Shingles: Fiber glass mat base, ceramic-coated mineral granules tightly embedded in refined, water-resistant asphalt, two stripes of self-sealing adhesive, ASTM D 3018, Type 1, ASTM D 3462, ASTM E 108 Class A Fire Resistance, ASTM D 3161-08b, Class “F” Wind Resistance (110-mph), ASTM D 3161-03b, Class “F” Wind Resistance (110-mph), ASTM D 3161-99a, 110-mph Wind Resistance, ASTM D 7158 Class “H” Wind Resistance, Weight/Square (approx.): 235 lb., Dimensions (overall): 18" x 36", Shingles/Square: 50, Weather Exposure: 8". Color: As selected by Architect or ref exterior finish schedule on exterior elevation sheets if applicable.

2.2 COMPONENTS

A. Ice Dam Membrane, below all roofed area: ASTM D1970; self adhering polymer modified bituminous sheet material, slip resistant surface, 40 mils thick, 36 inches wide, with strippable release paper to expose adhesive surface, Ice & Water Shield manufactured by WR Grace, or pre-approved equal.

2.3 ACCESSORIES

A. Nails: ASTM F1667; standard round wire roofing nails hot dipped galvanized steel type, minimum 0.105 inch diameter shank, minimum 0.375 inch diameter head; of sufficient length to penetrate 1” into roof sheathing.

B. Plastic Cement: ASTM D4586, Asphalt type with mineral fiber components, free of toxic solvents, capable of setting within 24 hours at temperatures of 75 degrees F and 50 percent RH.

C. Lap Cement: Fibrated cutback asphalt type, recommended for use in application of underlayment, free of toxic solvents.

D. Flashing Materials:
1. Lap siding areas: Pre-Finished Aluminum Sheet: ASTM B209; 3003 alloy, H14 temper alloy and temper as required for application and finish; 0.032 inch thick; mill plain stucco embossed finish shop pre-coated with polyester silicone polyester acrylic two coat three coat fluoropolymer top coat; color as scheduled color as selected from manufacturer's standard color as selected.
2. Exposed and at masonry veneer areas: Refer to masonry specifications.

E. Drip Edge: 0.040 inch thick aluminum, 5” exposure on face of roof, pre-primed and field painted to match building trim.

F. Bituminous Paint: Acid and alkali resistant type; black color.

G. Roof Cap Flashing: Soldered copper, shape and configurations indicated.

2.4 FABRICATION

A. Form flashings to profiles indicated on Drawings, and to protect roofing materials from physical damage and shed water.

B. Form eave edge and gable edge flashing to extend minimum 2 inches onto roof and minimum 0.25 inches below sheathing.

C. Form flashing sections square and accurate to profile, in maximum possible lengths, free from distortion or defects detrimental to appearance or performance.

D. Hem exposed edges of flashings minimum 1/4 inch on underside.

E. Apply bituminous paint on concealed surfaces of flashings.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify roof penetrations and plumbing stacks are in place and flashed to deck surface.

C. Verify roof openings are correctly framed.

D. Verify deck surfaces are dry, free of ridges, warps, or voids.

3.2 PREPARATION

A. Fill knot holes and surface cracks with latex filler at areas of bonded ice dam membrane.

B. Broom clean deck surfaces under ice dam membrane and underlayment.

3.3 INSTALLATION

A. Ice Dam Membrane Installation:
   1. Provide at all locations indicated specified.
   2. Install 12” continuous strip of ice dam membrane below all eave edge and gable edge metal flashing locations.
   3. Place eave edge and gable edge metal flashings tight with fascia boards over 12” strips of ice dam protection. Weather lap joints minimum 2 inches and seal with plastic cement. Secure flange with nails at maximum 12 inches on center.
   4. Apply 4 inch wide band of plastic cement over deck flange of eave edge flashings, and embed minimum 19 inch wide strip of ice dam membrane. Place underlayment starter strip with eave edge flush with face of flashings. Secure in place. Lap ends minimum 6 inches.
   5. Apply lap cement at rate of approximately 1-1/4 gal/100 sq ft over starter strip.
   6. Starting from lower edge of starter strip, lay additional 36 inch wide strips of ice dam membrane in lap cement, to produce two ply membrane. Weather lap plies minimum 19 inches and nail in place. Lap ends minimum 6 inches. Stagger end joints of each consecutive ply.
   7. Extend eave protection membrane upslope beyond interior face of exterior wall to provide full coverage of all roof surfaces.

8. Provide (1) one addition course over at roof ridges.
9. Extend protection membrane a minimum of 18” up face of walls and on roof surface at wall/roof intersections

B. Metal Flashing and Accessories Installation:
1. Weather lap joints minimum 2 inches and seal weather tight with plastic cement.
2. Secure in place with nails. Conceal fastenings.
3. Flash and seal work weather tight, projecting through or mounted on roofing with plastic cement.

C. Asphalt Shingles Installation:
1. Place shingles in straight coursing pattern with manufacturers design weather exposure to produce double thickness over full roof area. Install double course of shingles at eaves.
2. Project first course of shingles 3/4 inch beyond fascia boards.
3. Extend shingles 1/2 inch beyond face of gable edge fascia boards.
4. Cap hips and ridges with individual shingles, maintaining manufacturer’s recommended weather exposure. Place to avoid exposed nails.
5. Cap hips and ridges with individual shingles, maintaining 5 inch weather exposure. Place to avoid exposed nails.
6. Coordinate installation of roof mounted components or items projecting through roof with weather tight placement of Counterflashings.
7. Complete installation to provide weather tight service.

3.4 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

B. Before Substantial Completion, inspect roof to verify shingles self-sealed from exposure to prevent wind uplift. Apply plastic cement to secure shingles that failed to seal. Report results of inspection and required corrective measures.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

A. Section 01 70 00 - Execution and Closeout Requirements: Protecting installed construction.

B. Do not permit traffic over finished roof surface.

END OF SECTION

SECTION 07 46 10

EXTERIOR WOOD SIDING

PART 1

PART 2 – GENERAL

2.1 SUMMARY

A. Section includes underlayment, cedar shingle siding for walls, related wood trim, flashings, accessories, and fastenings.

B. Related Sections:

1. Drawings and general provisions of Contract including 'Standard General Conditions of the Construction Contract'.
2. Section 06 10 00 - Rough Carpentry: Framing and Sheathing.
3. Section 06 10 53 – Miscellaneous Rough Carpentry
4. Section 07 19 50 - Air and Vapor Barrier.
5. Section 06 60 00 - Plastic Fabrications.
6. Section 07 90 00 - Sealants.
7. Section 09 90 00 - Paints and Coatings.

2.2 SUBMITTALS

A. Reference 'Standard General Conditions of the Construction Contract'.

B. Product Data: Submit data indicating materials, component profiles, fastening methods, jointing details, sizes, surface texture, finishes, and accessories.

2.3 QUALITY ASSURANCE

A. Lumber Grading: Certified by NIST PS 20 - American Softwood Lumber Standard.

B. Shingle Grading: Certified by QFIC.

2.4 WARRANTY

A. Furnish ten year manufacturer's warranty for deterioration of finish on prefinished siding products.

PART 3 – PRODUCTS

3.1 SIDING

A. Manufacturers:

1. Maibec
2. SBC
3. Souvebec
4. Substitutions: Permitted subject to Owner approval.

3.2 COMPONENTS

A. Cedar Shingle Siding: Eastern White Cedar, Nantucket grade, Clear, prefinished on both faces and edges with one coat of 100% acrylic Solid Color Factory Finish, Maibec or equal.

B. Board Trim: Refer to 06 60 00 Plastic Fabrications.

3.3 ACCESSORIES

A. Nails: Stainless steel type, non-staining, ring shank, blunt tip with minimum 7/32” head

1. Shingle Siding Nails: Minimum 14.5 gauge; length required to penetrate support minimum 5/8”, but not more than 3/4”.

B. Siding Underlayment: Three dimensional matrix, 6mm nylon; Home Slicker, manufactured by Benjamin Obdyke.

C. Flashings: 0.040 inch aluminum, mill finish.

3.4 FIELD TOUCHUP

A. Pre-finish Cedar siding: 100% acrylic Type Solid Color finish provided by manufacturing, color as selected.

PART 4 – EXECUTION

4.1 INSTALLATION

A. Install flashings sealed to wall sheathing behind Cedar Breather.

B. Install Cedar Breather on new walls in accordance with manufacturer’s instructions.

C. Install wood siding in accordance with manufacturer’s instructions and installation guidelines for 6” exposure.

D. Nail siding through underlayment into solid backing. Double layer first course.

E. Install siding and trim for natural watershed, align level and plumb.

F. Install metal flashings at internal and external corners.

G. Install corner strips, closures and trim.

H. Install sealant to prevent weather penetration. Maintain neat appearance.

I. Touch-up damaged prefinished paint surfaces with factory supplied finish.

…END OF SECTION 07 46 00

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SECTION 07 62 00

SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.1 SUMMARY

A. Section includes flashings and counter flashings, sheet metal roofing trim, roof edge flashing and trim, window flashing and trim and other fabricated sheet metal items as indicated within the drawings.

B. Related Sections:

1. Drawings and general provisions of Contract including 'Standard General Conditions of the Construction Contract'.Section 06 10 00 - Rough Carpentry: Wood blocking for metal roofing substrate profiles and roof edge/parapet framing.
2. Section 07 90 00 - Joint Protection.

1.2 REFERENCES

A. American Architectural Manufacturers Association:
1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.
2. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
3. AAMA 2604 - Voluntary specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
4. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.

B. ASTM International:
1. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
2. ASTM A625/A625M - Standard Specification for Tin Mill Products, Black Plate, Single Reduced.
3. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
4. ASTM A755/A755M - Standard Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products.
5. ASTM B32 - Standard Specification for Solder Metal.
6. ASTM B101 - Standard Specification for Lead-Coated Copper Sheet and Strip for Building Construction.
7. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
8. ASTM B370 - Standard Specification for Copper Sheet and Strip for Building Construction.
9. ASTM B749 - Standard Specification for Lead and Lead Alloy Strip, Sheet, and Plate Products.

10. ASTM D226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
11. ASTM D4397 - Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications.
12. ASTM D4586 - Standard Specification for Asphalt Roof Cement, Asbestos-Free.

C. Copper Development Association Inc.:
1. CDA - Copper in Architecture - Handbook.

D. Federal Specification Unit:
1. FS TT-C-494 - Coating Compound, Bituminous, Solvent Type, Acid Resistant.

E. Sheet Metal and Air Conditioning Contractors:
1. SMACNA - Architectural Sheet Metal Manual.

1.3 DESIGN REQUIREMENTS

A. Sheet Metal Flashings: Conform to the following criteria of SMACNA "Architectural Sheet Metal Manual" and Copper Development Association "Copper in Architecture – Handbook”.

B. Maintain one copy of each document on site.

1.4 SUBMITTALS

A. Reference ‘Standard General Conditions of the Construction Contract’.

B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

C. Product Data: Submit data on manufactured components metal types, finishes, and characteristics.

D. Samples:
1. Submit two samples 6x6 inch in size illustrating metal finish color.

1.5 QUALIFICATIONS

A. Fabricator and Installer: Company specializing in sheet metal work with minimum three years experience.

1.6 PRE-INSTALLATION MEETINGS

A. Reference ‘Standard General Conditions of the Construction Contract’..

B. Convene minimum one week prior to commencing work of this section.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Reference ‘Standard General Conditions of the Construction Contract’.Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

B. Prevent contact with materials causing discoloration or staining.

1.8 COORDINATION

A. Reference ‘Standard General Conditions of the Construction Contract’.

B. Coordinate with Work of Sections:
1. 06 10 00 Rough Carpentry
2. 06 10 53 Miscellaneous Rough Carpentry
3. 06 20 00 Finish Carpentry
4. 06 60 00 Plastic Fabrications
5. 07 46 10 Exterior Wood Siding
6. 08 54 13 All Fiberglass Windows

PART 2 PRODUCTS

2.1 SHEET METAL FLASHING AND TRIM

A. Manufacturers:
1. Centria
2. Cheney Flashing Co.
3. Keystone Flashing Co.
4. Metl-Span
5. Substitutions: Section 01 00 00 - Basic Requirements.

B. Pre-Finished Aluminum Sheet: ASTM A755/A755M; structural aluminum sheet, minimum 0.040 thicknesses or as indicated within the drawings or increased thickness as required to avoid waving and oil-canning effects, shop pre-coated with fluoropolymer top coating; color as scheduled by architect from manufacturer's standard color line.

C. Copper Sheet: ASTM B370; H00 temper, 24 gauge (16 oz/sq ft); natural ASTM-B152 finish, cut and mechanically broken and formed as indicated with soldered joints to protect substrate.

A. Solder: ASTM B32; type suitable for application and material being soldered.

2.2 ACCESSORIES

A. Fasteners: Same as material and finish as flashing metal.

B. Underlayment: ASTM D226; Type II, No. 30 unperforated asphalt felt.

C. Primer: Zinc molybdate or Galvanized iron type.

D. Sealant: Type E butyl sealant specified in Section 07 90 00.

E. Reglets: Surface mounted, galvanized steel.

F. Solder: ASTM B32; type suitable for application and material being soldered.

2.3 FABRICATION

A. Form sections shape indicated on Drawings, accurate in size, square, and free from distortion or defects.

B. Conform to all SMACNA recommendations and best practices for indicated installation.

C. Provide water tight expansion joints per SMACNA recommendations and best practices.

D. Fabricate cleats of same material as sheet metal, interlocking with sheet.

E. Form pieces in longest possible lengths.

F. Hem exposed edges on underside 1/2 inch; miter and seam corners.

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

H. Fabricate corners from one piece with minimum 24 inch long legs; seam or solder for rigidity, seal with sealant.

I. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.

J. Fabricate flashings to allow toe to extend 2 inches over roofing. Return and brake edges.

K. Fabricate gutters to rectangular profile. Profile and size indicated within the drawings.

L. Fabricate downspouts to profile and size specified in Design Requirements Article of this Section.

M. Seal metal joints.

2.4 FACTORY FINISHING

A. Fluoropolymer Coating: Multiple coat as specified for sheet metal system, thermally cured, conforming to AAMA 2604 and AAMA 2605.

B. Washcoat: Finish concealed side of metal sheets with washcoat compatible with finish system, as recommended by finish system manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

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

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

3.2 PREPARATION

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

B. Install surface mounted reglets to lines and levels indicated on Drawings. Seal top of reglets with sealant.

C. Paint concealed metal surfaces with protective backing paint to minimum dry film thickness of 15 mil.

3.3 INSTALLATION

A. Insert flashings into reglets to form tight fit. Secure in place with plastic wedges. Pack remaining spaces with lead wool. Seal flashings into reglets with sealant.

B. Secure flashings in place using concealed fasteners to greatest extent practicable. Use exposed fasteners only where pre-approved.

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

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

E. Seal metal joints watertight.

F. Solder metal joints for full metal surface contact. After soldering, wash metal clean with neutralizing solution and rinse with water.

G. Secure gutters and downspouts in place using concealed fasteners.

H. Slope gutters minimum 1/4 inch per foot.

I. Connect downspouts to downspout boots, downspout shoes and storm water system. Seal connection watertight.

J. Seal metal joints watertight.

3.4 FIELD QUALITY CONTROL

A. Section 01 70 00 - Contract Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

B. Inspection will involve surveillance of Work during installation to ascertain compliance with specified requirements.

END OF SECTION

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SECTION 07 90 00

JOINT PROTECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section includes sealants and joint backing, and accessories.

B. Related Sections:
1. Drawings and general provisions of Contract including 'Standard General Conditions of the Construction Contract'.
2. Section 06 60 00 - Plastic Fabrications
3. Section 07 26 00 - Vapor Retarders: Sealants required in conjunction with vapor retarders.
4. Section 07 27 00 - Air and Vapor Barriers: Sealants required in conjunction with air barriers.
5. Section 07 46 10 – Wood Siding
6. Section 07 50 00 – Air Sealing
7. Section 08 11 13 – Steel Doors and Frames
8.

1.2 REFERENCES

A. ASTM International:
1. ASTM C834 - Standard Specification for Latex Sealants.
2. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications.
3. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
4. ASTM C1193 - Standard Guide for Use of Joint Sealants.
5. ASTM D1056 - Standard Specification for Flexible Cellular Materials-Sponge or Expanded Rubber.
6. ASTM D1667 - Standard Specification for Flexible Cellular Materials-Vinyl Chloride Polymers and Copolymers (Closed-Cell Foam).
7. ASTM D2628 - Standard Specification for Preformed Polychloroprene Elastomeric Joint Seals for Concrete Pavements.

B. South Coast Air Quality Management District:
1. SCAQMD Rule 1168 - Adhesive and Sealant Applications.

1.3 SUBMITTALS

A. Reference 'Standard General Conditions of the Construction Contract'.

B. Products Data: Submit data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.

C. Samples: Submit two samples illustrating sealant colors for selection.

D. Manufacturer's Installation Instructions: Submit special procedures, surface preparation, and perimeter conditions requiring special attention.

E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

F. Warranty: Include coverage for installed sealants and accessories failing to achieve airtight seal, watertight seal, exhibit loss of adhesion or cohesion, and sealants which do not cure.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with State and Municipality standards.

B. Maintain one copy of each document on site.

1.5 QUALIFICATIONS

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

B. Applicator: Company specializing in performing Work of this section with minimum three years documented experience, and approved by manufacturer.

1.6 MOCKUP

A. Reference ‘Standard General Conditions of the Construction Contract’.

B. Construct mockup of sealant joints in conjunction with window, wall, mockups specified in other sections.

C. Construct mockup with specified sealant types and with other components noted.
   1. Determine preparation and priming requirements based on manufacturers recommendations; take action necessary for correction of failure of sealant tests on mock-up.
   2. Verify sealants, primers, and other components do not stain adjacent materials.

D. Locate where directed by Architect/Engineer. where indicated on Drawings.

E. Incorporate accepted mockup as part of Work.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Reference ‘Standard General Conditions of the Construction Contract’.

B. Maintain temperature and humidity recommended by sealant manufacturer during and after installation.

1.8 COORDINATION

A. Reference ‘Standard General Conditions of the Construction Contract’.

B. Coordinate Work with sections referencing this section.

PART 2 PRODUCTS

2.1 JOINT SEALERS AND SEALANT SCHEDULE

A. Manufacturers:
   1. Dow Corning Corp.
   2. GE Silicones.
   3. Pecora Corp.
   4. Sika Corp. .
   5. Tremco Sealants & Waterproofing.
   6. Substitutions: Section 01 60 00 - Product Requirements Permitted.

B. Type A - General Purpose Exterior Sealant: Polyurethane; ASTM C 920, Grade NS, Class 25, Uses NT, M, G, A and O; single component; Sonneborn Sonolastic NP 1, or equal.
   1. Color as selected.
   2. Applications: Use for:
      a. Joints between concrete and other materials.
      b. Joints between brick and other materials.
      c. Joints between metal frames and other materials.
      d. Joints between siding and other materials.
      e. Joints between exterior wall wood framing members, including studs, plates, band joists.
      f. Other exterior joints for which no other sealant is indicated.

C. Type B - Exterior Metal Lap Joint Sealant: Butyl or polyisobutylene, ASTM C 1311, nondrying, non-skinning, non-curing; DAP Butyl-Flex, or equal.
   1. Applications: Use for:
      a. Concealed sealant bead in sheet metal work.
      b. Bedding for door thresholds.

D. Type C - General Purpose Interior Sealant: Siliconized Acrylic emulsion latex; ASTM C834, single component, paintable; DAP Alex Plus, or equal.
   1. Colors as selected.
   2. Applications: Use for:
      a. Interior wall and ceiling control joints.
      b. Interior joints between door and window frames and wall surfaces.
      c. Other interior joints for which no other type of sealant is indicated.

E. Type D - Bathtub/Tile Sealant: White silicone; ASTM C920, Uses NT, G and A; single component, mildew resistant; Sonneborn Sonolastic Omniplus, or equal.
   1. Applications: Use for:
      a. Joints between plumbing fixtures and floor and wall surfaces.
      b. Joints between kitchen and bath countertops and wall surfaces.

F. Type E - Acoustical Sealant: Butyl or acrylic sealant; ASTM C920, Grade NS, Class 12-1/2, Uses M and A; single component, solvent release curing, non-skinning.
   1. Applications: Use for concealed locations only:
      a. Sealant bead between top stud plate and structure and between bottom stud plate and floor.

G. Type F - Interior Floor Joint Sealant: Polyurethane, self-leveling; ASTM C920, Grade P, Class 25, Uses T, M and A; single component; Sonneborn Sonolastic SL1, or equal.

1. Colors as selected.
2. Applications: Use for:
   a. Expansion joints in floors.

H. Type G - Concrete Paving Joint Sealant: Polyurethane, self-leveling; ASTM C920, Class 25, Uses T, M and A; single component; Sonneborn Sonolastic SL1, or equal.
1. Color as selected.
2. Applications: Use for:
   a. Joints in sidewalks and vehicular paving.

I. Type H – Insulating Foam Sealant: Latex foam sealant, non expanding, paintable; DAPtex Plus, or equal.
1. Applications: Use for concealed locations only:
   a. Joints around windows and doors in exterior walls.

J. Type I – Elastomeric Latex Sealant: Acrylic polymer sealant, ASTM C 920, Type S, Grade NS, Class 25, low odor, mildew resistant, paintable; DAP Dynaflex 230, or equal.
1. Applications: Use for concealed locations only:
   a. Joints between exterior extruded polystyrene insulation boards.

2.2 ACCESSORIES

A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
1. Interior Sealants and Sealant Primers: Maximum volatile organic compound content in accordance with SCAQMD Rule 1168.

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

C. Joint Backing: Round foam rod compatible with sealant; ASTM D1056, sponge or expanded rubber D1667, closed cell PVC; oversized 30 to 50 percent larger than joint width.

D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify substrate surfaces and joint openings are ready to receive work.

C. Verify joint backing and release tapes are compatible with sealant.

3.2 PREPARATION

A. Remove loose materials and foreign matter impairing adhesion of sealant.

B. Clean and prime joints.

C. Perform preparation in accordance with ASTM C1193.

D. Protect elements surrounding Work of this section from damage or disfiguration.

3.3 INSTALLATION

A. Perform installation in accordance with ASTM C1193.

B. Perform acoustical sealant application work in accordance with ASTM C919.

C. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.

D. Install bond breaker where joint backing is not used.

E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

F. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

G. Tool joints concave. as detailed.

H. Precompressed Foam Sealant: Do not stretch; avoid joints except at corners, ends, and intersections; install with face 1/8 to 1/4 inch below adjoining surface.

I. Compression Gaskets: Avoid joints except at ends, corners, and intersections; seal joints with adhesive; install with face 1/8 to 1/4 inch below adjoining surface.

3.4 CLEANING

A. Section 01 70 00 - Execution and Closeout Requirements: Final cleaning.

B. Clean adjacent soiled surfaces.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

A. Section 01 70 00 - Execution and Closeout Requirements: Protecting installed construction.

B. Protect sealants until cured.

3.6 SCHEDULE

A. Provide Sealants where indicated on drawings and as per 2.1 JOINT SEALERS AND SEALANT SCHEDULE (above).

END OF SECTION

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08 10 00 DOOR AND FRAME SCHEDULE

NOTE: REFER TO NOTES AT END OF SCHEDULE

		Inches			Door Panel (Re: Plans)		Door Frame (Re: Plans)		Hardware (Re: 08 70 00)			
No.	**Location**	**W**	**H**	**T**	**Type**	**Material / Core**	**Type**	**Material / Casing**	**Function**	**Accessories**	**Label**	**Notes**
PUBLIC AREA DOORS												
First Level Doors												
101A	Pass-Through (West Side) OHD	104	96	MO	-	OGSCSD	-	N/A	Manual Chain Hoist	As specified		Door Size Dimension are for the Masonry Opening (MO)
101B	Pass-Through (East Side) OHD	104	96	MO	-	OGSCSD	-	N/A	Manual Chain Hoist	As specified		Door Size Dimension are for the Masonry Opening (MO)
102	Changing Room 102	36	84	1 3/4	F1	FPGSD	1A	SSSF	Privacy Lock 1	Weatherstripping, Kickplate, Threshold 2, Closer, Brush Sweep		
103	Changing Room 103	36	84	1 3/4	F1	FPGSD	1A	SSSF	Privacy Lock 2	Weatherstripping, Kickplate, Threshold 2, Closer, Brush Sweep		
104	Changing Room 104	36	84	1 3/4	F1	FPGSD	1A	SSSF	Privacy Lock 3	Weatherstripping, Kickplate, Threshold 2, Closer, Brush Sweep		
105	Changing Room 105	36	84	1 3/4	F1	FPGSD	1A	SSSF	Privacy Lock 4	Weatherstripping, Kickplate, Threshold 2, Closer, Brush Sweep		
106	Changing Room 106	36	84	1 3/4	F1	FPGSD	1A	SSSF	Privacy Lock 5	Weatherstripping, Kickplate, Threshold 2, Closer, Brush Sweep		
107	First Aid 107	36	84	1 3/4	FG1	FPGSD	1A	SSSF	Classroom 1	Weatherstripping, Threshold 2, Closer, kickplate		
108A	Lifeguard Storage (from First Aid)	36	84	1 3/4	F3.1	FPGSD	2	SSSF	Storeroom 1	Edge Sealing, Threshold 1, Closer, Kickplate	45 min	
108B	Lifeguard Storage Entrance OHD	80	88	MO	-	OGSCSD	-	N/A	Manual Chain Hoist	Threshold 02, As specified		Door Size Dimension are for the Masonry Opening (MO)
109	Men's Room Entry	36	84	1 3/4	F3	FPGSD	1A	SSSF	Store/Utility 1	Weatherstripping, Kickplate, Threshold 2, Closer, Hands Free Door Opener, Brush Sweep		
111	Janitor 111	28	84	1 3/4	F1	FPGSD	1A	SSSF	Storeroom 2	Kickplate, Door Silencers		
112	Mechanical 112	28	84	1 3/4	F1	FPGSD	1A	SSSF	Storeroom 1	Weatherstripping, Kickplate, Threshold 1, closer		
113	Women's Room Entry 113	36	84	1 3/4	F3	FPGSD	1A	SSSF	Store/Utility 1	Weatherstripping, Kickplate, Threshold 2, Closer, Hands Free Door Opener, Brush Sweep		
115	Janitor 115	36	84	1 3/4	F1	FPGSD	1A	SSSF	Storeroom 2	Kickplate, Door Silencers		
116	Year Round ADA Toilet 116	36	84	1 3/4	F2	TBFPGSD	1B	TBSSF	Privacy Lock 5	Weatherstripping, Kickplate, Threshold 3, Closer, Brush Sweep		Thermally Broken Door System
117	Mechanical 117	28	84	1 3/4	F2	TBFPGSD	1B	TBSSF	Storeroom 1	Weatherstripping, Kickplate, Threshold 3, closer		Thermally Broken Door System

Door and Frame Abbreviations

FPGSD	Flat Panel G90 Glavanized Steel	Provide:	Factory Primed, field painted finish 6 sides, Hardware as Scheduled
TBFPGSD	Thermally Broken Insulated Flat Panel G90 Glavanized Steel	Provide:	Factory Primed, field painted finish 6 sides, Hardware as Scheduled
SSSF	Standard 316 Stainless Steel Frame	Provide:	Unfinished standard frame where scheduled.
TBSSF	Thermally Broken Insulated 316 Stainless Steel Frame	Provide:	Unfinished thermally broken frame where scheduled.
OGSCSD	Overhead Galvanized Steel Coiling Service Door	Provide:	Provide and Install as specified.

Notes:
1. Provide concave wall mounted door stops (Wall Stop) at all doors opening against an adjacent wall or door.
2. See Floor Plans for dool location, swing and layout
3. Provide silencers at all doors with closers not equipped with weatherstipping.
4. Grout all Welded SS Frames with 2" Jambs and 4" Heads solid to masonry opening. Provide masonry anchors.

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SECTION 08 11 13

STEEL DOORS AND FRAMES

1 PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of contract including 'Standard General Conditions of the Construction Contract'.

1.2 SECTION INCLUDES

A. Steel doors panels and frames; non-rated and fire rated

1.3 SUBMITTALS

A. Reference 'Standard General Conditions of the Construction Contract'.

B. Shop Drawings: Indicate door and frame elevations, internal reinforcement, cut-outs for glazing, and finishes.

C. Product Data: Indicate door and frame configurations, location of cut-outs for hardware reinforcement.

1.4 QUALITY ASSURANCE

A. Conform to the following:

1. SDI-100 - Standard Steel Doors and Frames.
2. DHI - Door Hardware Institute - The Installation of Commercial Steel Doors and Steel Frames, Insulated Steel Doors in Wood Frames and Builder's Hardware.
3. Fire Rated Door Panel and Frame Construction: ASTM E152. NFPA 252. UL 10B. NFPA 80.
4. Handicapped: ANSI A117.1, ADA.

B. Warranty: 10 year warranty against defects in materials and workmanship.

2 PART 2 PRODUCTS

2.1 DOORS AND FRAMES

A. Manufacturers:

1. Amweld Building Products
2. Brockway Smith Co.; BROSCO Perma-Door Royal
3. Ceco Door Products
4. Curries Co
5. Flemming Door Products
6. General Products Co. Inc.; Benchmark

7. Lake Shore Industries Inc.; Therma-Tru
8. Peachtree Doors Inc.; Avanti
9. Pease Doors Inc.; Ever-Strait
10. Republic Builders Products
11. Stanley Works
12. Steelcraft Manufacturing

B. Exterior Frames: Welded 16 gauge, ANSI/SDI A250.8 Type 316 stainless steel, closed and tight mitered corners, weather stripping, door silencers, masonry anchors, prepped to be grouted solid and receive scheduled hardware. Provide Type 316 stainless steel interior components. Thermally broken where scheduled.

C. Interior Frames: Welded 16 gauge, stainless steel, weather stripping, door silencers, masonry anchors, prepped to be grouted solid and receive scheduled hardware.

D. Exterior Doors: (Insulated) 1-3/4" thick, level 2, heavy duty, embossed design, galvanized to ASTM A653 G90, factory primed to be field finished (painted). Thermally broken where scheduled.

E. Interior Doors: (Insulated) 1-3/4" thick, level 2, heavy duty, embossed design, galvanized to ASTM A653 G90, factory primed to be field finished (painted).

F. Door Core:

1. Exterior/Interior Doors: polyurethane foam.

2.2 ACCESSORIES

A. Vents: 24"x24" integral vent galvanized to ASTM A653 G90, factory primed to be field finished (painted).

B. Silencers: Resilient rubber fitted into drilled hole.

C. Weatherstripping; Integral compression type at jambs and head, bulb and fin at bottom.

D. Primer: Zinc chromate type.

2.3 FABRICATION - DOORS

A. Astragals for Double Doors (If required): Aluminum, T shaped, specifically for double doors. Provide units with fire rating at fire rated double doors.

B. Fabricate doors with hardware reinforcement welded in place.

C. Attach appropriate label to each fire rated door. DO NOT PAINT OVER LABELS.

2.4 FABRICATION - FRAMES

A. Fabricate steel frames welded for grout in place installation.

B. Fabricate frames with hardware reinforcement plates welded in place.

C. Prepare frame for silencers and install.

D. Attach appropriate label to each fire rated frame.

2.5 FINISH

A. Stainless Steel: Smooth finish.

B. Steel Sheet: Galvanized to ASTM A525 G90.

C. Primer: Air dried.

3 PART 3 EXECUTION

3.1 INSTALLATION

A. Install doors and frames in accordance with SDI-100.

B. Coordinate installation of doors and frames with installation of hardware specified in Section 08 71 00.

C. Coordinate with gypsum board wall construction for frame anchor placement.

D. Install door louvers plumb and level.

3.2 TOLERANCES

A. Maximum Diagonal Distortion: 1/8 inch measured with straight edge, corner to corner.

…END OF SECTION 08 11 13

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SECTION 08 33 00

OVERHEAD COILING SERVICE DOORS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Overhead coiling service doors.

1.2 RELATED SECTIONS

A. Section 05500 - Metal Fabrications: Support framing and framed opening.

B. Section 06200 - Finish Carpentry: Wood jamb and head trim.

C. Section 08710 - Door Hardware: Product Requirements for cylinder core and keys.

D. Section 09900 - Painting: Field applied finish.

E. Section 16130 - Raceway and Boxes: Conduit from electric circuit to door operator and from door operator to control station.

F. Section 16150 - Wiring Connections: Power to disconnect.

1.3 REFERENCES

A. Reference ‘Standard General Conditions of the Construction Contract’.

B. NFRC 102 - Test Procedure for Measuring the Steady-State Thermal Transmittance of Fenestration Systems.

C. ASTM E 90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Element.

D. ASTM E 330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.

E. ASTM A 653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

F. ASTM A 666 - Standard Specification for Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.

G. ASTM A 924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.

H. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

I. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

J. NEMA MG 1 - Motors and Generators.

1.4 DESIGN / PERFORMANCE REQUIREMENTS

A. Overhead coiling service doors:
   1. Wind Loads: Design door assembly to withstand wind/suction load of 20 psf (958 Pa) without damage to door or assembly components.
   2. Operation: Design door assembly, including operator, to operate for not less than 20,000 cycles.

B. Single-Source Responsibility: Provide doors, tracks, motors, and accessories from one manufacturer for each type of door. Provide secondary components from source acceptable to manufacturer of primary components.

C. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories, Inc. acceptable to authority having jurisdiction as suitable for purpose specified.

1.5 SUBMITTALS

A. Reference ‘Standard General Conditions of the Construction Contract’.

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. Details of construction and fabrication.
   4. Installation instructions.

C. Shop Drawings: Include detailed plans, elevations, details of framing members, anchoring methods, required clearances, hardware, and accessories. Include relationship with adjacent construction.

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) long, representing actual product, color, and patterns.

F. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

G. Operation and Maintenance Data: Submit lubrication requirements and frequency,

and periodic adjustments required.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in performing Work of this section with a minimum of five years experience in the fabrication and installation of security closures.

B. Installer Qualifications: Installer Qualifications: Company specializing in performing Work of this section with minimum three years and approved by manufacturer.

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

1.7 DELIVERY, STORAGE, AND HANDLING

A. Reference ‘Standard General Conditions of the Construction Contract’.

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

C. Protect materials from exposure to moisture. Do not deliver until after wet work is complete and dry.

D. Store materials in a dry, warm, ventilated weathertight location.

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 COORDINATION

A. Coordinate Work with other operations and installation of adjacent materials to avoid damage to installed materials.

1.10 WARRANTY

A. Warranty: Manufacturer's limited door and operator system, except the counterbalance spring and finish, to be free from defects in materials and workmanship for 3 years or 20,000 cycles, whichever occurs first.

B. Warranty: Manufacturer's limited door warranty for 2 years for all parts and components.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Overhead Door Corp., 2501 S. State Hwy. 121, Suite 200, Lewisville, TX 75067. ASD. Tel. Toll Free: (800) 275-3290. Phone: (469) 549-7100. Fax: (972) 906-1499. Web Site: www.overheaddoor.com. E-mail: info@overheaddoor.com.

B. Substitutions: Not permitted.

C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 OVERHEAD COILING SERVICE DOORS

A. Industrial Doors: Overhead Door Corporation, Model 610 Service Doors.
   1. Curtain: Interlocking roll-formed slats as specified following. Endlocks shall be attached to each end of alternate slats to prevent lateral movement.
      a. Flat profile type F-265 for doors up to 18 feet 4 inches (5.59 m) wide, fabricated of:
         1) 18 gauge galvanized steel.
   2. Finish:
      a. Galvanized Steel: Slats and hood galvanized in accordance with ASTM A 653 and receive rust-inhibitive, roll coating process, including 0.2 mils thick baked-on prime paint, and 0.6 mils thick baked-on polyester top coat.
         1) Powder coat: PowderGuard
            (a) PowderGuard Premium: Weather resistant polyester powder coat color as indicated in Exterior Finish Legend.
   3. Weatherseals:
      a. Vinyl bottom seal.
      b. Guide weatherseal.
   4. Bottom Bar:
      a. Two galvanized steel angles.

5. Guides: Three structural steel angles.
   a. Finish: PowderGuard Weathered finish with iron/black powder.
6. Brackets:
   a. Galvanized steel to support counterbalance, curtain and hood.
7. Counterbalance: Helical torsion spring type housed in a steel tube or pipe barrel, supporting the curtain with deflection limited to 0.03 inch per foot of span. Counterbalance is adjustable by means of an adjusting tension wheel.
8. Hood:
   a. 24 gauge galvanized steel with intermediate supports as required.
9. Manual Operation:
   a. Manual push up for doors up to 96 SF.
11. Windload Design:
   a. Standard windload shall be 20 PSF.
12. Locking:
   a. Activated cylinder locking, lateral slide bars for manual operattion and locking from the exterior.
13. Wall Mounting Condition:
   a. Face-of-wall mounting (see plan details).
14. Vision Lites: Provide with 3 inch by 5/8 inch (76 mm by 16 mm) uniformly spaced openings.
   a. Provide open with no cover.
   b. Provide with Plexiglas covers over openings.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify opening sizes, tolerances and conditions are acceptable.

B. Examine conditions of substrates, supports, and other conditions under which this work is to be performed.

C. 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 surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.

C. Securely and rigidly brace components suspended from structure. Secure guides to structural members only.

D. Fit and align assembly including hardware; level and plumb, to provide smooth operation.

E. Coordinate installation of electrical service with Section 16150. Complete wiring from disconnect to unit components.

F. Coordinate installation of sealants and backing materials at frame perimeter as specified in Section 07900.

G. Install perimeter trim and closures.

H. Instruct Owner's personnel in proper operating procedures and maintenance schedule.

3.4 ADJUSTING

A. Test for proper operation and adjust as necessary to provide proper operation without binding or distortion.

B. Adjust hardware and operating assemblies for smooth and noiseless operation.

3.5 CLEANING

A. Clean curtain and components using non-abrasive materials and methods recommended by manufacturer.

B. Remove labels and visible markings.

C. Touch-up, repair or replace damaged products before Substantial Completion.

3.6 PROTECTION

A. Protect installed products until completion of project.

END OF SECTION

SECTION 08 54 13

ALL FIBERGLASS WINDOWS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. All Fiberglass double hung and awning windows complete with hardware, glazing, weather strip, insect screen, and standard or specified anchors, trim and attachments.

1.2 RELATED SECTIONS

A. Related Sections:

1. Drawings and general provisions of Contract including 'Standard General Conditions of the Construction Contract'.
2. Section 06 10 53 – Miscellaneous Rough Carpentry
3. Section 07 90 00—Joint Sealants: Sill sealant and perimeter caulking.

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. E 283: Standard Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors.
2. E 330: Standard Test Method for Structural Performance of Exterior Windows, Curtains Walls, and Doors by Uniform Static Air Pressure Difference.
3. E 547: Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Cyclic Static Air Pressure Differential.
4. E 774: Specification for Sealed Insulated Glass Units.
5. C 1036: Standard Specification for Flat Glass.
6. E 2190: Standard Specification for Insulating Glass Unit Performance Evaluation.

B. Sealed Insulating Glass Manufactures Association / Insulating Glass Certification Council (SIGMA / IGCC).

C. American Architectural Manufacturers Association / Window and Door Manufacturers Association (AAMA / WDMA):
1. ANSI/AAMA/NWWDA 101 / I.S.2-97: Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors.
2. 101/I.S. 2/NAFS-02: Voluntary Performance Specification for Windows, Skylights and Glass Doors/

D. Window and Door Manufacturers Association (WDMA): Hallmark Certification Program.

E. American Architectural Manufacturers Association (AAMA): 613: Voluntary Performance Requirements and Test Procedures for Organic Coatings on Plastic Profiles.

F. National Fenestration Rating Council (NFRC): 101: Procedure for Determining Fenestration Product Thermal Properties.

1.4 SYSTEM DESCRIPTION

A. Design and Performance Requirements:
   1. Window units shall be designed to comply with ANSI / AAMA / NWWDA 101 / I.S.2-97 and 101 / I.S. 2/ NAFS-02
      a. Double Hung: (H-LC50)
   2. Air leakage shall not exceed the following when tested at 1.57 according to ASTM E 283: .0.3 cfm per square foot of frame.
   3. No water penetration shall occur when units are tested at the following pressure according to ASTM E 547:
      a. Double Hung: (H-LC50 – 7.5 psf)
      b. Awning: (AP-LC40 – 6 psf)
   c. Units shall be designed to comply with ASTM E330 for structural performance when tested at the following pressures:
      a. Double Hung: (H-LC-50 - 75 psf)
      b. Awning: (AP-LC40 – 75 psf)

1.5 SUBMITTALS

A. Reference ‘Standard General Conditions of the Construction Contract’.

B. Product Data: Submit data on product characteristics, performance criteria and limitations.

C. Manufacturer's Installation Instructions: Submit procedure for preparation and installation.

D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.7 QUALITY ASSURANCE

A. N/A.

1.8 DELIVERY

A. Reference ‘Standard General Conditions of the Construction Contract’.

B. Deliver in original packaging and protect from weather.

1.9 STORAGE AND HANDLING

A. Prime or seal wood surfaces, including surface to be concealed by wall construction, if more than thirty (30) days will expire between delivery and installation.

B. Store window units in an upright position in a clean and dry storage area above ground and protect from weather under provisions of Section 01 66 00.

1.10 WARRANTY

A. Windows shall be warranted to be free from defects in manufacturing, materials, and workmanship for a period of ten (10) years from purchase date.

B. Window glass shall be warranted to be free from defects in manufacturing, materials and workmanship for period of twenty (20) years from the purchase date.

PART 2 PRODUCTS

2.1 MANUFACTURED UNITS

A. Description: All Fiberglass Double Hung and Awning type units as manufactured by Integrity Windows and Doors, Fargo, North Dakota, or equal. Operating sash tilt to interior for cleaning or removal.

2.2 FRAME DESCRIPTION

A. Interior: Pultruded reinforced fiberglass, 0.070 – 0.077 inch (2 mm) thick.

B. Frame width: 3 3/32 inches (79 mm).

C. Jamb depth: 2 inches (51 mm).

2.3 SASH DESCRIPTION

A. Pultruded reinforced fiberglass, 0.075 – 0.077 inch (2 mm) thick.

B. Composite sash thickness: 15/16” inches (24 mm).

2.4 GLAZING

A. Select quality complying with ASTM C 1036. Insulating glass SIGMA/IGCC certified to performance level CBA when tested in accordance with ASTM E 774.

B. Glazing method: 11/16 inch (19 mm) Insulated glass.

C. Glass type: Clear LoĒ³-366 (Cardinal Glass, or equal) insulating glass with argon gas, or equal.

D. Glazing seal: Silicone bedding at exterior and a glazing boot to interior.

2.5 FINISH

A. Factory baked on acrylic urethane.

B. Color: Stone White exterior with Stone White interior.

2.6 HARDWARE

A. Double Hung:
   1. Balance System: Coil spring block and tackle with nylon cord and glass filled nylon shoe and steel locking shoe.
   2. Jamb Track: Pultrusion.
   3. Sash Lock: High pressure zinc die-cast cam lock and keeper.
      a. Finish: Phosphate coated and electrostatically painted. Color: White.
      b. Two locks on units that are over 3-0 in width.
   2. Sash Lift: Zinc die cast contoured sash lift, two per unit. Color: White.

B. Awning:

1. Standard casement hardware included: top and bottom hinges
   a. Hinges: stainless steel track and injection molded hinge shoe. Finish: Phosphate coated and electrostatically painted. Color: White.

2. Hardware Accessories: Factory-Installed Window Opening Control Device for operating units per ASTM F2090-10
   a. Sash Lock: Factory-installed, high pressure zinc die-cast cam lock and keeper, multi-point locking mechanism from a single point operation
      i. Finish: Phosphate coated and electrostatically painted. Color: White.
   b. Tether Assembly: Factory-installed, glass-filled nylon. Color match.

2.7 WEATHER STRIP

A. Frame Weather strip, Double Hung:
   1. At Bottom Sash: Color: White – Combination foam filled bulb.
   2. At Top Sash: Color: White – Combination hollow vinyl bulb.
   3. At Interlock: White – Rigid ABS with flexible hollow bulb.

B. Frame Weather strip, Awning:
   1. Primary Weather Strip: Color: White – Combination foam filled bulb.
   2. Secondary Weather Strip: Color: White - Combination foam filled bulb.

2.8 JAMB EXTENSION

A. N/A

2.9 INSECT SCREEN

A. Factory installed full screen. Screen mesh, 18 by 16: Charcoal fiberglass.
   1. Provide half screen at single hung window.
   2. Provide full screen at awning windows.

B. Aluminum frame finish: Stone White.

2.10 ACCESSORIES AND TRIM

A. Installation Accessories:
   1. Stool receiver sill. Confirm size and dimensions with drawings.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Before Installation, verify openings are plumb, square, and of proper dimension as required in Section 01 70 00. Report frame defects or unsuitable conditions to the General Contractor before proceeding.

B. Acceptance of Conditions: Beginning of installation confirms acceptance of existing conditions.

3.2 INSTALLATION

A. Comply with General Conditions.

B. Assemble and install window unit according to manufacturer's instructions and reviewed shop drawings.

C. Install sealant and related backing materials at perimeter of unit or assembly in accordance with Section 07 90 00 Joint Sealants. Do not use expansive foam sealant.

D. Install accessory items as required.

E. Use finish nails to apply wood trim and moldings.

3.3 CLEANING

A. Remove visible labels and adhesive residue according to manufacturer's instructions.

B. Leave windows and glass in a clean condition. Final cleaning as required in General Conditions.

3.4 PROTECTING INSTALLED CONSTRUCTION

A. Comply with General Conditions.

B. Protect windows from damage by chemicals, solvents, paint, or other construction operations that may cause damage.

END OF SECTION

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08 70 00

DOOR HARDWARE SCHEDULE

Item/function	Manufacturer	Model No.	Finish	Remarks
Store/Utility 1	Schlage	L9466	630	Lever 05
Storeroom 1	Schlage	L9080	630	Lever 42 - knurled lever at mechanical rooms ONLY
Storeroom 2	Schlage	L9080	630	Lever 05, "EZ" Turn Lever L583-363
Privacy 1	Schlage	L9496	630	Lever 05, "EZ" Turn Lever L583-363
Class Room 1	Schlage	L9070 ATHENS	630	Public Classroom Mortise Lock
Closer	Dorma	7600		ADA-compliant
Threshold 1	Pemko	2005CT	Mill Fin Alum	ADA compliant - maximum 1/2" height - Commercial Thermally Broken Latching Threshold
Threshold 2	Pemko	2548A	Mill Fin Alum	ADA complaint - maximum 1/2" height, 8" Wide Threshold
Threshold 3	Pemko	253x4_FG +1842APK Stop Strip	Mill Fin Alum	ADA compliant - maximum 1/2" height - Commercial Thermally Broken Latching Threshold
Hinges	Hager	Full mortise	630	Provide ball bearing hinges at all doors.
Wall Stop	Ives	406 1/2	630	See plans for locations, provide stainless steel masonry anchors.
Kickplate	Ives	8400	Stainless Steel	34" x 8"
Hands Free Door Opener	Foot Pull	FP03	356 Aluminum	FootPull Hands-Free Restroom Door Opener, FootPull.com, or equal
Knox Box	Knox	3200	Dark Bronze	
Combination Key Box	Kidde	Access Point 001015	Gray	Mount in Janitor Closet
Door edge sealing system	National Guard	5050	Color selected by Arch.	Provide at all exterior door and unt entry door

Notes

1) Provide masterkey system, with construction keying system. Consult with Owner for instructions on keying. Provide key removable core at all hardware with locking function.

2) Products of one or more manufacturers are listed to establish quality and performance characteristics. Products of other manufacturers may be accepted subject to review by Architect.

Acceptable Manufacturers

Locksets:	Schlage, Sargent, Corbin
Closers:	Sargent, Dorma, LCN, Norton, Rixson
Hinges:	Hager, Stanley
Thresholds:	National Guard Products, Pemko, Reese, Zero
Accessories:	Ives, Rockwood, Hiawatha

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SECTION 08 71 00

DOOR HARDWARE

1 PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract including 'Standard General Conditions of the Construction Contract'.

1.2 SUMMARY

A. Hardware for wood, hollow steel, doors.

B. Closers, door operators, electric strikes.

C. Thresholds, weatherstripping, seals, door gaskets, viewers and protection plates.

1.3 SUBMITTALS

A. Reference 'Standard General Conditions of the Construction Contract'.

B. Hardware Schedule: Indicate hardware components in sets correlated to door schedule.

C. Product Data: Submit data for hardware components illustrating style, operating features, color, and finish.

D. Operating and Maintenance Instructions: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.

1.4 QUALITY ASSURANCE

A. Hardware Supplier: Company specializing in supplying commercial door hardware with 5 years documented experience approved by manufacturer.

1.5 COORDINATION

A. Coordinate work of this section with other directly affected sections requiring any integral reinforcement for door hardware.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Reference 'Standard General Conditions of the Construction Contract'.

B. Package hardware items individually. Label and identify package with door opening code to match schedule.

C. Deliver keys to Owner.

1.7 MAINTENANCE

A. Provide manufacturer's maintenance services on door closers and locksets for one year from Date of Substantial Completion.

B. Provide special wrenches and tools applicable to each different or special hardware component.

2 PART 2 PRODUCTS

2.1 SUPPLIERS

A. Suppliers: Products of one or more manufacturers are listed in the Hardware Schedule to establish quality and performance characteristics. Products of other manufacturers may be accepted subject to review by Architect.

1. Manufacturers of Locksets:

   a. Corbin
   b. Sargent.
   c. Schlage.

2. Manufacturers of closers:

   a. LCN.
   b. Norton.
   c. Rixson.
   d. Sargent.

3. Manufacturers of hinges:

   a. Hager.
   b. McKinney.
   c. Stanley.

4. Manufacturers of thresholds and weatherstripping.

   a. National Guard Products.
   b. Pemko.
   c. Reese.
   d. Zero.

5. Manufacturers of panic sets:

   a. Sargent.
   b. Von Duprin

6. Manufacturers of door trim and accessories:

   a. Hiawatha.
   b. Ives.
   c. Rockwood.

2.2 KEYING

A. Door Locks: Master keyed with high security keying system. Include construction keying.

B. Supply 3 change keys for each lock and 5 master keys, each tagged. Provide keys of nickel silver only.

C. Provide 1 Key Cabinet: Sheet steel construction, enamelled finish, hinged door with key lock, internal hooks for 30 keys, identification labeling.

2.3 MATERIALS AND FABRICATION

A. Provide products complying with ANSI A 156.1 standards.

B. Name Plates: Do not provide products with manufacturers name or trade name displayed in a visible location except in conjunction with required UL labels.

C. Provide hardware manufactured to conform to templates with machine screw installation. Do not provide hardware prepared for self-tapping screws.

D. Fasteners: Provide Phillips flat head screws except as otherwise indicated. Finish screws to match adjacent hardware finish.

E. Lever Handles: Provide lever handles at all doors except bifold and sliding bypass.

2.4 FINISHES

A. Finishes are identified in the Hardware Schedule at end of this section.

3 PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Verify that doors and frames are ready to receive work and dimensions are as instructed by the manufacturer.

B. Verify that electric power is available to power operated devices and is of the correct characteristics.

3.2 INSTALLATION

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

B. Install hardware at fire rated doors in accordance with NFPA 80.

C. Use templates provided by hardware item manufacturer.

D. Adjust hardware and door control devices for proper operation, and to comply with ADA requirements.

…END OF SECTION 08 71 00

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York, ME

4-Oct-16

08 90 10

WINDOW SCHEDULE - BASE BID

No.	Window Manufactuer	Model/Number	Unit Type	Rough Opening (Between WD Bucks) Width	Rough Opening (Between WD Bucks) Height	Custom Masonry Unit Size (Verify) Width	Custom Masonry Unit Size (Verify) Height	Applicable Alteernates	Required Egress	Glazing System: 3/4" Low-E SmartSun with Argon	Glazing System: 11/16" LowE3 Glass, Argon Gas	Insect Screen @ Operable Sash Only	Pre-finished Interior/Exterior Colors
New Construction													
A	Paradigm Windows	Craftec, New Construciton, Tubular Plastic	Awning	2'-5 3/8"	1'-5 3/8"	2'-5"	1'-5"	N/A	No		Yes	Yes	Stone White
B	Paradigm Windows	Craftec, New Construciton, Tubular Plastic	Single Hung	3'-1 3/8"	4'-5 3/8"	3'-1"	4'-5"	N/A	No		Yes	No	Stone White

General Notes

1. Provide Safety Glazing where Required by CPSC Regulations.
2. Provide Insulated Glazing throughout as per specification.
3. See drawings for trim details

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SECTION 08 95 43

FLOOD VENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Flood vents.

1.2 RELATED SECTIONS

A. Section 03 30 00 - Cast-in-Place Concrete.

B. Section 04 20 19 – Unit Masonry

C. Section 07 90 00 - Joint Protection.

1.3 REFERENCES

A. ASCE/SEI 24-98, Flood Resistant Design and Construction.

B. ASCE/SEI 24-05, Flood Resistant Design and Construction.

C. ASCE/SEI 24-14, Flood Resistant Design and Construction.

D. FEMA, 44-CFR, Part 59-60 and 60.3 National Flood Insurance Program (NFIP).

E. FEMA/FIA-TB 1-2008, Openings in Foundation Walls and Walls of Enclosures for Buildings Located in Special Flood Hazard Areas.

F. NER-624, National Evaluation Report No. NER-624. July 2007.

G. International Code Council ICC-ES Acceptance Criteria for Automatic Foundation Flood Vents (AC-364). October 2007

H. International Code Council ICC-ES Acceptance Criteria for Mechanically Operated Flood Vents (AC-364). October 2013.

I. Federal Emergency Management Association's MEMO W-08086, October 2008

J. UL - Test for Fire Dampers in conjunction with flood vents.

1.4 DESIGN / PERFORMANCE REQUIREMENTS

A. SMART VENT Products Flood Vents, or equal, Engineered Openings that comply with the following:
   1. Certifications:
      a. International Code Council - Evaluation Service Report (ESR-2074) including Florida Building Code Supplement.
      b. Florida Building Product Approval (FL5822) approved for use in High Velocity Hurricane Zones (HVHZ).
   2. Compliance:
      a. FEMA Technical Bulletin 1: Openings in Foundation Walls and Walls of Enclosures (TB-1).
      b. NFIP Bulletin W-08086.

c. NFIP Flood Insurance Manual.
d. American Society of Civil Engineers: Flood Resistant Design and Construction (ASCE 24-14).
e. International Building Codes (IBC)

1.5 SUBMITTALS

A. Reference 'Standard General Conditions of the Construction Contract'.

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. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum 5 years documented experience.

B. Installer Qualifications: Installer with experience on projects of a similar size and scope with similar installation conditions.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Reference 'Standard General Conditions of the Construction Contract'.

B. Deliver and store materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

C. Store products in clean, dry area indoors until ready for installation. Store materials in accordance with manufacturer's instructions.

D. Protect materials and finish from damage during handling and installation.

1.8 SEQUENCING

A. Ensure that locating templates and other information required for installation of products of this section are furnished to affected trades in time to prevent interruption of construction progress.

B. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.9 WARRANTY

A. Provide the manufacturer's limited 15 year warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Smart Vent Products, Inc., which is located at: 430 Andbro Dr. Unit 1; Pitman, NJ 08071; Tel: 877-441-8368; Email: request info (info@smartvent.com); Web: www.smartvent.com.

B. Substitutions: Not permitted.

C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 FLOOD VENTS

A. General: Vents are constructed of Marine Grade 316 Stainless Steel formed and smooth-welded with a rigid construction. Frames designed for installation in masonry and concrete foundations. Vents have a pivoting door assembly that is fitted with two patented sealed floats that provide vermin protection and immediately and automatically release the door upon contact with rising water to relieve unbalanced lateral forces on foundation walls.

B. Dual Function Flood Vent Series: Provide both flood protection and natural air ventilation. Louvered blades are temperature controlled with a bimetal coil and the screen is vermin resistant:
   1. SMART VENT Products Model # 1540-510: Ventilated with Louvered Blades and Screen.
      a. Flood Coverage: 200 sq.ft.
      b. Air Ventilation: 51 sq.in.
      c. Size: 16 inches W by 8 inches H.
      d. Rough Opening: 16-1/4 inches W by 8-1/4 inches H.

C. Insulated Series: Provide flood protection only. Styrofoam insulation with perimeter weatherstripping.
   1. FLOOD VENT Products Model # 1540-520: Flush or Solid Insulated Door.
      a. Flood Coverage: 200 sq.ft.
      b. Styrofoam core R-Value: 8.34
      c. Size: 16 inches W by 8 inches H.
      d. Rough Opening: 16-1/4 inches W by 8-1/4 inches H.

D. Accessories:
   1. Stainless Steel straps, four for each vent, and masonry or concrete.
   2. Urethane base adhesive for masonry or concrete surfaces.
   3. Adjustable wrench for thru-bolted models and screwdriver for stud wall models.
   4. Trim and Sleeves: Sleeves for use in ' un-filled' masonry and for, Fire Walls where ' air-space' is required on Exterior Walls and to finish off the inside of openings:
      a. Adjustable Sleeve/Trim #1540-531-12: 8 inches to12 inches at CMU Walls.
      b. Vinyl Buck(s) #1540-800 Series for new poured concrete walls.

E. Stainless Steel Finish.

F. Sealant: Provide joint sealers as specified in Section 07 90 00 - Joint Protection. Only Fire-Rated sealant shall be used on Fire-Rated walls or openings.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. Verify vent locations are ready to receive work, and dimensions are as indicated on shop drawings or as instructed by manufacturers.

C. 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. Review and coordinate setting drawings, templates, and related items that are to be embedded in concrete and masonry.

C. Verify that no obstructions exist that will interfere with the proper operation of the vents.

D. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install vents in at least two different walls spaced evenly around foundation perimeter, and located a maximum of 12 inches above grade to bottom of vent.

C. Install vents plumb, level, square, true to line, and rigid.

D. Attach vents securely in place using fasteners supplied or approved by manufacturer.

E. Separate incompatible materials to prevent galvanic corrosion.

F. Install one single height flood vent where indicated.

G. Adjust flood vents for proper operation.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

3.5 SCHEDULES

A. See Drawings for locations.

END OF SECTION

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SECTION 09 21 00

PLASTER AND GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.1 SUMMARY

A. Section includes gypsum board with joint treatment.

B. Related Sections:
1. Drawings and general provisions of Contract including ‘Standard General Conditions of the Construction Contract’.

1.2 SUBMITTALS

A. Reference ‘Standard General Conditions of the Construction Contract’.

B. Product Data: Submit data on product characteristics, performance criteria and limitations.

C. Manufacturer's Installation Instructions: Submit procedure for preparation and installation.

D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.3 QUALITY ASSURANCE

A. Perform Work in accordance with ASTM C840, GA-201 - Gypsum Board for Walls and Ceilings, GA-214 - Recommended Specification: Levels of Gypsum Board Finish, GA-216 - Recommended Specifications for the Application and Finishing of Gypsum Board, GA-600 - Fire Resistance Design Manual.

B. Fire Rated Construction: Rating as indicated on Drawings.
1. Tested Rating: Determined in accordance with ASTM E119.
2. Fire Rated Partitions: Listed assembly by UL, WH, GA File.
3. Fire Rated Ceilings and Soffits: Listed assembly by UL, WH, GA File.
4. Fire Rated Structural Column Framing: Listed assembly by UL, WH, GA File.
5. Fire Rated Structural Beam Framing: Listed assembly by UL, WH, GA File.
6. Fire Rated Shaft Wall Requirements: two hour in accordance with UL listed assembly.

PART 2 PRODUCTS

2.1 GYPSUM BOARD ASSEMBLIES

A. Manufacturers:
1. Celotex Building Products
2. Domtar Gypsum, Inc.
3. G-P Gypsum Corp
4. National Gypsum Co

``

2.2 COMPONENTS

A. Gypsum Board Materials: ASTM C1396/C1396M; Type X fire resistant where indicated on Drawings.
   1. Standard Gypsum Board: 5/8 inch thick, maximum available length in place; ends square cut, tapered edges, where indicated
   2. Moisture Resistant Gypsum Board: 5/8 inch thick, maximum available length in place; ends square cut, tapered edges, at all wall and ceiling surfaces within bathrooms and other locations prone to moisture, where indicated on drawings.
   4. Gypsum Shaft Liner: ASTM C442, 1 inch thick, maximum available size in place; square edges, ends square cut and system channel framing system to achieve indicated fire ratings.
   5. Exterior Gypsum Sheathing Board: 5/8 inch thick, glass faced rated for exterior applications, maximum available size in place; ends square cut, square edges; water repellent paper faces. Fire rated as indicated in drawings.

1.3 ACCESSORIES

A. Gypsum Board Accessories: ASTM C1047; metal; corner beads, zip-strips, shaft wall assemblies, edge trim, or as otherwise indicate.
   1. Metal Accessories: Galvanized steel.
   2. Plastic Accessories: PVC plastic.
   3. Edge Trim: Type LC, L bead.

B. Joint Materials: ASTM C475, GA-201 and GA-216, reinforcing tape, joint compound, adhesive, and water.

C. Fasteners:
   1. ASTM C1002; Type S; length to suit application.
   2. for Recycled Plastic Furring: of type, material, size, corrosion resistance, holding power, and other properties required to fasten recycled plastic members to substrates.

D. Adhesive:
   1. ASTM C557, GA-216.
   2. OSI QB-30, Chemlink M-1, Chemlink Build Secrure, Chemlink Wall Secure or approved equal.

E. Sealants:
   1. 30 year Siliconized Arcylic Sealant, Chemlink M-1, 100% pure silicone or approved equal.

F. Gypsum Board Screws: ASTM C954, ASTM C1002; length to suit application.
   1. Screws for Steel Framing: Type S.
   2. Screws for Wood Framing: Type W.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify site conditions are ready to receive work.

3.2 INSTALLATION

``

A. Gypsum Board:
   1. Install gypsum board in accordance with GA-216 and GA-600.
   2. Fasten gypsum board to furring or framing with screws.
   3. Place control joints consistent with lines of building spaces as recommended by gypsum board manufacturer and as directed by Architect/Engineer.
   4. Place corner beads at external corners. Use longest practical length. Place edge trim where gypsum board abuts dissimilar materials.
   3. Seal cut edges and holes in moisture resistant gypsum board and exterior gypsum soffit board with sealant.

B. Joint Treatment:
   1. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
   2. Feather coats onto adjoining surfaces so camber is maximum 1/32 inch.

C. Tolerances: Maximum Variation from Flat Surface:1/8 inch in 10 feet in any direction.

END OF SECTION

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SECTION 09 77 00

FIBERGLASS REINFORCED PLASTIC PANELS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Special wall surfaces, including fiberglass reinforced plastic panels.

B. Related Sections: Section(s) related to this section include:
   1. Drawings and general provisions of Contract including 'Standard General Conditions of the Construction Contract'.

1.2 REFERENCES

A. General: Standards listed by reference, including revisions by issuing authority, form a part of this specification section to extent indicated. Standards listed are identified by issuing authority, authority abbreviation, designation number, title or other designation established by issuing authority. Standards subsequently referenced herein are referred to by issuing authority abbreviation and standard designation

B. ASTM International:
   1. ASTM D2583 Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor.
   2. ASTM D5420 Standard Test Method for Impact Resistance of Flat, Rigid Plastic Specimen by Means of a Striker Impacted by a Falling Weight (Gardner Impact).
   3. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.

1.3 SYSTEM DESCRIPTION

A. Performance Requirements: Provide fiberglass reinforced plastic (FRP) panels which have been manufactured and installed to maintain performance criteria stated by manufacturer without defects, damage or failure.

1.4 SUBMITTALS

A. Reference 'Standard General Conditions of the Construction Contract'.

B. Product Data: Submit data on product characteristics, performance criteria and limitations.

C. Manufacturer's Installation Instructions: Submit procedure for preparation and installation.

D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

A. Qualifications:
   1. Installer Qualifications: Installer should be experienced in performing work of this section and should have specialized in installation of work similar to that required for this project.
      a. Certificate: When requested, submit certificate indicating qualifications.

1.6 DELIVERY, STORAGE & HANDLING

A. Reference ‘Standard General Conditions of the Construction Contract’.

B. Ordering: Comply with manufacturer’s ordering instructions and lead time requirements to avoid construction delays.

C. Delivery:
   1. Deliver materials in manufacturer’s original, unopened, undamaged containers with identification labels intact. Package sheets on skids or pallets for shipment to project site.
   2. Deliver no components to project site until areas are ready for installation for duration of project.

D. Storage and Protection:
   1. Store materials protected from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer.
   2. Store panels indoors in a dry place at the project site.

E. Handling:
   1. Remove foreign matter from face of panel by using a soft bristle brush, avoiding abrasive action.
   2. Handle materials to prevent damage to prevent damage to finished surfaces. Provide protective covering to prevent physical damage or staining following installation for duration of project.

1.7 PROJECT CONDITIONS

A. Environmental Requirements:
   1. Installation shall not begin until building is enclosed, permanent heating and cooling equipment is in operation, and residual moisture from plaster, concrete or terrazzo work has dissipated.
   2. During installation, and for not less than 48 hours before, maintain an ambient temperature and relative humidity within limits required by type of adhesive used and recommendation of adhesive manufacturer.
   3. Provide ventilation to disperse fumes during application of adhesive as recommended by adhesive manufacturer.

B. Field Measurements: Verify actual measurements/openings by field measurements before fabrication. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

1.8 WARRANTY

A. Project Warranty: Reference ‘Standard General Conditions of the Construction Contract’.

B. Manufacturer’s Warranty: Submit, for Owner’s acceptance, manufacturer’s standard warranty document executed by authorized company official. Manufacturer’s warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.

1.9 MAINTENANCE

A. Extra Materials: Deliver to Owner extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels. Comply with Division 1 Closeout Submittals (Maintenance Materials) Section.
   1. Quantity: Furnish quantity of units equal to 5% of amount installed.

2. Delivery, Storage and Protection: Comply with Owner's requirements for delivery, storage and protection of extra materials.

PART 2 PRODUCTS

2.1 FIBERGLASS REINFORCED PLASTIC (FRP) PANELS

A. Manufacturer:
1. Kemlite Company, Inc.
2. Or Equal approved by Architect

B. Proprietary Product(s)/System(s): Kemlite Fiberglass Reinforced Plastic (FRP) Panels.
1. Kemply Panels:
a. Fire-X Glasbord FM
1) Class A embossed Factory Mutual approved identified by trademarked blue and red threads manufactured into the back of the panel and trademarked dual blue fluorescent embedded threads on the front of the panel (visible only under UV light).
2) Laminated to .40 inch white fluted Polypropylene substrate
3) Color as indicated in Interior Finish Legend
4) Surface: 0.075" (1.9mm) Smooth Glasbord-FSI
5) Size: Standard sizes are 4 feet × 8 feet, 4 feet × 9 feet, 4 feet × 10 feet and 4 feet × 12 feet; or as indicated on drawings.

b. Moldings: Provide harmonizing PVC (polyvinyl chloride) moldings.
1) Color as indicated in Interior Finish Legend

c. Rivets: Specify optional rivets in harmonizing colors (by color name and number) in areas where there are large fluctuations in temperature and/or humidity, where the substrate is unusually uneven, and in all low temperature or cold storage applications. Refer to manufacturer's Installation Guide for rivet pattern and installation instructions.

3. *Surfaseal* Surface Protection: Provide Kemlite *Surfaseal* surface protection for fiberglass reinforced plastic (FRP) panels.
4. Division Bars, Corner Trim: Panel manufacturer's standard length extruded vinyl pieces; longest length possible to eliminate end joints.
5. Fasteners: Noncorrosive drive rivets.

2.2 PRODUCT SUBSTITUTIONS

A. Substitutions: No substitutions permitted.

2.3 ACCESSORIES

A. Adhesive: Provide panel adhesive as recommended by panel manufacturer for substrate location and materials.

2.4 SOURCE QUALITY

A. Source Quality: Obtain fiberglass reinforced plastic (FRP) panels from a single manufacturer. Provide panels and molding only from manufacturer specified to ensure warranty and color harmonization of accessories.

PART 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

A. Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions and product carton instructions for installation.

3.2 EXAMINATION

A. Site Verification of Conditions: Verify that substrate conditions, which have been previously installed under other sections, are acceptable for product installation in accordance with manufacturer's instructions.

1. Examine backup surfaces to determine that corners are plumb and straight, surfaces are smooth, uniform, clean and free from foreign matter, nails are countersunk and joints and cracks are filled flush and smooth with the adjoining surface.
2. Do not begin installation until backup surfaces are in satisfactory condition.

3.3 PREPARATION

A. Surface Preparation: Specify applicable product preparation requirements.

3.4 INSTALLATION

A. Fiberglass Reinforced Panel (FRP) Installation:
1. Cut and drill panels with carbide tipped saw blades or drill bits, or cut with snips.
2. Install panels with manufacturer's recommended gap for panel field and corner joints.
3. Predrill fastener holes in panels with 1/8 inch (3.2 mm) oversize.
4. For trowel type and application of adhesive, follow adhesive manufacturer's recommendations.
5. Use products acceptable to panel manufacturer and install FRP system in accordance with panel manufacturer's printed instructions. Comply with panel manufacturer's *Installation Guide*.

B. Site Tolerances: 1/8" in 8 feet of any direction

C. Related Products Installation: Refer to other sections listed in Related Sections paragraph herein for related materials installation.

3.5 CLEANING

A. Cleaning: Remove temporary coverings and protection of adjacent work areas. Repair or replace products that have been installed and are damaged. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance. Remove construction debris from project site and legally dispose of debris.
1. Remove any adhesive or excessive sealant from panel face using solvent or cleaner recommended by panel manufacturer.

3.6 PROTECTION

A. Protection: Protect installed product and finish surfaces from damage during construction.

END OF SECTION

SECTION 09 90 00

PAINT SYSTEMS SCHEDULE

A. Not all products listed below required.
B. Provide products where indicated and at all new or modified work locations.
C. Refer to Interior and Exterior Paint System Specificaiton for additional product and execution requirements.
D. Refer to Manufacturer's product data sheets and comply with manufacturer's instructions, methods and recommendations.
E. Test selected system applied to specified substrate, prepared as specfied and recommended, for conformance of system performance priort to installing specified products.

INTERIOR SURFACES

Surface	Finish	System	Product	Coats
Concrete Walls	Satin	Primer	S-W PrepRite Block Filler, B25W25	1
		Finish	S-W Pro Industrial 0 VOC Satin B66 Series	2
Concrete Floor	Seal Coat		See Specification Section 03 30 00 – for surface treatment.	1
Drywall-No VOC	Eggshell	Primer	S-W ProMar 200 Zero VOC Interior Latex Primer, B28W2600, 0 g/L VOC	1
		Finish	S-W ProMar 200 Zero VOC Eg-Shel B20-2600 Series 0 g/l VOC	2
Metal	Semigloss	Primer	S-W Pro Cryl Universal Primer B66-310	1
		Finish	S-W Pro Industrial 0 VOC Acrylic Semi-Gloss B66-650	2
Wood - Painted	Semigloss	Primer	S-W Premium Interior Wall & Wood Primer B28W8111	1
		Finish	S-W Pro Industrial 0 VOC Acrylic Semi-Gloss B66-650	2

EXTERIOR SURFACES				
Surface	**Finish**	**System**	**Product**	**Coats**
Metal Railings	Gloss	Primer	S-W Kem Bond HS High Solids Alkyd Universal Metal Primer	1
		Finish	S-W Industrial Urethane Alkyd Enamel B54 Series	2
PVC	Satin	Primer	S-W Multi-Purpose Latex Primer B51 Series	1
		Finish	S-W SuperPaint Exterior Acrylic Latex A89 Series	2
Wood Shingle Siding: Pre-finshed		Touchup	100% acrylic Type Solid Color finish provided by manufacturing, applied by Painting contractor.	1
Wood Trim - Painted	Satin	Primer	S-W Exterior Oil Based Wood Primer Y24 Series	1
		Finish	S-W SuperPaint Exterior Acrylic Latex A89 Series	2
Galvanized Steel	Gloss	Primer	S-W Pro Cryl Universal Primer B66-310	1
		Finish	S-W SuperPaint Exterior Acrylic Latex A84 Series	2

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SECTION 09 91 23

PAINTING

PART 1 GENERAL

1.1 SUMMARY

A. Related Sections:
1. Drawings and general provisions of Contract including Reference ‘Standard General Conditions of the Construction Contract’.
2. Provision of waste management: Section 01 74 19, Construction Waste Management and Disposal.

1.2 SECTION INCLUDES

A. Surface preparation and field application of paints and coatings.

1.3 SYSTEM DESCRIPTION

A. Conform to applicable code for flame and smoke rating requirements for products and finishes.

1.4 SUBMITTALS

A. Reference ‘Standard General Conditions of the Construction Contract’.

B. Product Data: Submit data on product characteristics, performance criteria and limitations.

C. Manufacturer's Installation Instructions: Submit procedure for preparation and installation.

D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Store and apply materials in environmental conditions required by manufacturer's instructions.

1.6 EXTRA MATERIALS

A. Provide minimum of two (2) gallons of each type and color of coating specified.

PART 2 PRODUCTS

2.1 MATERIALS

A. Manufacturers: Products of one or more manufacturers are listed in Finish Schedules to establish appearance, performance and quality characteristics. Products of other manufacturers may be accepted subject to review by Architect.
1. Benjamin Moore and Co.
2. Dulux/Glidden Professional
3. PPG Industries: Pittsburgh Paints
4. Pratt and Lambert
5. Sherwin Williams Co.

B. Coatings: Ready mixed except field catalyzed coatings of good flow and brushing properties, capable of drying or curing free of streaks or sags.

C. VOC Content: Provide coatings with low or zero VOC content to the greatest extent possible. As a minimum, comply with requirements of Green Seal GS-11:
   1. Non flat: 150 g/l.
   2. Flat: 50 g/l.

D. Quality: Manufacturer's best quality of each type of product specified.

E. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials required to achieve the finishes specified, as recommended by coating manufacturer..

2.2 FINISHES

A. Refer to schedule at end of section for surface finish schedule.

PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Verify that substrate conditions are ready to receive work.

B. Measure moisture content of porous surfaces using an electronic moisture meter. Do not apply finishes unless moisture content is less than 12 percent.

C. Correct minor defects and clean surfaces which affect work of this section.

D. Remove electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.

E. Gypsum Board Surfaces: Fill minor defects with latex compounds. Spot prime defects after repair.

F. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.

G. Concrete and Unit Masonry Surfaces Scheduled to Receive Paint Finish: Remove foreign matter. Remove oil and grease with a solution of tri-sodium phosphate, rinse well and allow to dry.

H. Uncoated Ferrous Surfaces: Remove scale by wire brushing, sandblasting, clean by washing with solvent. Apply treatment of phosphoric acid solution. Prime paint after repairs.

I. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust, hand or power tool clean, clean surfaces with solvent. Prime bare steel surfaces.

J. Interior Wood Items Scheduled to Receive Paint Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats.

K. Interior Wood Items Scheduled to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats.

L. Exterior Wood Items Scheduled to Receive Paint Finish: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior caulking compound after prime coat has been applied.

M. Exterior Wood Items Scheduled to Receive Transparent Finish: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes with tinted exterior caulking compound after sealer coat has been applied.

3.2 APPLICATION

A. Apply products in accordance with manufacturer's instructions.

B. Sand transparent finishes lightly between coats to achieve required finish.

C. Back prime interior and exterior woodwork scheduled to receive paint finish with primer paint.

D. Back prime interior woodwork scheduled to receive stain or varnish finish with gloss varnish reduced 25 percent with mineral spirits.

E. Minimum Coating Thickness: As recommended by manufacturer.

F. Prime Coats: Prime material as recommended by manufacturer. Recoat primed surfaces as required to cover suction spots or unsealed areas.

G. Pigmented Surfaces: Completely cover to achieve an opaque, smooth surface of uniform finish, color and appearance. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness or other imperfections will not be accepted.

H. Transparent Finishes: Provide smooth surface of uniform luster, free of laps, cloudiness, color irregularity, runs, brush marks, orange peel, nail holes or other imperfections.

3.3 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

A. Refer to Division 15 and Division 16 sections for schedule of color coding, identification banding of equipment, ductwork, piping, and conduit.

B. Color code items in accordance with requirements indicated. Color band and identify with flow arrows, names, and numbering.

C. Paint shop primed equipment.

D. Remove unfinished louvers, grilles, covers, and access panels and paint separately. Paint dampers exposed behind louvers, grilles, convector and baseboard cabinets to match face panels.

E. Prime and paint insulated and exposed pipes, insulated and exposed ducts, hangers, brackets, collars and supports, except where items are prefinished.

F. Paint interior surfaces of air ducts, and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint, to limit of sight line.

G. Paint exposed conduit and electrical equipment occurring in finished areas except prefinished surfaces.

H. Paint both sides and edges of plywood backboards.

I. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.4 CLEANING

A. As work proceeds, promptly remove finishes where spilled, splashed, or spattered.

3.5 SCHEDULE - INTERIOR SURFACES

A. Refer to Section 09 90 00 Paint System Schedule.

END OF SECTION

SECTION 10 00 00

MISCELLANEOUS SPECIALTIES

1 PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract including 'Standard General Conditions of the Construction Contract'.

1.2 SECTION INCLUDES

A. Fire extinguishers.

1.3 SUBMITTALS

A. Reference 'Standard General Conditions of the Construction Contract'.

B. Product Data: Provide data on Product, and accessories.

C. Operating and Maintenance Instructions: Include relevant instructions. Include maintenance information.

1.4 QUALITY ASSURANCE

A. Fire Extinguishers: Conform to NFPA 10.

2 PART 2 PRODUCTS

2.1 FIRE EXTINGUISHERS

A. Manufacturers:

1. Allenco.
2. Amerex.
3. Ansul Fire Protection
4. Bobrick Washroom Equipment.
5. JL Industries.
6. Larsen's Manufacturing Co.
7. Potter-Roemer/Div. Smith Industries Inc.
8. Walter Kidde/Div. Kidde Inc.

B. Multi-Purpose Dry Chemical Type: Enameled steel tank, with pressure gage, 2A:10BC rating.

3 PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Verify that surfaces and internal wall blocking are ready to receive work and opening dimensions are as instructed by the manufacturer.

3.2 INSTALLATION - FIRE EXTINGUISHERS

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

B. Mount units to conform to ADA requirements, with center of door 48” above floor.

C. Install units level and plumb in wall openings.

…END OF SECTION 10 00 00

SECTION 10 14 00

SIGNS

PART 1 GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including 'Standard General Conditions of the Construction Contract'.

1.2 SUMMARY:

A. This Section includes the following types of signs:
   1. Building Interior panel signs.
   2. Building Identification Signage
   3. Site signage specified elsewhere.

1.3 SUBMITTALS:

A. Reference 'Standard General Conditions of the Construction Contract'.

B. General: Submit the following in accordance with Conditions of the Contract and Division 1 Specification Sections.

C. Product Data: Include manufacturer's construction details relative to materials, dimensions of individual components, profiles, and finishes for each type of sign required.

D. Samples: Provide samples of each sign component for initial selection of color, pattern, graphic content and surface texture as required and for verification of compliance with requirements indicated.

E. Schedule: Coordinate schedule of apartment numbering and building room identification names with Owner.

1.4 QUALITY ASSURANCE:

A. Single-Source Responsibility: For each separate type of sign required, obtain signs from one source from a single manufacturer.

PART 2 PRODUCTS

2.1 MATERIALS:

A. Acrylic: 1/8" thick sheet acrylic for exterior engraved panel signs, in colors indicated or, if not indicated, as selected by Architect from the manufacturer's standards.

2.2 PANEL SIGNS:

A. Panel Signs: Comply with requirements indicated for materials, thicknesses, finishes, colors, designs, shapes, sizes, and details of construction.
   1. Produce smooth, even, level sign panel surfaces, constructed to remain flat under installed conditions within a tolerance of plus or minus 1/16 inch measured diagonally.

C. Unframed Panel Signs: Fabricate signs with edges mechanically and smoothly finished to conform with the following requirements:
   1. Edge Condition: Square cut.
   2. Corner Condition: Rounded corners.
   3. Graphic Content and Style: Provide sign copy that complies with the requirements indicated for size, style, spacing, content, position, material, finishes, and colors of letters, numbers, and other graphic devices. Comply with requirements of ANSI A 117.1-1986, Uniform Federal Accessibility Standard and Americans with Disabilities Act.

2.3 BUILDING MOUNTED IDENTIFICATION SIGNAGE

A. Provide baked enamel cast aluminum letters “YORK” and “BATH HOUSE” at 8” tall and “LONG SANDS BEACH” and “ FIRST AID” at 6” tall, applied to building substrate; projected spacer mounted; TWENENTIETH CENTURY font and kerning as indicated, factory finished, stand-off rear stud mount, color as indicated in Exterior Finish Legend. Provide shop drawings and confirm text content, size, font and kerning prior to purchase and installation. Provide blocking behind substrate as required. Gemini Products or equal.

2.4 FINISHES:

A. Colors and Surface Textures: For exposed sign material that requires selection of materials with integral or applied colors, surface textures or other characteristics related to appearance, provide color matches as selected by the Architect from the manufacturer's standards.

PART 3 EXECUTION

3.1 INSTALLATION:

A. General: Locate sign units and accessories where indicated, using mounting methods of the type described and in compliance with the manufacturer's instructions. Comply with installation requirements of ANSI A 117.1-2003, Uniform Federal Accessibility Standard and Americans with Disabilities Act and listed accessibility codes.

B. Install signs level, plumb, and at the height indicated, with sign surfaces free from distortion or other defects in appearance.

C. Wall Mounted Panel Signs: Attach panel signs to wall surfaces using the methods indicated below:
   1. Vinyl-Tape Mounting: Use double-sided foam tape, of thickness recommended by sign manufacturer for installation intended, to mount signs to smooth, nonporous surfaces. Do not use this method for vinyl-covered or rough surfaces.
   2. Silicone-Adhesive Mounting: Use liquid silicone adhesive recommended by the sign manufacturer to attach sign units to irregular, porous, or vinyl-covered surfaces. Use double-sided vinyl tape where recommended by the sign manufacturer to hold the sign in place until the adhesive has fully cured.

3.2 CLEANING AND PROTECTION:

A. At completion of the installation, clean soiled sign surfaces in accordance with the manufacturer's instructions. Protect units from damage until acceptance by the Owner.

B. Restore sign surfaces that have been damaged prior to Substantial Completion. Replace damaged signs that cannot be repaired to satisfaction of Owner.

3.3 SIGN SCHEDULE:

B. Signs- Reference Signage Schedule on A4.10
   1. Common Area Signs: One per room, at entrance door.
   2. Mount interior signs in accordance with accessibility standards.

END OF SECTION

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SECTION 10 21 13

TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:
   1. Floor-mounted overhead-braced toilet partitions and wall-hung urinal screens fabricated solid plastic (HDPE).

1.2 RELATED SECTIONS

A. Related Sections:
   1. Drawings and 'Standard General Conditions of the Construction Contract'.
   2. Provision of waste management: Section 01 74 19, Construction Waste Management and Disposal.

B. Section 10 28 00 - TOILET ACCESSORIES for partition mounted accessories.

1.3 SUBMITTALS

A. Reference 'Standard General Conditions of the Construction Contract'.

B. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

C. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
   1. Show locations of cutouts for compartment-mounted toilet accessories.

D. Samples for Verification: Of each type of color and finish required for units, prepared on 6-inch-square samples of same thickness and material indicated for Work.

1.4 QUALITY ASSURANCE

B. Perform Work in accordance with 'Standard General Conditions of the Construction Contract'.

C. Maintain one copy of each document on site.

1.5 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements before fabrication and indicate measurements on Shop Drawings.
   1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating toilet compartments without field measurements. Coordinate wall, floor, ceilings, and

other contiguous construction to ensure that actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design, subject to compliance with requirement
1. Bradley Corp.

2.2 MATERIALS

A. Plastic Panels: High density polyethylene (HDPE) suitable for exposed applications, waterproof, non-absorbent, and graffiti-resistant textured surface.
1. Provide panels with minimum 30 percent pre-consumer recycled content.

B. Zinc Aluminum Magnesium and Copper Alloy (Zamac):ASTM B86

C. Stainless Steel Sheet: ASTM A 240 or A 666, 300 series

D. Stainless Steel Castings: ASTM A 743/A 743M

2.3 PLASTIC TOILET COMPARTMENTS

A. Toilet Compartment Type:
1. Floor-Mounted with Overhead-Brace, Bradmar Solid Plastic.
a. Basis of Design Product: Bradley, Series 400.

B. Urinal Screen Type:
1. Floor-Mounted Wall hung with continuous brackets, Bradmar Solid Plastic:
a. Basis of Design Product: Bradley, match Series 400.

C. Door, Panel, and Pilaster Construction, General: HDPE, with 3/16” radius edge.
1. Provide exposed surfaces free of pitting, visible seams and fabrication marks, stains, or other imperfections.
2. Provide aluminum heat sink at bottom edge of panels and doors.

D. Door Construction: 1 inch thick

E. Panel Construction: 1 inch thick

F. Pilaster Construction: 1 inch thick

G. Headrail: Continuous stainless steel head rail with anti-grip profile. Clamps around pilaster and is secured to the wall with stainless steel brackets.

I. Shoes: 4 inches high minimum, 300 series stainless steel with No. 4 satin brushed finish.

J. Urinal Screen Construction: Matching toilet compartment panel construction.

K. Brackets (Fittings): Continuous Type Brackets; Stainless Steel.

L. Plastic Panel Finish: Manufacture's standard impregnated finish with one color in each room.
1. Color: As selected by Architect from manufacturer's full color range.

2.4 HARDWARE

A. Hardware, Heavy Duty: Stainless Steet, including stainless steel tamper-resistant fasteners:
1. Hinges: Self-closing integral, nylon, gravity-type adjustable to hold doors open at any angle up to 90 degrees, with emergency access by lifting door.
2. Latch and Keeper: Surface-mounted slide latch with flat rubber-faced combination door strike and keeper, meeting requirements for accessibility at accessible compartments.
3. Coat Hook: combination hook and rubber-tipped stop, sized to prevent door from hitting compartment-mounted accessories. Provide wall bumper where door abuts wall. Provide formed L-shaped hook without stop at outswing doors.
4. Door Pull: Standard unit on outside of inswing doors. Provide pulls on both sides of outswing doors.

2.5 FABRICATION

A. Floor and Ceiling Anchored Units: Provide manufacturer's stainless steel corrosion resistant anchoring assemblies with leveling adjustment at tops and bottoms of pilasters. Provide shoes and sleeves (caps) at pilasters to conceal anchorage.

B. Door Size and Swings: Unless otherwise indicated, provide 30 inch wide in-swinging doors for standard toilet compartments and 36 inch wide out-swinging doors with a minimum 32 inch wide clear opening for compartments designated as accessible.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine work area to verify that measurements, substrates, supports, nd environmental conditions are in accordance with manufacturer's requirements to allow installation.

1. Proceed with installation once conditions meet manufacturer's requirements.

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.

B. Install toilet partitions and screens in spaces with operating, temperature controlled HVAC systems. Shield partitions and screens from direct sunlight.

C. Clearance: Install with clearances indicated on Drawings. Where clearances are not indicated allow maximum 1/2 inch between pilasters and panels, and 1 inch between panels and walls.

D. Stirrup Brackets: Secure panels to walls and to pilasters with no fewer than three brackets attached at midpoint and near top and bottom of panel. Locate wall brackets so holes for wall anchors occur in tile joints. Align brackets at pilasters with brackets at walls.

3.3 ADJUSTING

A. Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 15 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed positions.

3.4 FINAL CLEANING

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

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

END OF SECTION

SECTION 10 28 00

TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract including General and Supplementary Conditions and all Division 1 specification sections.

1.2 SECTION INCLUDES

A. Toilet accessories.

B. Grab bars.

1.3 SYSTEM DESCRIPTION

A. Conform to applicable code for installing work in conformance with ANSI A117.1 and ADA.

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Product Data: Submit data on product characteristics, performance criteria and limitations.

B. Manufacturer's Installation Instructions: Submit procedure for preparation and installation.

C. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

E. Supply 2 keys for each accessory to Owner. Key all accessories alike.

PART 2 PRODUCTS

2.1 MATERIALS

A. Manufacturers: Products of one or more manufacturers are listed in Schedules to establish quality, appearance and performance characteristics. Products of other manufacturers may be accepted subject to review by Architect.
   1. American Specialties Inc.
   2. Basco.
   3. Bobrick Washroom Equipment Inc.
   4. Bradley Corp.
   5. Franklin Brass.
   6. NuTone.
   7. McKinney/Parker Products Co.
   8. Best Bath

B. Sheet Steel: ASTM A366.

B. Stainless Steel Sheet: ASTM A167 Type 304.

C. Tubing: ASTM A269 stainless steel.

D. Fasteners, Screws, and Bolts: Hot dip galvanized steel, tamper-proof appropriate of substrate.

2.2 FABRICATION

A. Form surfaces flat without distortion. Weld and grind joints smooth.

B. Shop assemble components and package with anchors and fittings.

C. Back paint components to prevent electrolysis.

D. Provide steel anchor plates, adapters, and anchor components for installation.

E. Hot dip galvanize exposed and painted ferrous metal and fastening devices.

2.3 FINISHES

A. Anchors: Galvanize to 1.25 oz./sq yd.

B. Ferrous Metals - Shop Primed: Pretreat and clean, spray apply one coat primer and bake.

C. Enamel: Pretreat, one coat primer and two coats baked enamel.

D. Chrome/Nickel Plating: ASTM B456, Type SC 2 polished finish.

E. Stainless Steel: No. 4 satin luster finish.

PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Verify exact location of accessories for installation.

B. Deliver inserts and rough-in frames to site. Provide templates and rough-in measurements as required.

3.2 INSTALLATION

A. Install fixtures, accessories and items in accordance with manufacturers' instructions.

B. Install plumb and level, securely and rigidly anchored to substrate.

Continued next page…

3.3 SCHEDULE

ITEM (See Note 1 and 2)	MFR	MODEL NO.
Grab Bars – Wall Mount	Bradley	832 series
24”x36” Surface Mounted Stainless Steel Mirror	Bradley	7481-2436, Bottom of reflective surface shall be 40” max.
Soap Dispenser	Bradley	6563, Surface Mounted
Hand Dryer	Xlerator Hand Dryer	XL-W
Robe Hook	Bobrick	B6707
Toilet Tissue Dispenser	Bradley	5425, Jumbo Roll, Surface Mounted
Baby Changing Station	Bradley	Model 9632 Cream BradEX
Sanitary Napkin Disposal	Bobrick	B-5270, Surface Mounted

1. G.C. to provide solid wood blocking in wall for all scheduled toilet accessories within Year Round Toilet.
2. Reference interior elevations and floor plan for locations, size and quantities.

END OF SECTION

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SECTION 10 50 00

SOLID PLASTIC LOCKERS

PART 1 GENERAL

1.1 SUMMARY

A. Drawings and general provisions of Contract including 'Standard General Conditions of the Construction Contract'.

1.2 SECTION INCLUDES

A. Solid plastic lockers, (HDPE).

1.3 SUBMITTALS

A. Reference 'Standard General Conditions of the Construction Contract'.
B. Shop drawings: Include dimensioned layout, elevations, trim, closures, and accessories.
C. Product Data: Manufacturer's descriptive data.
D. Samples: 3 inch by 3 inch samples of full line of manufacturer's colors.

1.03 QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum 5 years experience in manufacture of solid plastic lockers with products in satisfactory use under similar service conditions.

B. Installer Qualifications: Minimum 5 years experience in work of this Section.

1.04 WARRANTIES

A. Provide manufacturer's 25 year warranty against breakage, corrosion and delimitation under normal conditions.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Contract Documents are based on products by Scranton Products. (www. Scrantonproducts.com)

B. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Solid Plastic Panels:

1. Lockers:

a. High impact, high density polyethylene (HDPE) formed under high pressure into solid plastic components with homogeneous color throughout, with smooth orange peel finish.

b. Edges machined to accept assembly brackets.
c. Color: As indicated in Interior Finish Legend
d. Layout: Refer to Interior Elevations for locker layout and configuration.

2.3 COMPONENTS- LOCKERS

A. Locker Doors and frames: 1/2 inch thick.

B. Sides, Tops, Bottoms, Backs, and Shelves: 3/8 inch thick.

C. Latch: Continuous type, manufactured from HDPE, capable of accepting various locking mechanisms, fastened to entire length of door.

D. Door Hinge: Heavy duty extruded aluminum, full length, assembled onto door and locker front.

E. Assembly Profile: Full height of lockers, PVC plastic, snap fit assembled onto locker sides.

F. Coat Hooks: Two-prong, high impact plastic, mounted to bottom of shelf or divider, one per door opening.

2.4 FABRICATION

A. Fabricate locker components square and rigid, finish free from scratches and chips.

B. Fabricate locker components for snap-together assembly or slide-together dovetail connections providing solid and secure, anti-racking construction.

C. Fabricate adjacent lockers with common side panel.

D. Fabricate locker units for assembly in maximum of three adjacent lockers.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS.

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

3.2 INSTALLATION.

A. Install lockers in accordance with manufacturer’s instructions and approved Shop Drawings.

B. Set lockers on prepared locker base.

C. Set plumb, level, rigid, and aligned.

D. Attach lockers to supporting construction with anchors best suited to substrate conditions.

E. Adjust doors and latches to operate correctly.

END OF SECTION

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SECTION 12 20 10

WINDOW TREATMENT

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract including 'Standard General Conditions of the Construction Contract'.

1.2 SECTION INCLUDES

A. Roll-up shades.

1.3 SUBMITTALS

A. Reference 'Standard General Conditions of the Construction Contract'.

B. Product Data: Provide data indicating physical and dimensional characteristics and operating features.

C. Samples: Submit samples for selection of color and finish of shades.

PART 2 PRODUCTS

2.1 ROLL-UP SHADES

A. Shades: Vertical roll-up room darkening window shade, with continuous metal chain and sprocket operation. Provide rolling chain termination device secured to lower window jamb.
   1. Fabric Sheeting: Vinyl coated fiberglass cloth.
   2. Color: As selected from full line of manufacturers colors.

B. Manufacturers:
   1. Bali-Graber Contract.
   2. Levolor Kirsch.
   3. C-Mor Products

D. Roller: Hollow Metal.

E. Attachment Hardware: Type recommended by blind manufacturer.

F. Operating Hardware: Continuous chain drive with wall mounted chain stabilizer.

2.3 FABRICATION

A. Fabricate blinds to fit within openings with uniform edge clearance as recommended by manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that openings are ready to receive the work.

3.2 INSTALLATION

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

B. Secure in place with flush countersunk fasteners appropriate for the substrate.

C. Adjust blinds for smooth operation.

D. Mount brackets within the structure’s window opening.

3.3 SCHEDULE

A. Provide (1) roll-up shade at each window within the First Aid room.

END OF SECTION

SECTION 12 35 30

RESIDENTIAL CASEWORK

PART 1 GENERAL

1.1 SUMMARY

A. Related Sections:
   1. Drawings and general provisions of Contract including General and Supplementary Conditions and all Division 1 specification sections.
   2. Provision of waste management: Section 01 74 19, Construction Waste Management and Disposal.

1.2 SECTION INCLUDES

A. Shop fabricated phenolic cabinet units and counter tops.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Product Data: Submit data on product characteristics, performance criteria and limitations.

C. Manufacturer's Installation Instructions: Submit procedure for preparation and installation.

D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

A. Design Data/Test Reports: Manufacturer shall submit test data and design criteria which are in compliance with the project specifications.

B. Certificates: All certifications required in the specifications shall be submitted with the original submittal package under separate cover. Certificates must be provided with the signature of a qualified individual of the supplier.

C. Manufacturers' Instructions: Provide manufacturer's instructions for installation and maintenance of all products provided and installed within this section. Instructions will be in bound form, tabbed and organized by section number.

PART 2 PRODUCTS

2.1 CASEWORK

A. Manufacturers: Products of one or more manufacturers are listed to establish quality, appearance and performance characteristics. Products of other manufacturers may be accepted subject to review by Architect.

D. Manufacturers of Cabinets:

1. New England Lab, BMT/Nelson Casework
2. Substitutions: Permitted, subject to compliance with requirements.

E. Manufacturers of Countertop:
1. Bradley Corporation
2. Substitutions: Permitted, subject to compliance with requirements.

F. Cabinet Style: Burlington Series, Solid General Purpose Phenolic Resin

2.2 CONSTRUCTION

A. Cabinet Construction
1. Phenolic Resin Layered Core
2. Frameless Construction
3. Full Overlay Front
4. Water Resistant Phenolic Base with 4” Toe Kick
5. Full Depth Adjustable Shelf with Steel pins
6. Phenolic Resin Layered Core
7. Phenolic Resin Drawer Box Construction

2.3 HARDWARE

A. Drawer and Door Pulls: Black Painted Wire Pull

B. Hinges: Concealed, self-closing.

C. Drawer Glides: Epoxy Coated Self-Closing, 75lb.

2.5 COUNTERTOPS

A. Engineered Stone Material, Basis of Design Product: Bradley, Evero
1. Surface Burning Characteristics: Smoke developed, less than 450; flame spread, less than 25, per ASTM E84.
2. Flexural Strength: 3267 psi (22.5 MPa). Minimum, per ASTM D 790.
3. Compressive Strength: 11,500 psi (79 MPa), minimum, per ASTM C 170.
4. Moisture Absorption: .065 percent in 24 hours, per ASTM D 570.
5. Hardness 6-7 Mohs Scale, per ASTM D 785.
6. Thickness: ½ inch.
7. Provide Backsplash and side splash.

PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Verify adequacy of backing and location of mechanical and electrical outlets.

B. Provide supplementary support framing.

3.2 INSTALLATION

A. Set and secure casework in place rigid, plumb, and level.

B. Provide cutouts for plumbing fixtures, appliances, and other fixtures and fittings.

C. Use fixture attachments at concealed locations for wall mounted components.

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

E. Carefully scribe casework which is against other building materials, leaving gaps of 1/32 inch maximum. Use filler strips, not additional overlay trim for this purpose.

F. Secure cabinet and counter bases to floor using appropriate anchorage.

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

END OF SECTION

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SECTION 12 93 00 SITE FURNISHINGS

PART 1 GENERAL

1.1 DESCRIPTION

A. Bidding requirements, conditions of the contract and pertinent portions of sections in Division One of these specifications, apply to the section as fully as though repeated herein.

B. Work under this section includes furnishing and installing.

1. Exterior Bicycle Racks

2. Exterior Seating

3. Exterior Shower Stations

C. Related work:

1. Section 31 05 12, Site Earthwork.

2. Section 32 13 13, Concrete Paving.

1.2 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

1. Exterior Bicycle Racks:

a. Product Data: Include physical characteristics such as shape, dimensions, bicycle parking capacity and finish for each bicycle rack.

b. Shop Drawings: Show installation details for each bicycle rack.

c. Samples for Verification: For the bicycle rack showing the color of the powder coat finish, Prepare 2 inch by 3.5 inch (50.8 mm by 87.5mm) powder coat samples (or larger) from the same material to be used to finish the product.

d. Maintenance Data: For each bicycle rack. Include recommended methods for repairing damage to the powder coat finish. **Provide Owner with manufacturer touch up paint kit.**

2. Exterior Seating:

a. Shop Drawings: Showing fabrication details and granite color.

3. Exterior Shower Units:

b. Exterior shower units including warranty documentation.

1.3 DELIVERY, STORAGE AND HANDLING

A. Package, handle, deliver and store site furnishings at the project site in a manner that will avoid damage.

B. Exterior Bicycle racks:

1. Upon delivery, before signing for shipment, inspect for any damages and notate on the B.O.L.

2. Store bicycle racks in original undamaged packages and containers until ready for installation.

3. Handle bicycle racks with sufficient care to prevent any scratches or damage to the finish.

4. Damaged bicycle racks shall not be installed; damage to paint finish shall be inspected by Project Landscape Architect before installation. Project Landscape Architect reserves the right to reject bike racks when damage to paint finish is significant and not suitable for touch up paint.

C. Exterior Granite Seating:

1. Upon delivery, before signing for shipment, inspect for any damages and notate on the B.O.L.

2. Store benches in protected location until ready for installation.

3. Handle benches with sufficient care to prevent any damage to granite.

D. Exterior Shower Units:

1. Upon delivery, before signing for shipment, inspect for any damages and notate on the B.O.L.

2. Store shower units in protected location until ready for installation.

3. Handle shower units with sufficient care to prevent any damage to granite.

1.4 QUALITY ASSURANCE

A. Exterior Bicycle racks:

1. Installer Qualifications: An experienced installer who has completed installation of bicycle racks 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.

2. Manufacturer Qualifications: A firm experienced in manufacturing bicycle racks similar to those required for this project and with a record of successful in-service performance.

B. Exterior Seating:

1. Installer Qualifications: An experienced installer who has completed installation of benches 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.

2. Manufacturer Qualifications: A firm experienced in manufacturing benches similar to those required for this project and with a record of successful in-service performance.

1.5 WARRANTY

A. Bicycle Racks shall carry a one year manufacturer's limited warranty against defects in materials and workmanship. The one year warranty period begins the date the product is shipped from the manufacturer.

B. Exterior Shower units shall carry a one year manufacturer's limited warranty against defects in materials and workmanship. The one year warranty period begins the date the product is shipped from the manufacturer.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Bicycle Rack:

1. Provide Wabash Valley BL100N in-ground mount 36 inch bike rack, color "Smoke", manufactured by Wabash Valley Manufacturing, Inc., 505 E. Main Street, P.O. Box 5, Silver Lake, IN 46982 (800-253-8619). Products of other manufacturers may be considered subject to compliance with requirements as judged solely by Landscape Architect.

B. Bench:

1 Provide Granite Benches in size and quantity as shown on site plans, color "Woodbury" and as detailed to be fabricated by Swenson Granite**:** 582 Bridgton Road, Westbrook, Maine 04092.

C. Concrete Bases and Footings: Furnish and install all concrete work in accordance with the following standards: ACI 301 Formwork, ASTM C150 Normal Type 1 Portland Cement, grey color, ASTM C33 fine and coarse aggregates, ASTM C94 concrete mix, comprehensive strength of 4000 PSI at 28 days. Deformed welded wire fabric ANSI/ASTM A497, rebar; ASTM A613 grade 60.

<u>Shower Unit</u>

a. Shower units shall be provided with (2) shower stations, (2) foot wash stations and (1) child/ADA shower at 50' inch height. Shower units shall be "Shower Tower", as manufactured by Shower Tower, Inc. – 970 Country Club Road – Sanford, FL. 32773, 1-800-330-9073.

PART 3 EXECUTION

3.1 INSTALLATION

A. Bike Rack:

1. Contractor shall handle install bike rack as shown on drawings in accordance with manufacturer's recommendations and installation instructions.

2. Protect finish surface of bike rack during installation and placement of concrete pad.

3. Installation Method: Surface mount with concrete anchors with tamper resistant nuts.

4. It is the responsibility of the installer to ensure that all base materials into which the rack will be installed can support the rack and will not be damaged by any required installation procedures.

B. Granite Seating:

1. Contractor shall install bench as shown on drawings in accordance with manufacturer's recommendations.

C. Concrete Bases and Footings: Contractor shall supply and install concrete bases and footings in quantities and locations as shown on the Drawings and specified herein.

D. Shower Unit:

Provide shower tower units in quantities as shown on plan. Install per manufacture requirements and as detailed on Drawings.

END OF SECTION

SECTION 220000 - PLUMBING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The drawings and the specifications including Section 23 05 00 “Supplemental General Mechanical Conditions” are hereby made a part of the work of this section.

B. Drawings and general provisions of the Contract including General and Supplementary Conditions and all Division 1 specification sections.

C. Uniform Federal Accessibility Standards (UFAS).

D. Americans with Disabilities Act (ADA).

1.2 DESCRIPTION

A. The work covered by this Section of the specifications includes the furnishing of labor, materials, equipment, transportation, permits, inspections, and incidentals and the performing of operations required to provide a complete and functional plumbing system.

B. Work shall be in accordance with the current edition of the Maine State Plumbing Code and applicable local ordinances.

1.3 SUBMITTALS

A. Substitutions: Your attention is directed to Section 23 05 00-"Substitutions", relative to competition and the (ONLY) notation. Familiarity with this section shall be achieved before reading the PRODUCTS section of this specification.

B. The items for which the submittals paragraph in Section 23 05 00, Supplemental General Mechanical Requirements, apply are as follows:

1. Piping materials.
2. Valves.
3. Pipe hangers.
4. Fixtures and trim.
5. Miscellaneous equipment.
6. Water heating equipment.
7. Piping, valves and equipment identification.
8. Trap primers.
9. Thermostatic mixing valve.

C. Section 01330 - Submittal Procedures: Submittal procedures.

D. Product Data: Submit data on product characteristics, performance criteria and limitations.

E. Manufacturer's Installation Instructions: Submit procedure for preparation and installation.

F. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

PART 2 PRODUCTS

2.1 PIPING MATERIALS

A. Soil and Waste (Sanitary) and Vent Piping: Schedule 40 PVC with solvent welded joints/fittings.

B. Domestic Water Piping and Condensate Drain Piping: Type L hard copper tubing and cast bronze or wrot copper solder fittings or "Flowguard Gold" Schedule 40 solvent-welded CPVC pipe and fittings. CPVC pipe and fittings shall be rated at 100 psig at 180^{0}F and shall meet or exceed the requirements of ASTM D2846, the IBC, and be certified by the ANSI/NSF for potable water applications. Installation, including supports, shall be per the manufacturer's recommendations. Piping at the water service and in the mechanical room shall be Type L Copper.

a. Branch piping less than 1" in size, to fixtures may be Uponor AquaPEX, NSF rated, 180°F at 100psi, red (HW), blue (CW) and white (RHW).

C. Exposed Water and Waste Piping at Fixtures: I.P.S. copper with cast brass fittings chrome plated finish, with deep one piece escutcheon plates at traverse points.

D. Solder: Lead-free (ONLY), Englehard Silvabrite 100, 440°F melting point, ASTM B32.

2.2 VALVES

A. Ball Valves: Copper alloy with stationary seat ring and chromium plated or stainless steel floating ball per Federal Specification WW-V-35B. Blowout proof stem, reinforced PTFE seal. Sizes 2" and larger shall have threaded ends. Provide lever handle with stem extension as required to allow operation without interfering with pipe insulation.

B. Check Valves: Horizontal Swing, MSS SP-80, Type 3, Class 125.

C. Drain Valves: Provide ball valves with 3/4" hose connection and brass cap.

D. Fixture Service Stop Valves: BrassCraft G2 Series ¼ Turn stops or equal, ASME A112.18M, Lead Free.

1. Each plumbing fixture shall have individual stop valves in the hot and cold supplies.

2. Service stop valves exposed in finished areas shall be chrome-plated brass; in non-finished areas, ball valves shall be used in lieu of chromed supplies.

E. Temperature and Pressure Relief Valves: Bronze body, tested under ANSI Z21.22, AGA and ASME rated, 125 psig/210°F relief settings.

F. Balancing Valves: Taco "Accu-Flo".

1. Bronze or brass body and internals, teflon seats, memory stop, 300 psi working pressure, 250°F working temperature. Balancing devices shall have provisions for connecting a portable differential pressure gauge. Each balancing device shall be sized to provide a differential pressure reading between 2 and 5 feet with the valve full open at design flow rates.

2. Install per manufacturer's recommendations for adjacent length of straight pipe.

3. Submittals shall indicate gpm, size, wide open differential pressure meter reading, and actual water pressure drop.

2.3 PIPE HANGERS

A. Adjustable Swivel Hangers:

1. Pipe sizes 2" and less: Carpenter and Paterson Fig. 800, oversize for insulated piping systems.

2. Pipe sizes larger than 2": Carpenter and Paterson Fig. 100, oversize for insulated piping systems.

B. Riser Clamp: Carpenter and Paterson Fig. 126 CT copper plated for copper piping, Fig. 126 for iron and PVC piping.

A. Insulation Shields: 18 ga. galvanized steel, 180° wrap, Carpenter and Paterson Fig. 265P, Type H.

2.4 FIXTURES AND TRIM

A. (P-1) Water Closet: Wall-mounted, flush-valve type, Kohler Kingston K-4323, back spud, elongated bowl, white vitreous china, low consumption (1.28 gpf).

1. Flush Valve: Zurn ZH6152AV-HET, concealed, hydraulically operated flush valve. Furnish with bumper stop, vacuum breaker and stop valve.

2. Seat: Kohler K-4731-C, heavy weight solid plastic, open front, external check hinges, for elongated bowl, white color.

3. Furnish with Zurn, MIFAB, Wade or Smith concealed wall carrier rated for 1,000lbs. Provide auxiliary support assemblies as required for back-to-back carriers and extended length bolts for thicker CMU walls. Mounting heights shall be as indicated on the Architectural Drawings.

B. (P-1A) ADA Water Closet: Wall-mounted, flush-valve type, Kohler Kingston K-4323, back spud, elongated bowl, white vitreous china, low consumption (1.6 gpf). Trip lever shall be mounted on the wide side of the stall.

1. Flush Valve: Zurn ZH6152AV-HET, concealed, hydraulically operated flush valve. Furnish with bumper stop, vacuum breaker and stop valve.

2. Seat: Kohler K-4731-C, heavy weight solid plastic, open front, external check hinges, for elongated bowl, white color.

3. Furnish with Zurn, MIFAB, Wade or Smith concealed wall carrier rated for 1,000lbs. Provide auxiliary support assemblies as required for back-to-back carriers and extended length bolts for thicker CMU walls. Mounting heights shall be as indicated on the Architectural Drawings.

4. Total installed height of front edge of seat shall be 17" to 19" above finished floor. Final installation shall meet ADA guidelines and ANSI A117.1.

C. (P-1C) ADA Water Closet: Floor-mounted, flush-valve type, Kohler Highline K-4405, back spud, elongated bowl, white vitreous china, low consumption (1.28 gpf). Trip lever shall be mounted on the wide side of the stall.

1. Flush Valve: Zurn ZH6000AV-HET, exposed, manually operated flush valve. Furnish with bumper stop, vacuum breaker and stop valve.

2. Seat: Kohler K-4731-C, heavy weight solid plastic, open front, external check hinges, for elongated bowl, white color.

3. Total installed height of front edge of seat shall be 17" to 19" above finished floor. Final installation shall meet ADA guidelines and ANSI A117.1.

D. (P-1B) ADA Urinal: Wall-hung, flush-valve type, Kohler K-5452-ER, white vitreous china, back spud, low consumption (0.125 gpf), urinal lip shall extend a minimum of 14" from finished wall.

1. Flush Valve: Zurn ZH6195AV, concealed, hydraulically operated flush valve. Furnish with bumper stop, vacuum breaker and stop valve.

2. Carrier: Zurn or Jay R. Smith, ANSI A112.6.1M with feet.

3. ADA urinal shall be installed with front rim a maximum of 17" above finished floor and flush valve handle a maximum of 44" above finished floor. Final installation shall meet ADA guidelines and ANSI A117.1.

E. (P-2) ADA Wall Hung Lavatory: Bradley LVRD1, Verge Lavatory System, single station, elongated bowl, utility shroud with access panel, thermostatic mixing valve. Color by Architect.

1. Metering Faucet: Zurn Z86100-XL, polished chrome, slow-closing metering faucet, vandal resistant, ADA compliant, adjustable cycle time and 0.25gpm aerator.

2. Trap: 1¼" PVC P-trap with cleanout plug. Adjustable with connected elbow and nipple to wall. Cover with Bradley trap cover enclosure.

3. The installation of and accessories shall meet ADA guidelines and ANSI A117.1.

F. (P-2A) ADA Wall Hung Lavatory: Bradley LVRD2, Verge Lavatory System, multi-user station, elongated bowl, utility shroud with access panel, thermostatic mixing valve. Color by Architect.

1. Metering Faucets: Zurn Z86100-XL, polished chrome, slow-closing metering faucet, vandal resistant, ADA compliant, adjustable cycle time and 0.25gpm aerator.

2. Trap: 1¼" PVC P-trap with cleanout plug. Adjustable with connected elbow and nipple to wall. Cover with Bradley trap cover enclosure.

3. The installation of and accessories shall meet ADA guidelines and ANSI A117.1.

G. (P-2B) ADA Wall Hung Lavatory: Bradley LVRD3, Verge Lavatory System, multi-user station, elongated bowl, utility shroud with access panel, thermostatic mixing valve. Color by Architect.

1. Metering Faucets: Zurn Z86100-XL, polished chrome, slow-closing metering faucet, vandal resistant, ADA compliant, adjustable cycle time and 0.25gpm aerator.

2. Trap: 1¼" PVC P-trap with cleanout plug. Adjustable with connected elbow and nipple to wall. Cover with Bradley trap cover enclosure.

3. The installation of and accessories shall meet ADA guidelines and ANSI A117.1.

H. (P-2C) ADA Kitchen Sink, Single Bowl: Just SLF-ADA-2017-A-GR, 18 gauge stainless steel, 20"x17"x6-1/2" overall size, 2 faucet holes on 4" centers, rear offset drain, overflow drain, fully sound deadened.

1. Faucet: Zurn Z812A4-XL, 4" lever handles, 10" gooseneck spout, polished chrome finish, quarter turn ceramic control cartridge, 1.0 aerator.

2. Strainer: Polished chrome grid strainer.

3. Sink installation shall be in compliance with the ADA guidelines.

4. Exposed traps and supplies with Truebro Lavguard.

I. (P-3) Mop Basin: Fiat Model MSB2424, Zurn, Williams, or approved equal, molded stone, 24"x24"x12" with 1" wide shoulders, 6" drop front; 3" stainless steel drain with combination dome strainer and lint basket.

1. Faucet: Fiat Service Faucet Model 830-AA, Speakman, or approved equal, chrome-plated with vacuum breaker, integral stops, adjustable wall brace, pail hook, and 3/4" hose thread on spout.

2. Hose and Hose Bracket: Fiat Model 832-AA, 30" long flexible heavy duty 5/8" cloth reinforced rubber hose with 3/4" chrome coupling at one end, 5"x3", stainless steel bracket with rubber grip.

3. Wall Guard: Fiat Model MSG-2424, stainless steel wall guards.

4. Mop Bracket: Fiat Model 889-CC, 24" stainless steel.

5. Caulk around mop basin at floor and walls with white silicone caulk.

J. (P-3A) Laundry Tub: Fiat model FL-1, floor mounted laundry tub, 23"x21-1/2" overall dimensions, molded stone basin with white baked enamel legs. Provide with Fiat model A-1 deck mounted faucet.

H. Provide quarter turn ball valve stops on hot and cold water supplies to each fixture with loose key operators for vandal resistance.

2.5 MISCELLANEOUS EQUIPMENT

A. Floor Drains (FD): Zurn Z-415, Watts, or approved equal, cast iron body with 4" bottom outlet, sediment bucket, combination invertible membrane clamp and adjustable collar. Strainer shall be 6" diameter Zurn "Type B", polished nickel-bronze. Floor drains shall have trap primer connection, connect to nearest plumbing fixture.

B. Floor/Yard Cleanout (FCO/YCO): Zurn Z-1400 Watts, or approved equal, adjustable floor cleanout, cast iron body, with gas and watertight ABS tapered thread plug. Provide size equal to piping served with maximum size of 4".

1. Concrete floor finishes: Scoriated round polished bronze top.

2. Sheet tile finishes: Scoriated square polished bronze top recessed to receive tile.

3. Carpeted finishes: Scoriated round polished bronze top and carpet marker.

C. Wall Cleanout (WCO): Sanitary tee with threaded raised nut or countersunk-nut cleanout plug located behind Zurn Z-1468, Watts, or approved equal, round stainless steel wall access cover.

D. Vacuum Breaker: Watts Model N36, 3/4" size, 20 CFM capacity.

E. Automatic Trap Primers: PPP Prime-Pro Trap Primer, Watts or Zurn, flow thru design for use with low flow plumbing fixtures.

G. Strainer: Watts Series 777, MIL-S-16293, bronze body wye-type, 200 WOG rating, screwed end connections, 20 mesh stainless steel, monel, or bronze screen.

H. Indoor Wall Hydrant (HB): Zurn Z1350 or approved equal, narrow wall, recessed box, 3/4" size, brass body, brass head nut, automatic draining, with vacuum breaker and loose tee key.

I. Freezeless Wall Hydrant (FPHB): Zurn Z1320-C or approved equal, recessed box, 3/4" size, brass body, brass head nut, automatic draining, with vacuum breaker and loose tee key.

J. Water Hammer Arrestor (Shock Absorber): Plumbing and Drainage Institute listed.

Schedule:

"A" - Size #100 PDI - 0-11 Fixture Units
"B" - Size #200 PDI - 12-32 Fixture Units
"C" - Size #300 PDI - 33-60 Fixture Units

K. Vacuum Breaker: Watts Model N36, 3/4" size, 15 CFM capacity.

L. Water Meter: Coordinate with the Portland Water District and include the cost of the meter and installation per the Water District requirements.

M. Backflow Preventers (BFP): Conforming to AWWA C506, FCCHR-USC Manual Section 10, and UL listed. Types, sizes and capacities scheduled, Apollo, Zurn or Watts.

1. Double Check (DC): Double check backflow assembly with test ports, bronze body with stainless steel springs, corrosion resistant internals, stop and waste ball valves.

2. Atmospheric Double Check (DCA): Double check continuous pressure type with atmospheric port for low hazard applications, 250°F maximum water temperature, bronze body, stainless steel internals with rubber seals and integral strainer.

3. Reduced Pressure Zone (RPZ): Reduced pressure principle type; bronze body with stainless steel internals. Provide bronze body ball valves, test cocks, and air gap fittings.

N. Thermostatic Mixing Valve (TMV-#): Shall be Powers, Apollo, Symmons or Leonard, capacities and performance as scheduled with swivel action check-stops, thermometer, shut-off and removable cartridge with strainer. Controller shall consist of a liquid fill thermal motor with bellows mounted out of the water. Finish shall be rough bronze.

2.6 WATER HEATING EQUIPMENT

A. Electric Water Heater (EWH): Make, model, and performance as scheduled on Drawings; UL 174 and ASHRAE 90.1 compliant, glass-lined tank with replaceable anode rod and heavy gauge steel jacket with baked enamel finish, ASME rated temperature and pressure relief valve, dial thermometer, adjustable range thermostat and high temperature cut-off.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection:

1. Prior to work of this Section, carefully inspect the installed work of other trades and verify that such work is complete to the point where this installation may properly commence.

2. Verify that plumbing may be installed in strict accordance with pertinent codes and regulations and the reviewed Shop Drawings.

3.2 INSTALLATION OF PIPING

A. Provide and erect in accordance with the best practice of the trade piping shown on the drawings and as required to complete the intended installation. Make offsets as shown or required to place piping in proper position to avoid other work and to allow the application of insulation and finish painting to the satisfaction of the Architect.

B. The size and general arrangements, as well as the methods of connecting piping, valves, and equipment, shall be as indicated, or so as to meet the requirements of the Architect.

C. Piping shall be erected so as to provide for the easy and noiseless passage of fluids under working conditions.

D. Install unions to facilitate removal of equipment.

E. Copper pipe shall be reamed to remove burrs.

F. Connections between copper and steel piping shall be made with dielectric fittings.

G. Solder joints shall be made with lead free solder. Clean surfaces to be soldered and use a paste flux. Wash joints with sodium bicarbonate and water to remove corrosive effects of heated solder paste. Caution: Lead-bearing solder is not permitted.

H. Pipe penetrations through walls, floors and ceilings shall be in accordance with Section 23 05 00 "Supplemental General Mechanical Requirements". Traverse points of piping shall be escutcheoned with split chrome floor and ceiling plates and spring anchors, where visible to occupancy.

I. Provide a cleanout in the vertical position at the base of each sanitary drop.

J. Sanitary and vent piping shall be sized and installed at 1/4" per foot slope.

K. All vertical and horizontal penetrations through walls, floors and ceilings shall be sealed against air movement between spaces.

3.3 PIPE HANGERS

A. Impact driven studs are prohibited.

B. Copper Tubing: supported at intervals with rod sizes as follows, double nuts on hangers and on beam clips.

Copper Size	Hanger Intervals	Rod Sizes
1/2"	5'	3/8"
3/4"	6'	3/8"
1"	6'	3/8"
1-1/4"	8'	3/8"
1-1/2"	8'	3/8"
2"	10'	3/8"

C. Cast Iron Pipe: Supported at intervals with rod sizes as follows, double nuts on hangers and on beam clips.

Cast Iron Size	Hanger Intervals	Rod Sizes
1-1/2"	5'	3/8"
2"	5'	3/8"
2-1/2"	5'	1/2"
3"	6'	1/2"
4"	7'	5/8"

D. PVC/CPVC Pipe: Supported at 4 foot intervals.

E. Verticals: Supported by use of clamp hangers at every story height, and at not more than 6 feet intervals for copper piping 1-1/4" and smaller size.

F. Spring Isolators: All pipe 20' upstream and downstream of pumps.

3.4 CLOSING IN UNINSPECTED WORK

A. General: Cover up or enclose work after it has been properly and completely reviewed.

B. If any of the work is covered or enclosed prior to required inspections and review, uncover the work as required for the test and review. After review, tests and acceptance, repairs and replacements shall be made by the appropriate trades with such materials as necessary for the acceptance by the Architect and at no additional cost to the Owner.

3.5 CLEANUP AND CORROSION PREVENTION

A. Upon completion of the work thoroughly clean and flush piping systems to the sewer with water.

B. Fixtures, piping and equipment shall be thoroughly cleaned. Dirt, dust, and debris shall be removed and the premises left in a clean and neat condition.

C. Caulk around fixtures at floor and wall.

D. Before covering is applied to piping systems, clips, rods, clevises and other hanger attachments, and before uncovered piping is permitted to be concealed, corrosion and rust shall be wire brushed and cleaned and in the case of iron products, a coat of approved protective paint applied to these surfaces. When corrosion is from the effects of hot solder paste, the areas shall be cleaned and polished and a wash of bicarbonate of soda and water used to neutralize the acid condition.

3.6 DISINFECTING

A. After the entire potable water system is completed, cleaned and tested, and just before the building is ready to be occupied, disinfect the system as follows: After flushing the mains, introduce a water and chlorine solution for a period of not less than three hours before final flushing of the system.

3.7 TESTS

A. Sanitary soil, waste and vent piping: Fill with water to top of vents, and test as required by Code.

B. Water piping shall be tested to a pressure of 100 lbs. per square inch for at least 30 minutes. Pressure drop in this period shall not exceed two pounds per square inch. Leaks shall be repaired and system retested. Notify Architect 24 hours before test is to be performed.

3.8 INSTRUCTIONS

A. On completion of the project, provide a competent technician to thoroughly instruct the Owner's representative in the care and operation of the system. The total period of instruction shall not exceed four (4) hours. The time of instruction shall be arranged with the Owner.

* END OF SECTION *

SECTION 23 05 00 - SUPPLEMENTAL MECHANICAL GENERAL REQUIREMENTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The General Conditions, Supplemental General Conditions and Instructions to Bidders shall apply to this work. Read these to be familiar with conditions related to the installation of the work.

B. Drawings and general provisions of Contract including General and Supplementary Conditions and all Division 1 specification sections.

1.2 WORK SHOWN ON DRAWINGS

A. The drawings accompanying this specification, as a part thereof, are working drawings indicating the location and arrangement of the increments of the systems of this section of work. Material deviation from this arrangement, process or means of application, shall bear the Engineer's review stamp before the change is made on the job or materials are ordered. Changes made without such review shall be ordered removed and items installed as specified shall be provided at no additional expense to the Owner.

B. The drawings are not intended to show in minute detail minor items of installation or materials such as specific fittings or findings.

1.3 MATERIALS AND LABOR

A. Furnish materials and labor necessary to deliver to the Owner a complete and operable system installed in accordance with the contract documents.

B. Materials shall be of the best quality. Workmanship shall be of highest grade and construction shall be done according to best practices of the trade.

C. Provide, when required, labeled samples of material or equipment specified herein or proposed to be used in this work.

D. Where words "furnish", "provide", or "install" are mentioned, either singly or in combination, these words are hereby interpreted to mean "furnish and install" or "provide and install", including materials complete with connections, supplemental devices, accessories and appurtenances, unless specifically otherwise noted. These words are likewise hereby interpreted as being prefixed to materials, equipment, and apparatus hereinafter mentioned, either in abbreviated or scheduled information or in the technical sections of the specifications.

1.4 EQUIPMENT INSTALLATION IN HEATING SEASON

A. The system shall be installed such that the construction area will have sufficient heat to maintain temperature above 40°F throughout the construction period.

1.5 COOPERATION BETWEEN TRADES

A. Provide information sufficiently in advance of this work, so that work by the other trades may be coordinated and installed without delays. Furnish and locate sleeves, supports, anchors and necessary access panels.

B. Where work is concealed, assure it does not project beyond finished lines of floors, ceilings, or walls.

C. Equipment or piping requiring access found to be located above sheetrock ceilings shall be brought immediately to the attention of the Architect for resolution.

1.6 ORDINANCES, AUTHORITIES, PERMITS, AND FEES

A. Obtain necessary permits and licenses, give notices and comply with laws, ordinances, rules, regulations or orders affecting the work, and pay fees and charges in connection therewith.

B. The "authority having jurisdiction" is the organization, office, or individual responsible for "approving" equipment, an installation, or a procedure.

1.7 PROTECTION OF WORK AND MATERIALS

A. Protect and care for materials delivered and work performed until the completion of the work. Defective equipment or equipment damaged in the course of storage, installation or test shall be replaced or repaired to the satisfaction of the Engineer at no additional cost to the Owner.

1.8 INSURANCE

A. Purchase and maintain Public Liability and Property Insurance during the progress of the work and until completion and acceptance of the entire project by the Owner in the amounts as specified in the General Conditions.

1.9 APPLICABLE CODES

A. Work and materials shall conform to the latest rules and regulations listed below and these rules and regulations hereby are made part of this specification. They include, but are not necessarily limited to the following:

American Society for Testing and Materials (ASTM)
Underwriters' Laboratories, Inc. (UL)
Air Moving and Conditioning Assoc. (AMCA)
American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE)
American Society of Mechanical Engineers (ASME)
National Electrical Manufacturers Association (NEMA)
Institute of Electrical and Electronics Engineers (IEEE)
American National Standards Institute (ANSI)
National Fire Protection Association (NFPA)
American Water Works Association (AWWA)
Local Fire Code
Local Plumbing Codes
American Welding Society
International Building Code (IBC)
Maine Uniform Building and Energy Code (MUBEC)

1.10 SHOP DRAWINGS

A. Submit shop drawings, manufacturers' data and certificates for equipment, materials and finish, and pertinent details for each system where specified in each individual section, five (5) copies, to be submitted to the Architect. Shop drawings will be returned "No Exceptions Taken", "Make Corrections Noted", "Amend and Resubmit", "Submit Specified

Item", or "Rejected" less two (2) copies. Work shall progress in accordance with "Reviewed" shop drawings (ONLY).

B. **Shop drawings that are facsimiled, (FAX) produced, or photocopies of FAX documents will not be considered or reviewed. Only originals and or photocopied originals, complying with this section will be considered.**

C. Groups of similar shop drawings shall be submitted as individual bound documents with covers and indexes. Typical similar items would be "Diffusers and Registers", "Valves and Controls". Rejection of individual items shall not be cause for rejection of the entire document.

D. **Clearly indicate item(s) to be reviewed on each submission by highlighting or underlining intended item(s). Submissions not clearly marked shall be returned "Amend and Resubmit".**

E. Shop drawings must bear the Engineer's review stamp. In the event that the Engineer returns shop drawings "Amend and Resubmit" or "Rejected", the shop drawing must be revised and resubmitted for review.

F. Furnishing of the specified item must still produce the results and performance, dependability and quality reasonably to be expected within the spirit of the specifications, drawings, and the standard of good mechanical performance normal to the trade.

G. Section 013300 - Submittal Procedures: Submittal procedures.

H. Product Data: Submit data on product characteristics, performance criteria and limitations.

I. Manufacturer's Installation Instructions: Submit procedure for preparation and installation.

J. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.11 SUBSTITUTIONS

A. Where the specifications allow the substitution of a product, still this product is subject to review by the Engineer in accordance with the paragraph entitled "Shop Drawings". Review of a substitute item is an indication only that the substitute item is compatible with the specified item as a claim of the manufacturer. Insure dimensional propriety, performance, and quality of the substitute item.

B. Reference in the specifications or on the drawings to any product, material, fixture, form or type of construction, by proprietary name, manufacturer, make or catalog number, establishes a standard of quality or design and is not meant to limit competition. Use any equivalent substitute provided favorable written review by the Engineer is first obtained. The (ONLY) notation in the specification is an exception to this and leaves no option.

C. For materials or equipment which are supplied with integral or factory applied finish, the colors will be considered in evaluating substitutions.

D. For the purpose of avoiding conflicts with other trades, contracts, and adjoining work where more than one (1) article, device, material, fixture, form or proprietary name, manufacturer, make or catalog number, the first named shall be used as the basis of design and details. The cost of any changes because of substituted item shall be borne by the Contractor requesting such change.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.1 EQUIPMENT SUPPORTS

A. Furnish and install equipment supports for mechanical equipment as required. Supports shall be subject to review by the Engineer.

3.2 SLEEVES AND PREPARED OPENINGS

A. Coordinate cutting, patching and setting of sleeves, frames, framing and lintels for openings with other trades. Sleeves shall be furnished by the Contractor. All penetrations through concrete shall be sleeved as required by IBC.

B. Failure to give timely notice of and to locate openings and furnish sleeves shall cause no additional expense to the Owner.

3.3 CONNECTION TO EQUIPMENT

A. Provide piping connections, supports, brackets, compensators or flexible connections to prevent application of excessive stresses to equipment.

B. Equipment shall be installed with flanges or unions in such a manner as to permit disconnecting for removal of tubes, coils, elements and other equipment for inspection, service and repairs.

3.4 ACCESS TO EQUIPMENT

A. The installation of work performed shall provide reasonable accessibility for operation, inspection, and maintenance of equipment and accessories. The Engineer shall determine the adequacy of such accessibility.

3.5 ACCESS PANELS

A. Access panels shall be provided where indicated on the drawings and as required for access to valves and other serviceable components.

B. Access panels installed in fire-rated assemblies shall have the same fire rating as the assembly.

3.6 PAINTING OF EQUIPMENT

A. Exposed ironwork, including steel supports and hangers in unfinished spaces, mechanical rooms, pits, and trenches shall be properly cleaned, prepared and painted with two (2) coats of black asphaltum varnish.

3.7 GUARDS

A. Exposed moving and rotating elements of mechanical equipment items shall be protected with suitable guards for personnel protection. Guards shall be of rigid construction, firmly positioned. Holes shall be provided in guards at shaft centers to facilitate tachometer readings.

3.8 LUBRICATION

A. Furnish and install grease fittings for points requiring lubrication. Furnish extension type fittings as required to provide easy access for maintenance lubrication.

B. Furnish initial charges of lubricants for equipment. Lubricants shall be in conformance with the manufacturer's requirements and recommendations.

3.9 ELECTRIC MOTORS AND MOTOR CONTROLS

A. Unless otherwise noted, motors, motor starters and other electrical accessories which are specified under Mechanical specifications shall be selected with characteristics as follows:

1/2 Horsepower and less - 120 volt, 1 phase, 60 Hz.
3/4 Horsepower and greater – 240 volt, 1 phase, 60Hz.

B. Motors shall be built in accordance with the latest applicable NEMA, IEEE and ANSI Standards. Motors shall be of the latest type and quality specified under individual items of equipment.

C. Magnetic motor starters for mechanical items of equipment shall be furnished under Division 16 unless the starter is an integral part of a factory packaged item of equipment. Each starter furnished as an integral item of equipment shall be provided with overload heater elements. Starters shall have single phase protection or shall have relays installed to provide this feature. Starters shall be equipped with suitable step-down transformers to provide required control voltage.

D. Motors shall have a minimum continuous duty service factor of 1.15. Minimum motor efficiency shall be:

MOTOR HORSEPOWER	PERCENTAGE EFFICIENCY		
	(1200RPM)	(1800 RPM)	(3600 RPM)
1,1-1/2,2,3	----	78.0	76.0
5	87.4	87.4	86.3
7.5	89.4	89.8	87.7
10	89.7	90.3	89.0

3.10 CLEANING OF SYSTEMS

A. Piping systems shall be thoroughly cleaned and flushed prior to initial operation.

B. Thoroughly clean exposed portions of the mechanical installation, removing labels and foreign substance.

C. Furnish detergents, solvents, cleaning compounds, and tools required for cleaning operations.

D. Keep the premises free from accumulation of waste material or rubbish and at the completion of the work, remove from the job site tools, scaffolding, surplus materials, and rubbish, leaving the work areas "broom" clean.

3.11 STARTING OF EQUIPMENT

A. Testing or starting of equipment shall be done in collaboration with trades concerned to insure safe and proper operation of the equipment.

B. Prior to starting equipment, provide lubrication at required points. Before starting any electrical or electric motor driven equipment, a check must be made to insure that proper heater coils are installed in the starters and that the equipment is rotating in the proper direction.

3.12 OPERATIONAL TESTING

A. Operate systems until successful operation is demonstrated to the Engineer. This initial operation shall be in addition to the testing of the system and shall be done after the system is cleaned and finished.

3.13 RECORD DRAWINGS

A. During construction, keep an accurate record of deviations to the installation of the work as indicated on the drawings. Upon completion of the work, furnish a copy of this record to the Engineer. **Submit record drawings before requesting final payment**.

3.14 MANUFACTURER'S REPRESENTATIVE

A. As indicated in the Technical Sections of this specification or as directed by the Engineer, provide the services of a factory trained Engineer or Technician to inspect, adjust, and place in proper operating condition the equipment or item involved. No additional compensation will be allowed for such service.

3.15 MANUFACTURER'S INSTRUCTIONS, OPERATION AND MAINTENANCE DATA

A. Provide for each item of equipment or apparatus furnished, a complete set of printed instructions obtained from the manufacturer covering proper operation, maintenance, lubrication, cleaning, servicing, adjustment, and safety instructions.

B. Manufacturer's data shall include performance data (curves are preferred where applicable) complete parts lists, recommended spare parts lists, piping, and wiring diagrams.

C. Arrange data in complete sets, properly indexed and marked.

D. Data shall include a complete set of shop drawings.

E. Material shall first be submitted in preliminary form for review by the Engineer. After review, submit two (2) copies in bound volumes to the Engineer for distribution.

3.16 GUARANTEES

A. An item becomes "defective" when it ceases to conform to the Contract Documents. Guarantees begin on the date of issuance of a certificate authorizing final payment or certificate of substantial completion with the Owner taking occupancy or beneficial use thereafter.

B. Upon completion of the work and before applying for final payment, furnish a written guarantee, stating that the work complies with the provisions of codes listed herein and the local enforcing authorities, and that it will be free from defects of material and workmanship for not less than one (1) year. Guarantee shall further state that the Contractor will, at his own expense, repair or replace any of his material and work which may become defective during the time of guarantee, together with other work damaged as a consequence of such defects.

C. Repeated malfunctioning or failure in service of any item or work of the system is sufficient cause for the Engineer to order the removal of the item, and its replacement with new item at the expense of the Contractor.

* END OF SECTION *

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SECTION 23 07 00 - INSULATION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The drawings and the specifications including Section 23 05 00 “Supplemental General Mechanical Conditions” are hereby made a part of the work of this section.

B. Drawings and general provisions of Contract including General and Supplementary Conditions and all Division 1 specification sections.

1.2 DESCRIPTION

A. The work covered by this Section of the specifications includes the furnishing of labor, materials, equipment, transportation, permits, inspections and incidentals and the performing of operations required to insulate the heating, ventilating and plumbing systems.

1.3 SUBMITTALS

A. Substitutions: Your attention is directed to Section 23 05 00-"Substitutions", relative to competition and the (ONLY) notation. Familiarity with this section shall be achieved before reading the PRODUCTS section of this specification.

B. The items for which the submittals paragraph in Section 23 05 00, Supplemental General Mechanical Requirements, apply are as follows:

1. Piping insulation.
2. Duct insulation.
3. Insulation application schedule.
4. Vapor barrier coating.

C. Section 01330 - Submittal Procedures: Submittal procedures.

D. Product Data: Submit data on product characteristics, performance criteria and limitations.

E. Manufacturer's Installation Instructions: Submit procedure for preparation and installation.

F. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 DEFINITIONS

A. Finished Spaces: Spaces other than furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawl spaces, and tunnels, unless specifically listed below as an unfinished space.

B. Unfinished Spaces: Mech/Elect Rooms and attic.

C. Unconditioned Spaces: Spaces exposed to near outside ambient temperatures (attic) and spaces not air conditioned.

C. Outside: Areas beyond the exterior side of walls or above the roof, unexcavated spaces, and crawl spaces.

D. Concealed: Not visible in finished or unfinished spaces. For example, above ceilings, below floors, between double walls, furred-in areas, pipe and duct shafts, and similar spaces.

E. Exposed: Visible from a finished or unfinished space.

1.6 MANUFACTURER'S STAMP OR LABEL

A. Packages or standard containers of insulation, jackets, cements, adhesives, and coatings delivered to the project site for use must have the manufacturer's stamp or label attached giving name of manufacturer, brand, and description of material. Insulation shall be asbestos-free.

1.7 FLAME SPREAD AND SMOKE DEVELOPED RATINGS

A. Materials shall have a flame-spread rating of not more than 25 and a smoke developed rating of not more than 50 when tested in accordance with NFPA 255, ASTM E84, or UL 723.

B. Provide materials with flame resistant treatments not subject to deterioration due to aging, moisture, high humidity, oxygen, ozone, or heat.

C. Materials Exempt From Fire-Resistant Rating: Nylon anchors for securing insulation to ducts or equipment.

PART 2 PRODUCTS

2.1 PIPING INSULATION

A. Fiberglass: Heavy density preformed fiberglass with thermal conductivity of 0.29 Btu-in/hr-ft^2-^{o}F at 150°F mean temperature. Insulation shall conform to ASTM C547 Class I and shall be suitable for 450°F service. Fitting insulation shall be of same material used for pipe.

1. Insulation Jacket: All service (ASJ) type conforming to Fed. Spec. HH-B-100B Type I. Jacket permeability shall not exceed 0.02 perms (ASTM E96). Pipe fitting jacket shall be factory premolded, one-piece, PVC covers with pressure sensitive taped joints. Jackets in exposed locations shall have a white surface suitable for field painting. Provide vapor barrier as required by service.

B. Flexible Unicellular: Flexible unicellular with thermal conductivity of 0.27 Btu-in/hr-ft^2-^{o}F at 75°F mean temperature. Insulation shall conform to ASTM C534, Type I, Tubular and shall be suitable for 200°F service. Fitting insulation shall be of same material used for pipe. Permeability shall not exceed 0.10 perms (ASTM E96). Insulation adhesive shall conform to Mil. Spec. MIL-A-24179A, Type II, Class 1.

C. Fittings, Flanges, and Valves: Provide insulation for fittings, flanges, and valves premolded, precut, or job fabricated of the same thickness and conductivity as used on adjacent piping.

D. Insulation Kit: Insulate exposed supply and waste piping at handicapped accessible sinks with fully molded insulation kit. McGuire Products ProWrap, 3/16" thick closed vinyl with anti-microbial additive, 1.02 Btu-in/hr-F^2-^{o}F thermal conductivity, white color.

2.2 EQUIPMENT INSULATION

A. Fiberglass (Hot Equipment): Semi-rigid fiberglass board conforming to Fed. Spec. HH-I-558B, Form B, Type I. Thermal conductivity shall be 0.32 Btu-in/hr-ft^2-^{o}F at 150°F mean temperature (ASTM C177), insulation shall be suitable for 650°F service. Insulation jacket shall be "all service" type conforming to Fed. Spec. HH-I-100B Type I or II. Jacket permeability shall not exceed 0.02 perms (ASTM E96).

B. Flexible Unicellular (Cold Equipment): Flexible unicellular with thermal conductivity of 0.27 Btu-in/hr-ft^2-^{o}F at 75°F mean temperature. Insulation shall conform to ASTM C534, Type II, sheet and shall be suitable for 200°F service. Permeability shall not exceed 0.10 perms (ASTM E96). Insulation adhesive shall conform to Mil. Spec. MIL-A-24179A, Type II, Class 1.

2.3 DUCT INSULATION

A. Fiberglass (Ductwrap): Fiberglass duct wrap with foil-scrim-kraft facing/vapor barrier, 1.0 lb/cu.ft. density (0.75 lb/cu.ft. for 3" thickness only), 0.29 Btu-in/hr-ft2-oF conductivity at 75°F mean temperature, 0.05 permeance rating. Insulation shall meet the requirements of NFPA 90A & B and shall be UL rated. Provide foil-scrim-kraft (FSK) tape.

2.4 VAPOR BARRIER COATING

A. Raw (cut) ends of fiberglass pipe insulation shall be finished (protected) with the application of a suitable vapor barrier coating or finishing cement (mastic) to maintain the continuous visual and functional integrity of the insulation jacket. Mastic shall be Childers “Chil-Perm” CP-30, elastomeric resin, or approved equal, applied in accordance with the manufacturer’s recommendations.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection:

1. Prior to work of this Section, carefully inspect the installed work of other trades and verify that such work is complete to the point where this installation may properly commence.

2. Verify that the insulation systems may be installed in accordance with pertinent codes and regulations and the reviewed Submittals.

3.2 GENERAL

A. Insulate after system tests have been completed and surfaces to be insulated have been cleaned of dirt, rust, and scale and are dry.

B. Install insulation with jackets drawn tight and cement down longitudinal and end laps. Do not use scrap pieces where a full length section will fit. Insulation shall be continuous through sleeves, wall and ceiling openings, except at fire dampers in duct systems and pipe penetrations through fire rated assemblies. Extend surface finishes to protect ends, and raw edges of insulation. Apply coatings and adhesives at the manufacturer's recommended coverage per gallon. Individually insulate piping and ductwork. Keep insulation dry during the application of the finish. Bevel and seal the edges of exposed insulation.

C. Unless otherwise indicated, do not insulate the following:

1. Factory pre-insulated flexible ductwork.
2. Factory pre-insulated ductwork, plenums, casings, mixing boxes, and filter boxes.
3. Chrome plated pipes and fire protection pipes.
4. Vibration isolating connections
5. Adjacent insulation
6. ASME stamps, nameplates, access plates
7. Ductwork exposed to view in a normally occupied space.
8. Hydronic specialties: Low water cutoff, relief valves, relief valve discharge piping, pressure reducing valves, and expansion tanks.

9. Unions and flanges at equipment required for frequent service.

3.3 PIPING INSULATION

A. Pipe Insulation (Fiberglass): Place sections of insulation around the pipe and joints, tightly butt into place. Draw jacket laps tight and smooth. Secure jacket with fire resistant adhesive, or factory applied self sealing lap. Cover circumferential joints with butt strips, not less than 3-inches wide, of material identical to the jacket material. Overlap longitudinal laps of jacket material not less than 1-1/2 inches. Adhesive used to secure the butt strip shall be the same as used to secure the jacket laps. Exposed fiberglass shall be coated with vapor barrier coating.

B. Flanges, Unions, Valves and Fittings Insulation (Fiberglass): Factory fabricated removable and reusable insulation covers. Place factory pre-molded, precut or field-fabricated segmented insulation of the same thickness and conductivity as the adjoining pipe insulation around the flange, union, valve, and fitting abutting the adjoining pipe insulation. Install factory premolded one-piece PVC fitting covers over the insulation and secure by stapling or with metal or plastic tacks made for securing PVC fitting covers and secure with PVC vapor barrier tape.

C. Pipe Insulation (Flexible Unicellular): Bond cuts, butt joints, ends, and longitudinal joints with adhesive. Miter 90-degree turns and elbows, tees, and valve insulation. Insulate flanges, unions, valves, and fittings.

D. Where penetrating roofs and exterior walls, insulate piping to a point flush with the underside of the deck or wall and seal with a vapor barrier coating.

E. Hangers and Anchors: Pipe insulation shall be continuous through pipe hangers. Where pipe is supported by the insulation, provide MSS SP-58, Type 40 galvanized steel shields (16 gage maximum). For fiberglass insulation systems on pipe sizes 2 inches through 3", provide insulation inserts at points of hangers and supports. Insulation inserts shall be of molded glass fiber (minimum 12 pcf). Insulation inserts shall cover the bottom half of the pipe circumference, 180 degrees, and be not less than 4" long. Vapor-barrier facing of the insert shall be of the same material as the facing on the adjacent insulation. Seal inserts into the insulation. Insulation inserts for pipe sizes 4" and larger shall be welded pipe saddles. Install insulation in void area of saddle of same material used on adjacent insulation. For pipe sizes 2" and smaller, insulation inserts for flexible unicellular insulation systems shall be wooden doweling set on end of length equal to insulation thickness. Seal dowel to insulation with adhesive.

3.4 DUCT INSULATION

A. Rigid Insulation: Secure rigid insulation by impaling over pins or anchors located not more than 3 inches from joint edges of boards, spaced not more than 12 inches on centers and secure with washers and clips. Spot weld anchor pins or attach with a waterproof adhesive especially designed for use on metal surfaces. Each pin or anchor shall be capable of supporting a 20-pound load. Cut off protruding ends of pins. After installing washers, provide foil-scrim-kraft (FSK) tape to seal break in vapor barrier, tape shall extend 1" minimum around pin. Apply insulation with joints tightly butted. Bevel insulation around name plates and access plates and doors. Seal joints with FSK tape. Provide additional adhesive or staples to assist tape adhesion in difficult applications.

B. Flexible Blanket Insulation: Apply insulation with joints tightly butted. Staple laps of jacket with outward clinching staples and seal with foil scrim kraft (FSK) tape. Sagging of flexible duct insulation shall not be permitted. For ductwork over 24-inches wide on horizontal duct runs, provide pins, washers and clips. Install speed washers with pins and pin trimmed to washer. Cut off protruding ends of pins after clips are secured. Seal with FSK tape, extend tape 1" minimum around pin. Use pins on sides of vertical ductwork being insulated. Space

pins and clips on 18 inch centers and not more than 18 inches from duct corners. Carry insulation over standing seams and trapeze-type hangers.

3.5 INSULATION APPLICATION SCHEDULE

SERVICE	THICKNESS	MATERIAL/JACKET
PIPING:		
Domestic Cold Water Piping (Copper, CPVC & PEX)		
1" and smaller	1/2"	Fiberglass w/ASJ or Flexible Unicellular
1¼" and larger	1"	Fiberglass w/ASJ or Flexible Unicellular
Domestic Hot Water Piping and Domestic Hot Water Recirculation Piping (Copper, CPVC & PEX)	1"	Fiberglass w/ASJ or Flexible Unicellular
Water and Drain Piping Under Handicap Accessible Fixtures		Insulation Kit (Truebro)
DUCTWORK:		
EF-2 Exhaust Ductwork	3"	Ductwrap, FSK
EQUIPMENT:		
Water Meter	1/2"	Flexible Unicellular
Backflow Preventers	1/2"	Flexible Unicellular

3.6 FIELD INSPECTION

A. Visually inspect to ensure that materials used conform to specifications. Inspect installations progressively for compliance with requirements.

* END OF SECTION *

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SECTION 233000 - DUCTWORK AND ACCESSORIES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The drawings and the specifications including Section 23 05 00 "Supplemental Mechanical General Requirements" are hereby made a part of the work of this section.

B. Drawings and general provisions of Contract including General and Supplementary Conditions and all Division 1 specification sections.

C. Ductwork shall be protected from dirt and debris in accordance with SMACNA Standard “Duct Cleanliness for New Construction”.

1.2 DESCRIPTION OF WORK

A. The work covered by this Section of the specifications includes the furnishing of labor, materials, equipment, transportation, permits, inspections and incidentals and the performing of operations required to install the ductwork systems indicated.

1.3 SUBMITTALS

A. Substitutions: Your attention is directed to Section 23 05 00-"Substitutions", relative to competition and the (ONLY) notation. Familiarity with this section should be achieved before reading the PRODUCTS section of this specification.

B. The items for which the submittals paragraph in Section 23 05 00, Supplemental General Mechanical Requirements, apply are as follows:

1. Ductwork.
2. Ductwork accessories.
3. Firestopping materials and methods.
4. Ductwork sealing products.
5. Louvers.
6. Grilles, registers and diffusers.
7. Fans.
8. Electric wall heaters.

C. Section 01330 - Submittal Procedures: Submittal procedures.

D. Product Data: Submit data on product characteristics, performance criteria and limitations.

E. Manufacturer's Installation Instructions: Submit procedure for preparation and installation.

F. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

PART 2 PRODUCTS

2.1 DUCTWORK

A. Classification of Ductwork: Low pressure ductwork: up to 2" W.G. static pressure.

B. Materials: Unless otherwise indicated low pressure ductwork shall be galvanized steel. Galvanized sheet metal shall be new galvanized steel sheets of lock forming quality with zinc coating that will not flake or peel under forming operation.

C. Construction for Low Pressure Round and Rectangular Ductwork:

1. Material: Galvanized steel conforming to ASTM A527, weight of galvanized coating shall be not less than 1-1/4 ounces total for both sides of one sq.ft. of a sheet. Construction, metal gage, and reinforcements shall conform with SMACNA "Duct Construction Standards" and NFPA 90A for 2" W.G. pressure class.

2. Fittings: Shall be constructed in accordance with SMACNA Standards and shall be of the types indicated (ONLY).

3. Longitudinal joints shall be Pittsburgh lockseam (ONLY). Button punch snap locks are not acceptable.

4. Joints shall be sealed to SMACNA seal class B.

2.2 DUCTWORK ACCESSORIES

A. Access Doors: Ruskin Model ADC2, 12"x12" size, 24 gauge galvanized steel, steel on both sides of door, foam gasket seals, 1" insulation, 2 cam locks, no hinge.

B. Backdraft Dampers (BDD): Ruskin Model CBD2 or American Warming and Ventilating aluminum frame and blades, extruded vinyl edge seals, field set at 0.10" W.G. pressure differential for full open operation.

C. Flexible Duct Connections: Ventfabrics, Inc. neoprene coated glass fabric. Provide flexible connections at all air handling equipment, e.g. ERV's, unless equipment is furnished with integral flexible connectors.

D. Drawbands for Flexible Ducts: Clinch type stainless steel with screwdriver adjustment, or nylon with lever action tightening tool provided by the drawband manufacturer.

E. Turning Vanes: (Low Pressure):

1. Solid blade, mounted with the long edge down stream in accordance with duct construction details indicated. Submit a 12"x12" sample elbow for review prior to fabrication.

F. Volume Dampers:

1. Factory fabricated as specified, or shop fabricated in accordance with SMACNA "HVAC Duct Construction Standards".

2. Rectangular: Ruskin Model MD-35, or American Warming and Ventilating, 12 gauge galvanized steel, locking quadrant, opposed blade over 11", single blade 11" and under.

3. Round: Ruskin Model MDRS25, or American Warming and Ventilating, 20 gauge galvanized steel with locking quadrant(ONLY). Dampers may be provided integral with spin-in fittings.

G. Flexible Ductwork:

1. Low Pressure Duct Systems: Wiremold type WGCF, polyester core with wire helix, 2" thick (R-6 min.), 3/4 lb fiberglass insulation, polyolefin jacket/vapor barrier, 2" W.G. rated pressure.

H. Joint Sealer:

1. Hardcast Two-Part II DT tape with RTA-50 indoor/outdoor activator.

2. Hardcast Duct-Seal 321 water based indoor/outdoor sealant.

I. Acoustical duct liner for rectangular ductwork shall be Type AP Armaflex SA duct liner. The liner shall be elastomeric unicellular (closed cell) and have a thermal conductivity of 0.27 Btuh/^{0}F.-sf-in. and be cleanable and suitable for duct velocities of 4000 FPM. Duct liner thickness shall be 1" unless indicated otherwise. The installation shall include 100% coverage of the manufacturer's recommended adhesive and protective Z-strips at all exposed upstream edges. Mechanical fasteners shall be used in addition to adhesive. Insulation shall comply with NFPA 90A and NFPA 90B and be approved by Factory Mutual. Duct dimension are net inside of liner.

J. Louvers (L): Ruskin ELR Series round stationary louver with Ruskin EME420DD Wind-Driven Rain blades, Greenheck, or American Warming and Ventilating. Extruded aluminum construction, 0.063" thick, aluminum extrusions, double drainable sight-proof blades, 5/8" expanded metal bird screen, size and performance as scheduled. AMCA certified leakage rate shall be a maximum of 0.01 ounces of water per square foot of free area at 1067 FPM free area velocity. Provide Kynar 500 finish, color selected by Architect. Provide frame styles compatible with building construction, see architectural details. Provide concealed architectural or standard visible mullions in multi-panel louver assemblies as indicated on the drawings. Inactive / blanked-off louvers shall have a double wall sheetmetal closure on the interior face of the louver. The closure shall have a 2" thickness of 1.5 pcf rigid fiberglass board insulation with a foil face. Both sides of the sheetmetal shall be painted flat black.

2.3 AIR DEVICES (Krueger, Price, Metal Aire, Titus, Seiho) ONLY

A. Material and Finishes: Construct diffusers, registers, and grilles of steel, suitable for use with ceiling radiation dampers (CRD) where applicable. Exterior and exposed edges shall be rolled, or otherwise stiffened and rounded. Steel parts shall be factory zinc-phosphate treated prior to priming and painting or have a baked-on enamel finish. Provide frame style compatible with ceiling or wall type. Colors shall be selected by Architect. Devices to be installed on exposed duct installations shall be furnished in primer suitable for field application of color coat.

B. Sound Pressure Level: Manufacturer certified sound pressure level rating of inlets and outlets in accordance with ADC 1062 R4. Conform with the permissible room sound pressure level for each device as scheduled.

C. Throw: Defined as distance from the diffuser, register, or grille to the point which the resultant room air velocity is 50 to 35 feet per minute.

D. Ceiling Diffusers: Equip with core styles required to provide air distribution pattern indicated. Internal parts shall be removable through the diffuser-neck for access to the duct and without the use of special tools. Construct each diffuser of four or more concentric elements designed to deliver air in a generally horizontal direction. The interior elements of square and rectangular ceiling diffusers may be square or rectangular as manufacturer's standard. Screws or bolts in exposed face of frames or core elements are not acceptable. Diffusers shall have an opposed blade volume damper in the diffuser neck. Diffusers shall have a 24"x24" lay-in panel for areas with acoustical ceilings and surface-mount frame for GWB ceilings

E. Grilles and Registers: Construction and finish as indicated, 1/2" louver spacing, 45° curved blade. Grilles and registers shall have opposed-blade volume dampers with lever adjuster. Unless otherwise indicated, registers shall be provided. Provide CRD's at each rated ceiling penetration.

F. General: The interior of all sheetmetal connections to grilles, registers and diffusers shall be painted with a non-specular flat black paint so that no sheetmetal surfaces are visible from the finished space. All ceiling mounted registers, grilles and diffusers shall be provided with ceiling radiation dampers.

2.4 FANS

A. Shall be model indicated. Fan manufacturers shall be Panasonic, Greenheck, Cook or equal. The fans shall include housing, fan wheel, shaft, bearings, inlet shroud, motor, mounting support and mounting frame as a factory-assembled unit. An OSHA-approved belt guard for each fan shall be included. The fan drive shall have a 1.5 service factor for the maximum rated horsepower. Provide a disconnect switch for each fan. Provide gravity-operated, gasketted backdraft dampers for all exhaust fans. Kitchen hood exhaust fans shall be upblast type, UL-listed for grease exhaust applications with hinged ventilated curb and grease cup.

B. Bearings shall be precision, flange-mounted self-aligning ball bearings at inlet and discharge. Minimum average L50 design life shall be 200,000 hours at maximum catalogued operating conditions. Grease lines shall extend to the exterior of the fan housing.

C. Submit sound power data for inlet and discharge sound.

D. Submit fan curves for each fan with the design operating point clearly marked.

E. Controls:

1. EF-1 shall be controlled by a master switch as located on the drawings.
2. EF-2 shall be controlled by the light switch in the Year Round Restroom.

2.5 ELECTRIC WALL HEATERS

A. Electric wall heaters (WH) shall be manufactured by Qmark, Berko Electric or approved equal, UL listed. Unit configuration shall be wall-mounted, inverted flow. Cabinet shall be 16 gauge cold rolled steel with hinged front access door for access to control panel and access panel for access to all other internal components. Heating element shall be warranted for five years and shall be a non-glowing design constructed of a steel sheath with steel fins and shall include a thermal cutout to directly interrupt power to the element in the case of overheating without the use of relays. Power and performance as scheduled. Provide with service switch, surface mount kit and remote mounted thermostat at ADA mounting height.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection:

1. Prior to work of this Section, carefully inspect the installed work of other trades and verify that such work is complete to the point where this installation may properly commence.

2. Verify that the duct systems may be installed in accordance with pertinent codes and regulations and the reviewed Submittals.

3.2 INSTALLATION OF DUCTWORK AND AIR DEVICES

A. Provide and erect in accordance with the best practice of the trade ductwork shown on the drawings and as required to complete the intended installation. Make offsets as shown or required to place ductwork in proper position to avoid conflicts with other work and to allow the application of insulation and finish painting to the satisfaction of the Architect. Sizes given are "inside - clear" dimensions and not necessarily that of sheet metal. Ducts shall be arranged to adjust to "field conditions". The Sheet Metal trades shall coordinate his work with other trades. Work shall conform to ASHRAE duct construction recommendations, SMACNA "Duct Construction Standards", NFPA, and the requirements of MUBEC.

B. Joint Sealing: See PRODUCTS section.

C. Longitudinal joints: See PRODUCTS section.

D. Turns shall be made with long radius elbows or, if physically impossible to use long radius elbows, shall be square turns with specified turning vanes. CAUTION: Turns not conforming to this requirement shall be ordered removed and replaced with properly built turns.

E. Access Doors: Provide access doors for concealed apparatus requiring service and inspection in the duct system including but not limited to dampers, smoke detectors, sensors and motors, and upstream and downstream from duct coils.

F. Duct Sleeves and Prepared Openings: Install duct sleeves and prepared openings for duct mains, duct branches, and ducts passing through walls, roofs, and ceilings. Insure the proper size and location of sleeves and prepared openings. Allow one-inch clearance between duct and sleeve or one-inch clearance between insulation and sleeve for insulated ducts, except at grilles, registers, and diffusers.

G. Duct Supports: Unless otherwise indicated, provide one-inch wide by 16 gage galvanized steel sheet metal strips on each side of ducts. Anchor risers in the center of the vertical run to allow ends or riser free vertical movements. Attach supports only to structural framing members. Do not anchor supports to metal decking unless a means is provided (architectural review required) for preventing the anchors from puncturing the metal decking. Where supports are required between structural framing members, provide suitable intermediate metal framing. Where C clamps are used, use retainer clips.

H. Flexible Collars and Connections: Provide flexible collars between fans and ducts or casings and where ducts are of dissimilar metals, as indicated or required. For round ducts, securely fasten flexible connections using stainless steel clinch-type draw-band. Nylon drawbands may be used if installed using the drawband manufacturer's lever-action tightening tool. For rectangular ducts, lock flexible connections to metal collars.

I. Flexible Ducts: Provide where indicated. No fiberglass shall be in contact with air flow. Flexible duct length shall not be more than 4'-0". Install with metal band hangers and without excess length, provide maximum extension of flex duct. Securely fasten flexible ducts to metal collars using a stainless steel or tool-tightened nylon drawband on the duct core and a second drawband on the insulation vapor barrier. If the duct exceeds 12 inches diameter, position the drawband behind a bead on the metal collar. Taping in lieu of drawbands is not allowed.

J. Any deviation in the duct system must be submitted as a shop drawing and stamped. CAUTION: Any deviation not submitted and favorably reviewed will be ordered removed from the system and replaced with that which is shown on the Drawings.

K. Discrepancies between actual field conditions and the Contract Documents shall be brought to the attention of the Architect prior to fabrication.

L. Field Changes to Ductwork: Field changes of ducts such as those required to suit the sizes of factory-fabricated equipment actually furnished shall be designed to minimize expansion and contraction. Use 4:1 transitions in field changes as well as modifications to connecting ducts.

M. Transitions with a slope greater than 4 to 1 shall be ordered removed from the system and replaced with a transition which meets this criteria.

N. Joints and seams at intake and exhaust plenums and joints on intake and exhaust ductwork for a distance of 3 feet from the plenum shall be sealed watertight on the bottom and side joints and seams.

O. Isolation dampers at intake and exhaust louvers and vent hoods shall be sealed to the ductwork to provide an airtight assembly with similar performance characteristics to the isolation damper.

3.3 CLOSING IN WORK

A. Cover up or enclose work after it has been properly and completely tested and reviewed.

B. No additional cost to the Owner will be allowed for uncovering or recovering any work that is covered or enclosed prior to required test and review.

3.4 TEST AND ADJUST

A. Before operating any system, the system shall be cleaned out to remove dust and foreign materials.

B. After the installation is complete and ready for operation, test the system under normal operating conditions in the presence of the Architect and demonstrate that the system functions as designed.

C. Correct defects which develop during the test period, conduct additional testing until defect free operation is achieved.

3.5 CLEANUP AND CORROSION PREVENTION

A. Ductwork and equipment shall be thoroughly cleaned. Dirt, dust, and debris shall be removed and the premises left in a clean and neat condition.

B. Before covering is applied to duct systems, clips, rods, clevises and other hanger attachments, and before uncovered piping is permitted to be concealed, corrosion and rust shall be wire brushed and cleaned and in the case of iron products, a coat of approved protective paint applied to these surfaces.

3.6 INSTRUCTIONS

A. On completion of the project, instruct the Owner's representative in the care and operation of the system. The total period of instruction shall not exceed four (4) hours. The time of

instruction shall be arranged with the Owner. In addition to the prime Mechanical Contractor, the control system Contractor, Balancing Contractor, and Owner's representative shall be present and participate in the Owner's instruction.

3.7 FIRESTOPPING

A. Firestopping shall be performed in accordance with Specification Section 07841 “Firestopping”. All penetrations of fire-rated assemblies including walls and floors by mechanical system components (piping, ductwork, conduits, etc.) shall be firestopped as specified.

* END OF SECTION *

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SECTION 260000 - GENERAL ELECTRICAL REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Basic Electrical Requirements specifically applicable to Divisions 26, 27 and 28 Sections.

1.02 REFERENCES

A. ANSI/NFPA 70 - National Electrical Code.

B. ANSI C2 - National Electrical Safety Code.

C. ANSI/NFPA 101 - Life Safety Code.

1.03 RELATED REQUIREMENTS

A. Conditions of the Contract and Division 1 - General Requirements, apply to all work, including work of this Division. Examine all contract documents for requirements affecting this work.

1.04 SUBMITTALS

A. Submit under provisions of Division 01.

B. Submit shop drawings and product data grouped to include complete submittals of related systems, products, and accessories in a single submittal.

C. Mark dimensions and values in units to match those specified.

D. Provide fixture schedule, lighting drawings, panelboard schedules and single line or risers diagram(s) to supplier for assistance in pricing as applicable. Contractor shall receive one set of black line drawings for reproduction from the engineer for this purpose.

1.05 REGULATORY REQUIREMENTS

A. Conform to applicable local, State and Federal Building Code for the State of Maine.

B. Electrical: Conform to NFPA 70, NFPA72, NFPA 99, NFPA 101, ANSI C2, 2 FM, UL, and applicable ASTM and ANSI Standards.

C. Contractor shall visit the site to become familiar with all existing conditions affecting this work. No claim shall be recognized for extra compensation due to failure of contractor to familiarize himself/herself with the conditions and extent of proposed work.

D. Obtain permits and request inspections by local authority having jurisdiction.

1.06 PROJECT/SITE CONDITIONS

A. Install Work in locations shown on Drawings, unless prevented by Project conditions.

B. Prepare drawings showing proposed rearrangement of Work to meet Project conditions,

including changes to Work specified in other Sections. Obtain permission of Engineer before proceeding.

1.08 TEMPORARY LIGHT AND POWER

A. Temporary light and power shall be installed and maintained by the Electrical Contractor for use by all trades for the duration of construction complete with all wiring, switches, protective devices and similar equipment as may be required. Arrangement for the temporary service with the Power Company is the responsibility of the Electrical Contractor. Power bills will be paid by the General Contractor. Provide 120/208 volt or 120/240 volt 100 ampere, drop box similar to standard CMP detail 980-31.1.4. Provide 15-20 watt self ballasted compact fluorescent, lamps with plastic “cages” as needed. or 4 foot twin lamp (T8) fluorescent tamper-proof, gasketted and water-tight as required.

1.09 CONTRACT DRAWINGS AND SPECIFICATIONS

A. It is to be understood that drawings accompanying these specifications are intended to show general arrangement and extent of work to be done, but exact location and arrangement of all components shall be determined as work progresses. Anything shown on the drawings and not specifically mentioned in specifications or vice versa shall be considered as required in both.

B. Locations of equipment, and materials, etc., as given on drawings are approximate unless dimensioned. It shall be understood they are subject to such modifications as may be found necessary or desirable at time of installation in order to meet any structural conditions. Such changes shall be made by the contractor without extra charges.

C. Because of small scale drawings, all required offsets, etc., as may be required to clear work of other Contractors, may not be shown. Contractor, however, shall provide all necessary offsets, etc., as required to complete the installation of their work and not conflict with that of others.

D. It is the intention that wiring systems shall be complete and fully operational. The contractor shall identify system components during the bid process that clearly constitute conditions that would cause the system to be incomplete. Clarification: The remedy to these discrepancies shall be communicated by the engineer to all bidders or included as an addenda.

1.10 MATERIALS AND LABOR

A. Bidders for this work shall carefully examine the Plans and Specifications, as the Contractor shall be required to furnish all materials and labor necessary to deliver to the Owner a complete system installed in full accordance with Local State and Federal laws. The system shall be furnished as specified, tested, and turned over to the Owner in perfect operating condition.

B. All materials shall be new and of best quality of their respective kinds. Workmanship in all respects shall be of highest grade and all construction shall be done according to best practices of the trade. Materials shall be warrantied directly by the manufacturer.

C. Contractor shall provide, when required for review of Engineer, labeled samples of any material or equipment specified herein or proposed to be used on this project.

D. Where words "furnish", "provide" or "install" are mentioned, either singly or in combination, these words are hereby interpreted to mean "furnish and install" or "provide and install," including all materials complete with all connections, supplemental devices, accessories and

appurtenances, unless specifically otherwise noted. These words are likewise hereby interpreted as being prefixed to all materials, equipment, and apparatus hereinafter mentioned, either in abbreviated or schedule information.

1.11 PROTECTION OF WORK AND MATERIALS

A. Contractors shall be responsible for the care and protection of all materials delivered and labor performed until the completion of the work.

B. Cap all uncompleted lines, raceways, and ducts until ready for final connections, or future work as indicated.

C. All portions of the work liable to damage by weather or by those engaged on the project, must be securely protected by temporary, but substantial covering which must be maintained in position until Engineer authorizes removal.

1.12 REPLACEMENTS

A. In the event of damage to any equipment or materials, immediately make all repairs and replacements necessary to the approval of the Engineer at no additional cost to the Owner.

1.13 SAFETY REGULATIONS

A. All work to be performed and/or installed shall conform to all requirements of the Occupational Safety and Health Act (OSHA) of 1970 and all Amendments thereto.

1.14 INSURANCE

A. The Contractor shall purchase and maintain all Workmen's Compensation Insurance, Public Liability and Property Damage Insurance during the progress of the work and until completion and acceptance of the entire project by the Owner.

1.15 QUALITY ASSURANCE/CONTROL OF INSTALLATION

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

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

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

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

E. Perform work using persons qualified to produce workmanship of specified quality.

F. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and physical distortion or disfigurement.

1.16 SCHEDULE OF MATERIALS AND EQUIPMENT

A. As soon as practicable, and before commencement of installation of any material or equipment, a complete schedule of materials and equipment proposed for installation shall be

submitted for review. Schedule shall also include a list of all proposed subcontractors. Partial or incomplete lists will not be considered. Any materials, fixtures, and equipment not conforming to specifications may be rejected. Also see Section 01300, Submittals.

B. Orders for purchase of any devices, material, conduit, etc., or other equipment shall not be placed until this schedule is reviewed.

1.17 UNDERWRITER'S APPROVALS

A. All electrical materials and equipment shall bear label of Underwriter's Laboratories, shall be listed by them in their list of electrical fittings and shall be approved by them for purpose for which they are to be used, unless materials and equipment are of a type for which Underwriter's Laboratories does not list or provide label service.

1.18 SUBSTITUTIONS

A. Where the specifications allow the substitution of a product for that which has been specified, said substitution must be reviewed by the Engineer and shall be equivalent in all respects to that which is specified. The Engineer's decision shall be obtained on all questions as follows, and his/her judgment shall be final and binding on all parties.

B. Reference in the specifications or on the drawings to any product, material, fixture, form or type of construction, etc., by proprietary name, manufacturer, make or catalog number, shall be interpreted as establishing a standard of quality or design and shall not be construed as limiting competition. The Contractor may, at his/her option, use any fully equivalent substitute provided written review by the Engineer is first obtained indicating acceptance of the equality of the substitute preferred.

C. For materials or equipment which are supplied with integral or factory applied finish, the colors of same shall be considered in evaluating substitutions.

D. For the purpose of avoiding conflicts with other trades, contracts, and adjoining work where more than one (1) article, device, material, fixture, form or type of construction, etc., is referred to by proprietary name, manufacturer, make or catalog number, the first named shall be used as the basis of design and details. The cost of any changes of approved equivalent item shall be borne by the Contractor requesting such change.

1.19 RECORD DRAWINGS

A. During construction, the Contractor shall keep an accurate record of all deviations to the installation of the work as indicated on the drawings. Upon completion of the work, the Contractor shall furnish a copy of this record to the Engineer, on a black line of the original which will be available from the Engineer. Submit record drawings before requesting final payment.

1.20 MANUFACTURER'S REPRESENTATIVE

A. At appropriate times, or as directed by the Engineer, provide the services of a competent factory trained Engineer or Technician of the particular manufacturer of equipment or item involved, to inspect, adjust, and place in proper operating condition any and all such items of manufacture. No additional compensation shall be allowed Contractors for such service.

1.21 MANUFACTURERS' INSTRUCTIONS, AND OPERATION AND MAINTENANCE DATA

A. Provide for each item of equipment or apparatus furnished, a complete set of printed

instructions obtained from the manufacturer covering proper operation, care, lubrication, cleaning, servicing, adjustment, etc., together with any special safety instructions.

B. Manufacturers' data shall further include performance data (time current curves, where applicable), complete parts lists, recommended spare parts lists, and wiring diagrams.

C. Data shall be arranged in complete sets, properly indexed and marked.

D. Data shall include complete set of shop drawings.

E. Material shall first be submitted in preliminary fashion for review by Engineer. After approval, Contractor shall submit two (2) copies in bound volumes to the Engineer for distribution.

F. Provide contacts for service agencies for all major system components.

1.22 GUARANTEES

A. An item becomes "defective" when it ceases to conform to this Contract Document. Guarantees beginning on the date of issuance of the Owner's final payment, or certificate of substantial completion, with Owner taking occupancy or beneficial use thereafter.

B. Upon completion of the work and before applying for final payment, furnish a written guarantee, stating that the work complies with the provisions of codes listed herein and the local enforcing authorities, and that it will be free from defects of material and workmanship for the required guarantee period. Guarantee shall further state that the Contractor will, at his own expense, repair and/or replace any of his material and work which may become defective during the time of guarantee, together with other work damaged as a consequence of such defects. All manufacturers written warranties shall apply to materials. Warranties other than that of the manufacturer are not acceptable.

C. The guarantee period shall be one (1) year except when longer periods are indicated for specific equipment.

D. All materials in Division 26 where a written warranty is published shall require the warranty to be offered by the product manufacturer.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.01 CONNECTION TO EQUIPMENT

A The Contractor shall be responsible for proper wiring and raceway connections to equipment, make sure of alignment, both initially and under operating conditions, and provide proper supports, brackets, means of expansion, etc., to make sure that no excessive stresses are applied to equipment. Raceways shall be run to the equipment and alignment checked before final bolting and fastening.

B At the request of the Engineer, dismantle equipment connections to demonstrate proper installation and make such corrections necessary without additional compensation for disassembly, re-connection, or the required corrective work.

C Equipment shall be installed in such a manner as to permit disconnecting for service and repairs without the necessity of rigging.

3.02 CLOSING IN UNINSPECTED WORK

A General: Do not cover up or enclose work until it has been properly and completely inspected and approved. Engineer may waive this requirement by written permission.

B Noncompliance: Should any of the work be covered up or enclosed prior to all required inspections and approvals, uncover the work as required, and after it has been completely inspected and approved, make all repairs and replacements with such materials as are necessary to the approval of the Engineer and at no additional cost to the Owner.

3.03 CLEANING OF SYSTEMS

A All wiring systems shall be thoroughly cleaned prior to initial operation and in accordance with manufacturer's instructions for equipment to be furnished and/or installed.

B Furnish all detergents, solvents, cleaning compounds, tools, etc., required in connection with cleaning operations.

C Thoroughly clean all exposed portions of all equipment, remove all labels, and wipe clean with a damp rag.

3.04 TESTING, BALANCING, AND ADJUSTING

A Electrical loads shall be balanced on all phase legs to a tolerance of plus or minus 10 percent. Include testing circuits for shorts to ground. Measure grounding system resistance. Correct all deficiencies. Provide all test equipment.

3.05 INSTRUCTIONS

A On completion of the job, Contractor shall provide competent technicians to thoroughly instruct the Owner's representative in the care and operation of the system. The total period of instruction shall not exceed 2 hours and be performed in a minimum of one interval. The time of instruction shall be arranged with the Owner. The Electrical subcontractor shall be present and participate in the Owner’s instruction.

3.06 FIRESTOPPING

A Firestopping shall be performed in accordance with Specification Section “Firestopping”. All penetrations of fire-rated assemblies including walls and floors by electrical system components (conduits, cables, trays, etc.) shall be firestopped as specified. Coordinate size, location and type of sleeves as required by firestopping systems.

*** END OF SECTION ***

SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

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. Building wires and cables rated 600 V and less.
2. Connectors, splices, and terminations rated 600 V and less.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

A. Aluminum and Copper Conductors: Comply with NEMA WC 70/ICEA S-95-658.

B. Conductor Insulation: Comply with NEMA WC 70/ICEA S-95-658 for Type THHN-2-THWN-2 and Type SO.

C. Multiconductor Cable: Comply with NEMA WC 70/ICEA S-95-658 for nonmetallic-sheathed cable, Type NM with ground wire and metal-clad cable.

2.2 CONNECTORS AND SPLICES

A. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

2.3 SYSTEM DESCRIPTION

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with NFPA 70.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Conductor sizes and quantities shown on drawings are for copper.

B. Minimum branch circuit conductor size; 12 AWG

C. Feeders: Copper for feeders smaller than No. 4 AWG; copper or aluminum for feeders No. 4 AWG and larger. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

D. Branch Circuits (residential areas): Copper. Solid for No. 12 AWG; stranded for No. 10 AWG and larger.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Service Entrance: Type THHN-2-THWN-2, single conductors in raceway.

B. Exposed Feeders: Type THHN-2-THWN-2, single conductors in raceway.

C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspaces: Type THHN-2-THWN-2, single conductors in raceway.

D. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-2-THWN-2, single conductors in raceway.

E. Exposed Branch Circuits: Type THHN-2-THWN-2, single conductors in raceway.

F. Branch Circuits (Residential spaces) Concealed in Ceilings, Walls, and Partitions: Nonmetallic-sheathed cable, Type NM.

G. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-2-THWN-2, single conductors in raceway.

H. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.

B. Complete raceway installation between conductor and cable termination points according to Section 260533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.

C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips that will not damage cables or raceway.

E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

3.4 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.

B. Make splices, terminations, and taps that are compatible with conductor material**.**

1. Use oxide inhibitor in each splice, termination, and tap for aluminum conductors.

C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches (150 mm) of slack.

3.5 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating.

END OF SECTION 260519

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SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

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: Grounding systems and equipment.

B. Section includes grounding systems and equipment, plus the following special applications:

1. Underground distribution grounding.

1.3 ACTION SUBMITTALS

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

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 - PRODUCTS

2.1 CONDUCTORS

A. Insulated Conductors: Copper or tinned-copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

B. Bare Copper Conductors:

1. Solid Conductors: ASTM B 3.
2. Stranded Conductors: ASTM B 8.
3. Tinned Conductors: ASTM B 33.
4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch (6 mm) in diameter.
5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
6. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.
7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.

C. Grounding Bus: Predrilled rectangular bars of annealed copper, 1/4 by 4 inches (6.3 by 100 mm) in cross section, with 9/32-inch (7.14-mm) holes spaced 1-1/8 inches (28 mm) apart. Stand-off insulators for mounting shall comply with UL 891 for use in switchboards, 600 V. Lexan or PVC, impulse tested at 5000 V.

2.2 CONNECTORS

A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.

B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, pressure type with at least two bolts.

1. Pipe Connectors: Clamp type, sized for pipe.

C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

D. Bus-bar Connectors: Mechanical type, cast silicon bronze, solderless compression-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.

2.3 GROUNDING ELECTRODES

A. Ground Rods: Copper-clad steel; 3/4 inch by 10 feet.

1. Termination: Factory-attached No. 4/0 AWG bare conductor at least 48 inches (1200 mm) long.
2. Backfill Material: Electrode manufacturers recommended material.

PART 3 - EXECUTION

3.1 APPLICATIONS

A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.

B. Underground Grounding Conductors: Install bare tinned-copper conductor, No. 2/0 AWG minimum.

1. Bury at least 24 inches (600 mm) below grade.
2. Duct-Bank Grounding Conductor: Bury 12 inches (300 mm) above duct bank when indicated as part of duct-bank installation.

C. Grounding Bus: Install in electrical and telephone equipment rooms, in rooms housing service equipment, and elsewhere as indicated.

1. Install bus on insulated spacers 2 inches (50 mm) minimum from wall, 6 inches (150 mm) above finished floor unless otherwise indicated.
2. Where indicated on both sides of doorways, route bus up to top of door frame, across top of doorway, and down to specified height above floor; connect to horizontal bus.

D. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
3. Connections to Ground Rods at Test Wells: Bolted connectors.
4. Connections to Structural Steel: Welded connectors.

3.2 GROUNDING UNDERGROUND DISTRIBUTION SYSTEM COMPONENTS

A. Comply with IEEE C2 grounding requirements.

A. Install insulated equipment grounding conductors with all feeders and branch circuits.

B. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.

C. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.

D. Metal Poles Supporting Outdoor Lighting Fixtures: Install grounding electrode and a separate insulated equipment grounding conductor in addition to grounding conductor installed with branch-circuit conductors.

3.4 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Ground Rods: Drive rods until tops are 2 inches (50 mm) below finished floor or final grade unless otherwise indicated.

1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.
2. For grounding electrode system, install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes, and connect to the service grounding electrode conductor.

C. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.

1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.

D. Grounding and Bonding for Piping:

1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes; use a bolted clamp connector or bolt a lug-type connector to a pipe flange by using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.

E. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install bonding jumper to bond across flexible duct connections to achieve continuity.

3.5 LABELING

A. Comply with requirements in Section 260553 "Identification for Electrical Systems" for instruction signs. The label or its text shall be green.

3.6 FIELD QUALITY CONTROL

A. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

B. Tests and Inspections:

1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.

C. Grounding system will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

E. Report measured ground resistances that exceed the following values:

1. Power and Lighting Equipment or System with Capacity of 500 kVA and less: 10 ohms.

F. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

END OF SECTION 260526

SECTION 260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

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. Nonmetal conduits, tubing, and fittings.
2. Boxes, enclosures, and cabinets.

1.3 ACTION SUBMITTALS

A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

PART 2 - PRODUCTS

2.1 NONMETALLIC CONDUITS, TUBING, AND FITTINGS

A. Listing and Labeling: Nonmetallic conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. RNC: Type EPC-40-PVC, complying with NEMA TC 2 and UL 651 unless otherwise indicated.

C. Fittings for RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.

D. Solvent cements and adhesive primers shall have a VOC content of 510 and 550 g/L or less, respectively, when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

E. Solvent cements and adhesive primers shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.2 BOXES, ENCLOSURES, AND CABINETS

A. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.

B. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, cast aluminum with gasketed cover.

C. Box extensions used to accommodate new building finishes shall be of same material as recessed box.

D. Device Box Dimensions: 4 inches square by 2-1/8 inches deep (100 mm square by 60 mm deep).

E. Nonmetallic Outlet and Device Boxes: Comply with NEMA OS 2 and UL 514C.

F. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 3R with continuous-hinge cover with flush latch unless otherwise indicated.

1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
2. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

A. Outdoors: Apply raceway products as specified below unless otherwise indicated:

1. Exposed Conduit: RNC.
2. Concealed Conduit, Aboveground: RNC.
3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
4. Boxes and Enclosures, Aboveground: PVC.

B. Indoors: Apply raceway products as specified below unless otherwise indicated:

1. Exposed: RNC.
2. Concealed in Ceilings and Interior Walls and Partitions: RNC.
3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC
4. Damp or Wet Locations: RNC.
5. Boxes and Enclosures: PVC.

C. Minimum Raceway Size: 3/4-inch (21-mm) trade size.

D. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. RNC: Use setscrew, steel fittings. Comply with NEMA FB 2.10.
2. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.

3.2 INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.

B. Keep raceways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

C. Complete raceway installation before starting conductor installation.

D. Arrange stub-ups so curved portions of bends are not visible above finished slab.

E. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches (300 mm) of changes in direction.

F. Conceal conduit and RNC within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.

G. Support conduit within 12 inches (300 mm) of enclosures to which attached.

H. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.

I. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.

J. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch (35mm) trade size and insulated throat metal bushings on 1-1/2-inch (41-mm) trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.

K. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.

L. Cut conduit perpendicular to the length. For conduits 2-inch (53-mm) trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.

M. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.

N. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 72 inches (1830 mm) of flexible conduit for equipment subject to vibration, noise transmission, or movement; and for transformers and motors.

1. Use LFMC in damp or wet locations subject to severe physical damage.

O. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.

P. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.

Q. Locate boxes so that cover or plate will not span different building finishes.

R. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.

S. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.

3.3 INSTALLATION OF ELECTRICAL BOXES IN FIRE RATED WALLS

A. Outlet boxes on opposite sides of the wall shall be separated as follows:

1. By a horizontal distance of not less than 24 inches (610 mm);

2. By a horizontal distance of not less than the depth of the wall cavity where the wall cavity is filled with cellulose loose fill, rockwool or slag mineral wool insulation.

3. By protecting both outlet boxes by listed putty pads, 3M Catalog # MPP+ or equal.

B. Boxes exceeding 16 sq. in. (103 sq. cm) must be protected by listed putty pads, 3M Catalog # MPP+ or equal.

END OF SECTION 260533

SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

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. Identification for raceways.
2. Identification of power and control cables.
3. Identification for conductors.
4. Underground-line warning tape.
5. Warning labels and signs.
6. Instruction signs.
7. Equipment identification labels.
8. Miscellaneous identification products.

1.3 ACTION SUBMITTALS

A. Product Data: For each electrical identification product indicated.

1.4 QUALITY ASSURANCE

A. Comply with ANSI A13.1.

B. Comply with NFPA 70.

C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.

D. Comply with ANSI Z535.4 for safety signs and labels.

E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

1.5 COORDINATION

A. Coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual; and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.

B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

C. Coordinate installation of identifying devices with location of access panels and doors.

D. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 POWER AND CONTROL RACEWAY IDENTIFICATION MATERIALS

A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway size.

B. Colors for Raceways Carrying Circuits at 600 V or Less:

1. Black letters on an white field.
2. Legend: Indicate voltage.

C. Vinyl Labels for Raceways Carrying Circuits at 600 V or Less: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing ends of legend label.

D. Snap-Around Labels for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

E. Snap-Around, Color-Coding Bands for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches (50 mm) long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

F. Tape and Stencil for Raceways Carrying Circuits More Than 600 V: 4-inch- (100-mm-) wide black stripes on 10-inch (250-mm) centers diagonally over orange background that extends full length of raceway or duct and is 12 inches (300 mm) wide. Stop stripes at legends.

2.2 ARMORED AND METAL-CLAD CABLE IDENTIFICATION MATERIALS

A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each cable size.

B. Colors for Cables Carrying Circuits at 600 V and Less:

1. Black letters on an white field.
2. Legend: Indicate voltage.

C. Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing ends of legend label.

D. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; 2 inches (50 mm) wide; compounded for outdoor use.

E. Heat-Shrink Preprinted Tubes: Flame-retardant polyolefin tube with machine-printed identification label. Sized to suit diameter of and shrinks to fit firmly around cable it identifies. Full shrink recovery at a maximum of 200 deg F (93 deg C). Comply with UL 224.

2.3 POWER AND CONTROL CABLE IDENTIFICATION MATERIALS

A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each cable size.

B. Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing ends of legend label.

C. Self-Adhesive, Self-Laminating Polyester Labels: Preprinted, 3-mil- (0.08-mm-) thick flexible label with acrylic pressure-sensitive adhesive that provides a clear, weather- and chemical-resistant, self-laminating, protective shield over the legend. Labels sized to fit the cable diameter such that the clear shield overlaps the entire printed legend.

D. Heat-Shrink Preprinted Tubes: Flame-retardant polyolefin tube with machine-printed identification label. Sized to suit diameter of and shrinks to fit firmly around cable it identifies. Full shrink recovery at a maximum of 200 deg F (93 deg C). Comply with UL 224.

2.4 UNDERGROUND-LINE WARNING TAPE

A. Tape:

1. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical and communications utility lines.
2. Printing on tape shall be permanent and shall not be damaged by burial operations.
3. Tape material and ink shall be chemically inert, and not subject to degrading when exposed to acids, alkalis, and other destructive substances commonly found in soils.

B. Color and Printing:

1. Comply with ANSI Z535.1 through ANSI Z535.5.
2. Inscriptions for Red-Colored Tapes: ELECTRIC LINE.
3. Inscriptions for Orange-Colored Tapes: TELEPHONE CABLE, CATV CABLE, COMMUNICATIONS CABLE.

2.5 WARNING LABELS AND SIGNS

A. Comply with NFPA 70 and 29 CFR 1910.145.

B. Self-Adhesive Warning Labels: Factory-printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated.

C. Baked-Enamel Warning Signs:

1. Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application.
2. 1/4-inch (6.4-mm) grommets in corners for mounting.
3. Nominal size, 7 by 10 inches (180 by 250 mm).

D. Warning label and sign shall include, but are not limited to, the following legends:

1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES (915 MM)."

2.6 INSTRUCTION SIGNS

A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch (1.6 mm) thick for signs up to 20 sq. inches (129 sq. cm) and 1/8 inch (3.2 mm) thick for larger sizes.

1. Engraved legend with black letters on white face.
2. Punched or drilled for mechanical fasteners.
3. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

B. Adhesive Film Label: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch (10 mm).

2.7 EQUIPMENT IDENTIFICATION LABELS

A. Adhesive Film Label: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch (10 mm).

B. Self-Adhesive, Engraved, Laminated Acrylic or Melamine Label: Adhesive backed, with white letters on a dark-gray background. Minimum letter height shall be 3/8 inch (10 mm).

C. Engraved, Laminated Acrylic or Melamine Label: Punched or drilled for screw mounting. White letters on a dark-gray background. Minimum letter height shall be 3/8 inch (10 mm).

2.8 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Select paint system applicable for surface material and location (exterior or interior).

B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Verify identity of each item before installing identification products.

B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.

C. Apply identification devices to surfaces that require finish after completing finish work.

D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.

E. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 6 to 8 inches (150 to 200 mm) below finished grade. Use multiple tapes where width of multiple lines installed in a common trench exceeds 16 inches (400 mm) overall.

3.2 IDENTIFICATION SCHEDULE

A. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits More Than 30 A, and 120 V to ground: Identify with self-adhesive vinyl label. Install labels at 30-foot (10-m) maximum intervals.

B. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.

1. Color-Coding for Phase Identification, 600 V or Less: Use colors listed below for ungrounded feeder and service conductors.

a. Color shall be factory applied or field applied for sizes larger than No. 8 AWG, if authorities having jurisdiction permit.
b. Colors for 208/120-V Circuits:

1) Phase A: Black.
2) Phase B: Red.
3) Phase C: Blue.

C. Install instructional sign including the color-code for grounded and ungrounded conductors using adhesive-film-type labels.

D. Control-Circuit Conductor Identification: For conductors and cables in pull and junction boxes, and handholes, use self-adhesive vinyl labels with the conductor or cable designation, origin, and destination.

E. Control-Circuit Conductor Termination Identification: For identification at terminations provide self-adhesive vinyl labels with the conductor designation.

F. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.

1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual.

G. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring.

1. Install underground-line warning tape for both direct-buried cables and cables in raceway.

H. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Self-adhesive warning labels.

1. Comply with 29 CFR 1910.145.
2. Identify system voltage with black letters on an orange background.
3. Apply to exterior of door, cover, or other access.
4. For equipment with multiple power or control sources, apply to door or cover of equipment including, but not limited to, the following:

   a. Power transfer switches.
   b. Controls with external control power connections.

I. Operating Instruction Signs: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.

J. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.

1. Labeling Instructions:

   a. Indoor Equipment: Self-adhesive, engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high letters on 1-1/2-inch- (38-mm-) high label; where two lines of text are required, use labels 2 inches (50 mm) high.
   b. Outdoor Equipment: Engraved, laminated acrylic or melamine label.
   c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
   d. Unless provided with self-adhesive means of attachment, fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.

2. Equipment to Be Labeled:

   a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be self-adhesive, engraved, laminated acrylic or melamine label.
   b. Enclosures and electrical cabinets.
   c. Access doors and panels for concealed electrical items.
   d. Enclosed switches.
   e. Enclosed circuit breakers.
   f. Enclosed controllers.
   g. Variable-speed controllers.
   h. Push-button stations.
   i. Contactors.
   j. Remote-controlled switches, dimmer modules, and control devices.

END OF SECTION 260553

SECTION 262726 - WIRING DEVICES

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. Receptacles, receptacles with integral GFCI, and associated device plates.
2. Weather-resistant receptacles.
3. Snap switches and wall-box dimmers.
4. Cord and plug sets.

1.3 DEFINITIONS

A. EMI: Electromagnetic interference.

B. GFCI: Ground-fault circuit interrupter.

C. Pigtail: Short lead used to connect a device to a branch-circuit conductor.

D. RFI: Radio-frequency interference.

E. TVSS: Transient voltage surge suppressor.

F. UTP: Unshielded twisted pair.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Receptacles for Owner-Furnished Equipment: Match plug configurations.
2. Cord and Plug Sets: Match equipment requirements.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.6 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:

1. Cooper Wiring Devices; Division of Cooper Industries, Inc. (Cooper).
2. Hubbell Incorporated; Wiring Device-Kellems (Hubbell).
3. Leviton Mfg. Company Inc. (Leviton).
4. Pass & Seymour/Legrand (Pass & Seymour).

B. Source Limitations: Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

2.2 GENERAL WIRING-DEVICE REQUIREMENTS

A. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with NFPA 70.

C. Devices that are manufactured for use with modular plug-in connectors may be substituted under the following conditions:

1. Connectors shall comply with UL 2459 and shall be made with stranding building wire.
2. Devices shall comply with the requirements in this Section.

2.3 STRAIGHT-BLADE RECEPTACLES

A. Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, and FS W-C-596.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

2.4 GFCI RECEPTACLES

A. General Description:

1. Straight blade, non-feed-through type.
2. Comply with NEMA WD 1, NEMA WD 6, UL 498, UL 943 Class A, and FS W-C-596.
3. Include indicator light that shows when the GFCI has malfunctioned and no longer provides proper GFCI protection.

B. Duplex GFCI Convenience Receptacles, 125 V, 20 A:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

2.5 TOGGLE SWITCHES

A. Comply with NEMA WD 1, UL 20, and FS W-S-896.

B. Switches, 120/277 V, 20 A:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

2.6 WALL PLATES

A. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with Type 3R, weather-resistant**,** die-cast aluminum with lockable cover.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with NECA 1, including mounting heights listed in that standard, unless otherwise indicated.

B. Coordination with Other Trades:

1. Protect installed devices and their boxes. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of boxes.
2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
4. Install wiring devices after all wall preparation, including painting, is complete.

C. Conductors:

1. Do not strip insulation from conductors until right before they are spliced or terminated on devices.
2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.

D. Device Installation:

1. Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete.
2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
4. Connect devices to branch circuits using pigtails that are not less than 6 inches (152 mm) in length.

5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, two-thirds to three-fourths of the way around terminal screw.
6. Use a torque screwdriver when a torque is recommended or required by manufacturer.
7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
8. Tighten unused terminal screws on the device.
9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.

E. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles down, and on horizontally mounted receptacles to the right.

F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

G. Dimmers:

1. Install dimmers within terms of their listing.
2. Install unshared neutral conductors on line and load side of dimmers according to manufacturers' device listing conditions in the written instructions.

H. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.

I. Adjust locations of floor service outlets and service poles to suit arrangement of partitions and furnishings.

3.2 GFCI RECEPTACLES

A. Install non-feed-through-type GFCI receptacles where protection of downstream receptacles is not required.

3.3 IDENTIFICATION

A. Comply with Section 260553 "Identification for Electrical Systems."

B. Identify each receptacle with panelboard identification and circuit number. Use hot, stamped, or engraved machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

3.4 FIELD QUALITY CONTROL

A. Test straight-blade for the retention force of the grounding blade according to NFPA 99. Retention force shall be not less than 4 oz. (115 g).

B. Wiring device will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

END OF SECTION 262726

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SECTION 264700 - PANELBOARDS

PART 1 GENERAL

1.01 WORK INCLUDED

A. Service and distribution panelboards.

1.02 RELATED WORK

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

1.03 REFERENCES

A. NECA (National Electrical Contractors Assoc.) "Standard of Installation".

B. FS W-C-375 - Circuit Breakers, Molded Case, Branch Circuit and Service.

C. NEMA AB 1 - Molded Case Circuit Breakers.

D. NEMA KS 1 - Enclosed Switches.

E. NEMA PB 1 - Panelboards.

F. NEMA PB 1.1 - Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less.

G. NEMA PB 1.2 - Application Guide for Ground-Fault Protective Devices for Equipment.

H. NFPA 70 - National Electrical Code.

1.04 SUBMITTALS

A. Submit shop drawings for equipment and component devices.

B. Include outline and support point dimensions, voltage, main bus ampacity, integrated short circuit ampere rating, circuit breaker and fusible switch arrangement and sizes.

1.05 SPARE PARTS

A. Keys: Furnish 4 each to Owner.

PART 2 PRODUCTS

2.01 PANELBOARDS

A. Main and Distribution Panelboards

1. Panelboards: NEMA PB 1; circuit breaker type – bolt on.
2. Enclosure: NEMA PB 1; Type 1.
3. Provide cabinet front with concealed trim clamps, screw cover, and hinged door with flush lock. Finish in manufacturer's standard gray enamel.
4. Provide panelboards with aluminum bus, ratings as scheduled on Drawings. Provide copper ground bus in all panelboards.

5. Minimum Integrated Short Circuit Rating: Short circuit rating for LP panels shall be 22,000 AIC. Main Service Circuit Breaker 100,000 AIC or as noted on drawings.
6. Molded Case Circuit Breakers: NEMA AB 1 FS W-C-375; provide circuit breakers with integral thermal and instantaneous magnetic trip in each pole. Provide circuit breakers UL listed as Type HACR for air conditioning equipment branch circuits.
7. Molded Case Circuit Breakers with Current Limiters: NEMA AB 1 FS W-C-375; provide circuit breakers with replaceable current limiting elements, in addition to integral thermal and instantaneous magnetic trip in each pole.
8. Current Limiting Molded Case Circuit Breakers; NEMA AB 1 FS W-C-375; provide circuit breakers with integral thermal and instantaneous magnetic trip in each pole, coordinated with automatically resetting current limiting elements in each pole. Interrupting rating 100,000 symmetrical amperes, let-through current and energy level less than permitted for same size Class RK-5 fuse.
9. Provide circuit breaker accessory trip units and auxiliary contacts as indicated.
10. Install the quantity of corrosion inhibiting compound recommended by manufacturer in all wireways and device enclosures. This includes PVC enclosures where device terminals are exposed to the atmosphere.

Branch Circuit Panelboards

1. Lighting and Appliance Branch Circuit Panelboards: NEMA PB 1; circuit breaker type. FS W-P-115; Type I, Class 1.
2. Enclosure: NEMA PB 1; Type 1.
3. Cabinet Size: 6 inches deep; 20 inches wide for 240 volt and less panelboards.
4. Provide surface cabinet front with concealed trip clamps, concealed hinge and flush lock all keyed alike. Finish in manufacturer's standard gray enamel.
5. Provide panelboards with aluminum bus, ratings as scheduled on Drawings. Provide copper ground bus in all panelboards.
6. Minimum Integrated Short Circuit Rating: 22,000 amperes rms symmetrical for 208 volt panelboards or as shown on Drawings.
7. Molded Case Circuit Breakers: NEMA AB 1 FS W-C- 375; bolt-on type thermal magnetic trip circuit breakers, with common trip handle for all poles. Provide circuit breakers UL listed as Type SWD for lighting circuits. Provide UL Class A ground fault interrupter circuit breakers where scheduled on Drawings.
8. Current Limiting Molded Case Circuit Breakers: NEMA AB 1 FS W-C-375; provide circuit breakers with integral thermal and instantaneous magnetic trip in each pole, coordinated with automatically resetting current limiting elements in each pole. Interrupting rating 100,000 symmetrical amperes, let-through current and energy level less than permitted for same size Class RK-5 fuse.
9. Provide circuit breaker accessory trip units and auxiliary contacts as indicated.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install panelboards plumb and flush with wall finishes, in conformance with NEMA PB 1.1.

B. Height: 6 feet to top of panelboard maximum.

C. Provide filler plates for unused spaces in panelboards.

D. Provide typed or neatly handwritten circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes required to balance phase loads. Label Panels per Section 261950.

E. Provide 6 – 1" EMT conduits from recessed panelboards to accessible point above the ceiling wherever possible.

3.02 FIELD QUALITY CONTROL

A. Measure steady state load currents at each panelboard feeder. Should the difference at any panelboard between phases exceed 20 percent, rearrange circuits in the panelboard to balance the phase loads within 20 percent. Take care to maintain proper phasing for multi-wire branch circuits.

B. Visual and Mechanical Inspection: Inspect for physical damage, proper alignment, anchorage, and grounding. Check proper installation and tightness of connections for circuit breakers, fusible switches, and fuses.

*** END OF SECTION ***

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SECTION 265100 - INTERIOR LIGHTING

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 lighting fixtures, LEDs and drivers.
2. Emergency lighting units.
3. Exit signs.
4. Lighting fixture supports.

1.3 DEFINITIONS

A. CCT: Correlated color temperature.

B. CRI: Color-rendering index.

C. LER: Luminaire efficacy rating.

D. Lumen: Measured output of lamp and luminaire, or both.

E. Luminaire: Complete lighting fixture, including ballast housing if provided.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of lighting fixture, arranged in order of fixture designation. Include data on features, accessories, finishes, and the following:

1. Physical description of lighting fixture including dimensions.
2. Emergency lighting units including battery and charger.
3. Energy-efficiency data.
4. Life, output (lumens, CCT, and CRI), and energy-efficiency data for lamps.
5. Lamp data including dimensions, color temperature and power consumption
6. Photometric data and adjustment factors based on laboratory tests, complying with IESNA Lighting Measurements Testing & Calculation Guides, of each lighting fixture type. The adjustment factors shall be for lamps, ballasts, and accessories identical to those indicated for the lighting fixture as applied in this Project.

a. Testing Agency Certified Data: For indicated fixtures, photometric data shall be certified by a qualified independent testing agency. Photometric data for remaining fixtures shall be certified by manufacturer.
b. Manufacturer Certified Data: Photometric data shall be certified by a manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.

B. Installation instructions.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For lighting equipment and fixtures to include in emergency, operation, and maintenance manuals.

1. Provide a list of all lamp types used on Project; use ANSI and manufacturers' codes.

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. Lamps: 10 of each type and rating installed. Furnish at least one of each type.
2. Plastic Diffusers and Lenses: One of each type and rating installed. Furnish at least one of each type.
3. Ballasts: 2 of each type and rating installed. Furnish at least one of each type.
4. Globes and Guards: 1 of each type and rating installed. Furnish at least one of each type.

1.7 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with NFPA 70.

1.8 COORDINATION

A. Coordinate layout and installation of lighting fixtures and suspension system with other construction that penetrates ceilings or is supported by them, including HVAC equipment, fire-suppression system, and partition assemblies.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, product(s) indicated on Drawings.

2.2 GENERAL REQUIREMENTS FOR LIGHTING FIXTURES AND COMPONENTS

A. Recessed Fixtures: Comply with NEMA LE 4 for ceiling compatibility for recessed fixtures.

B. Metal Parts: Free of burrs and sharp corners and edges.

C. Sheet Metal Components: Steel unless otherwise indicated. Form and support to prevent warping and sagging.

D. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

E. Diffusers and Globes:

1. Acrylic Lighting Diffusers: 100 percent virgin acrylic plastic. High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

   a. Lens Thickness: At least 0.125 inch (3.175 mm) minimum unless otherwise indicated.
   b. UV stabilized.

2. Glass: Annealed crystal glass unless otherwise indicated.

2.3 LEDs:

1. The light source of the luminaires shall consist of LED arrays or bars. If required, the LED arrays or bars shall be removable.
2. The LEDs shall be either white or RGB, according to the light fixture schedule and Drawings. For luminaires specified with white light, it is not acceptable to provide RGB LEDs mixed to produce white light.
3. Refer to the light fixture schedule and Drawings for the specified correlated color temperature (CCT) of each luminaire.
4. Individual LEDs shall be binned by manufacturer to comply with ANSI C78.377.
5. The LEDs shall be manufactured by Cree, Philips, Toshiba, Osram, Samsung, or Nichia, unless otherwise noted.

2.4 DRIVERS:

1. The driver or power supply for the luminaire shall be modular and replaceable.
2. The rated life of the driver shall match the rated life of the LEDs and luminaire.
3. In general, the drive current rating of the driver shall be minimized, while still maintaining the required lumen output, to improve luminaire efficiency and life.
4. The driver shall meet the emission standards of IEC EN-61000-6-3 at a minimum. For healthcare or other applications with EMI sensitive equipment, provide drivers that meet more stringent standards as required.

2.5 EXIT SIGNS

A. General Requirements for Exit Signs: Comply with UL 924; for sign colors, visibility, luminance, and lettering size, comply with authorities having jurisdiction.

B. Internally Lighted Signs:

1. Lamps for AC Operation: LEDs, 50,000 hours minimum rated lamp life.
2. Self-Powered Exit Signs (Battery Type): Integral automatic charger in a self-contained power pack.

    a. Battery: Sealed, maintenance-free, nickel-cadmium type.
    b. Charger: Fully automatic, solid-state type with sealed transfer relay.
    c. Operation: Relay automatically energizes lamp from battery when circuit voltage drops to 80 percent of nominal voltage or below. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
    d. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
    e. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.

2.6 EMERGENCY LIGHTING UNITS

A. General Requirements for Emergency Lighting Units: Self-contained units complying with UL 924.

1. Battery: Sealed, maintenance-free, lead-acid type.
2. Charger: Fully automatic, solid-state type with sealed transfer relay.
3. Operation: Relay automatically turns lamp on when power-supply circuit voltage drops to 80 percent of nominal voltage or below. Lamp automatically disconnects from battery when voltage approaches deep-discharge level. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
4. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
5. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Lighting fixtures:

1. Set level, plumb, and square with ceilings and walls unless otherwise indicated.
2. Install lamps in each luminaire.

B. Temporary Lighting: If it is necessary, and approved by Architect, to use permanent luminaires for temporary lighting, install and energize the minimum number of luminaires necessary. When

construction is sufficiently complete, remove the temporary luminaires, disassemble, clean thoroughly, install new lamps, and reinstall.

C. Suspended Lighting Fixture Support:

1. Pendants and Rods: Where longer than 48 inches (1200 mm), brace to limit swinging.
2. Stem-Mounted, Single-Unit Fixtures: Suspend with twin-stem hangers.
3. Continuous Rows: Use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of fixture chassis, including one at each end.
4. Do not use grid as support for pendant luminaires. Connect support wires or rods to building structure.

D. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

3.2 IDENTIFICATION

A. Install labels with panel and circuit numbers on concealed junction and outlet boxes. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.3 FIELD QUALITY CONTROL

A. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery and retransfer to normal.

3.4 STARTUP SERVICE

A. Burn-in all lamps that require specific aging period to operate properly, prior to occupancy by Owner. Burn-in fluorescent and compact fluorescent lamps intended to be dimmed, for at least 100 hours at full voltage.

3.5 ADJUSTING

A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting aimable luminaires to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose. Some of this work may be required after dark.

1. Adjust aimable luminaires in the presence of Architect.

END OF SECTION 265100

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SECTION 312000 - EARTH MOVING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Excavating and filling for rough grading the Site.
2. Preparing subgrades for slabs-on-grade, walks/pavements, and turf/grasses.
3. Excavating and backfilling for buildings and structures.
4. Drainage course for concrete slabs-on-grade.
5. Subbase course for concrete walks/pavements.
6. Subbase course for asphalt paving.

1.2 DEFINITIONS

A. Backfill: Soil material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Aggregate layer placed between the subbase course and hot-mix asphalt paving.

C. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

D. Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

E. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Construction Manager. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Engineer. Unauthorized excavation, as well as remedial work directed by Engineer, shall be without additional compensation.

F. Fill: Soil materials used to raise existing grades.

G. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

H. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.

I. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.

J. Utilities: On-site underground pipes, conduits, ducts, and cables as well as underground services within buildings.

1.3 SUBMITTALS

A. Material test reports.

1.4 FIELD CONDITIONS

A. Utility Locator Service: Notify utility locator service for area where Project is located before beginning earth-moving operations.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. All soil materials, including but not limited to, common borrow, sub-base, base course, fill, stone, and aggregates shall be in accordance with Maine Department of Transportation Standard Specifications, most recent edition.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth-moving operations.

B. Protect and maintain erosion and sedimentation controls during earth-moving operations.

C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil

materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

3.3 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.4 SUBGRADE INSPECTION

A. Proof-roll subgrade below the building slabs and pavements with a pneumatic-tired dump truck to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

B. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Engineer, without additional compensation.

3.5 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

3.6 SOIL FILL

A. Place and compact fill material in layers to required elevations as follows:

1. Under grass and planted areas, use satisfactory soil material.
2. Under walks and pavements, use satisfactory soil material.
3. Under steps and ramps, use engineered fill.
4. Under building slabs, use engineered fill.
5. Under footings and foundations, use engineered fill.

3.7 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.8 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill soil materials evenly on all sides of structures to required elevations and uniformly along the full length of each structure.

C. Compact soil materials to not less than the following percentages of maximum dry unit weight:

1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inchesof existing subgrade and each layer of backfill or fill soil material a 95 percent.
2. Under walkways, scarify and recompact top 6 inchesbelow subgrade and compact each layer of backfill or fill soil material at 92 percent.
3. Under turf or unpaved areas, scarify and recompact top 6 inchesbelow subgrade and compact each layer of backfill or fill soil material at 75 percent.

3.9 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to elevations required to achieve indicated finish elevations, within the following subgrade tolerances:

1. Turf or Unpaved Areas: Plus or minus 1 inch.
2. Walks: Plus or minus 1 inch
3. Pavements: Plus or minus ½-inch.

C. Grading inside Building Lines: Finish subgrade to a tolerance of ½-inchwhen tested with a 10-footstraightedge.

3.10 SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS

A. Place subbase course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place subbase course under pavements and walks as follows:

1. Shape subbase course to required crown elevations and cross-slope grades.
2. Place subbase course that exceeds 6 inchesin compacted thickness in layers of equal thickness, with no compacted layer more than 6 inchesthick or less than 3 inchesthick.
3. Compact subbase course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight.

3.11 DRAINAGE COURSE UNDER CONCRETE SLABS-ON-GRADE

A. Place drainage course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place and compact drainage course under cast-in-place concrete slabs-on-grade as follows:

1. Place drainage course that exceeds 6 inchesin compacted thickness in layers of equal thickness, with no compacted layer more than 6 inchesthick or less than 3 inches thick.
2. Compact each layer of drainage course to required cross sections and thicknesses to not less than 95 percent of maximum dry unit weight according to ASTM D 698.

3.12 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform inspections, as necessary.

B. Testing Agency: Owner will engage a qualified geotechnical engineering testing agency to perform tests and inspections, as necessary.

C. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.

D. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.13 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.14 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION 312000

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SECTION 312319 - DEWATERING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes construction dewatering (if determined to be necessary).

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Dewatering Performance: Design, furnish, install, test, operate, monitor, and maintain dewatering system of sufficient scope, size, and capacity to control hydrostatic pressures and to lower, control, remove, and dispose of ground water and permit excavation and construction to proceed on dry, stable subgrades.

PART 3 - EXECUTION

3.1 PREPARATION

A. Provide temporary grading to facilitate dewatering and control of surface water.

B. Protect and maintain temporary erosion and sedimentation controls, which are specified in Section 015000 "Temporary Facilities and Controls" during dewatering operations.

3.2 INSTALLATION

A. Install dewatering system utilizing wells, well points, or similar methods complete with pump equipment, standby power and pumps, filter material gradation, valves, appurtenances, water disposal, and surface-water controls, as necessary.

1. Use filters or other means to prevent pumping of fine sands or silts from the subsurface

B. Place dewatering system into operation to lower water to specified levels before excavating below ground-water level.

C. Provide standby equipment on-site, installed and available for immediate operation, to maintain dewatering on continuous basis if any part of system becomes inadequate or fails.

3.3 OPERATION

A. Operate system continuously until dewatering is no longer required.

B. Operate system to lower and control ground water to permit excavation, construction of structures, and placement of fill materials on dry subgrades. Drain water-bearing strata above and below bottom of foundations, drains, sewers, and other excavations.

1. Do not permit open-sump pumping that leads to loss of fines, soil piping, subgrade softening, and slope instability.
2. Reduce hydrostatic head in water-bearing strata below subgrade elevations of foundations, drains, sewers, and other excavations.
3. Maintain piezometric water level a minimum of 24 inches below bottom of excavation.

C. Remove dewatering system from Project site on completion of dewatering. Plug or fill well holes with sand or cut off and cap wells a minimum of 36 inches below overlying construction.

3.4 FIELD QUALITY CONTROL

A. Survey-Work Benchmarks: Resurvey benchmarks regularly during dewatering and maintain an accurate log of surveyed elevations for comparison with original elevations. Promptly notify Engineer if changes in elevations occur or if cracks, sags, or other damage is evident in adjacent construction.

END OF SECTION 312319

SECTION 315000 - EXCAVATION SUPPORT AND PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes temporary excavation support and protection systems.

1.2 INFORMATIONAL SUBMITTALS

A. Contractor Calculations: For excavation support and protection system. Include analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Provide, design, monitor, and maintain excavation support and protection system capable of supporting excavation sidewalls and of resisting earth and hydrostatic pressures and superimposed and construction loads.

1. Design excavation support and protection system, including comprehensive engineering analysis by a qualified professional engineer.

PART 3 - EXECUTION

3.1 SHEET PILING, AS NECESSARY

A. Before starting excavation, install one-piece sheet piling lengths and tightly interlock vertical edges to form a continuous barrier.

B. Accurately place the piling, using templates and guide frames unless otherwise recommended in writing by the sheet piling manufacturer. Limit vertical offset of adjacent sheet piling to 60 inches. Accurately align exposed faces of sheet piling to vary not more than 2 inchesfrom a horizontal line and not more than 1:120 out of vertical alignment.

C. Cut tops of sheet piling to uniform elevation at top of excavation.

3.2 TIEBACKS, AS NECESSARY

A. Drill, install, grout, and tension tiebacks.

B. Test load-carrying capacity of each tieback and replace and retest deficient tiebacks.

1. Have test loading observed by a qualified professional engineer responsible for design of excavation support and protection system.

C. Maintain tiebacks in place until permanent construction is able to withstand lateral earth and hydrostatic pressures.

3.3 BRACING, AS NECESSARY

A. Bracing: Locate bracing to clear columns, floor framing construction, and other permanent work. If necessary to move brace, install new bracing before removing original brace.

1. Do not place bracing where it will be cast into or included in permanent concrete work unless otherwise approved by Engineer.
2. Install internal bracing if required to prevent spreading or distortion of braced frames.
3. Maintain bracing until structural elements are supported by other bracing or until permanent construction is able to withstand lateral earth and hydrostatic pressures.

3.4 FIELD QUALITY CONTROL

A. Survey-Work Benchmarks: Resurvey benchmarks regularly during installation of excavation support and protection systems, excavation progress, and for as long as excavation remains open. Maintain an accurate log of surveyed elevations and positions for comparison with original elevations and positions. Promptly notify Engineer if changes in elevations or positions occur or if cracks, sags, or other damage is evident in adjacent construction.

3.5 REMOVAL AND REPAIRS

A. Remove excavation support and protection systems when construction has progressed sufficiently to support excavation and earth and hydrostatic pressures. Remove in stages to avoid disturbing underlying soils and rock or damaging structures, pavements, facilities, and utilities.

END OF SECTION 315000

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SECTION 32 14 13

PRECAST CONCRETE UNIT PAVING

PART 1 GENERAL

1.1 DESCRIPTION:

A. Bidding requirements, conditions of the contract and pertinent portions of sections in Division One of these specifications, apply to the section as fully as though repeated herein.

B. Work under this section includes furnishing and installing truncated dome precast concrete unit pavers.

C. Related work:

1. Section 31 05 12, Site Earthwork.
2. Section 32 12 16, Asphalt Paving.

1.2 SUBMITTALS:

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

1. Product data for truncated dome precast concrete unit pavers and selected unit pavers.

1.3 DELIVERY:

A. Package, handle, deliver and store precast concrete unit pavers and access truncated dome pavers at the project site in a manner that will avoid damage.

PART 2 PRODUCTS

2.1 MANUFACTURER:

A. Precast concrete unit pavers for sidewalk/plaza shall be “Tradeport Stone Antique” color to be Granite Blend, (see drawings) as provided by Genest, Wilson Street, Sanford, Maine 04073 1-800-649-4773, or equal. Product of other manufacturers may be considered subject to compliance with the requirements as judged by the Landscape Architect, and or Owner’s Representative.

B. Precast concrete unit pavers for designated Bathhouse Pass Through area shall be “Portland Plank” color shall be Granite Blend, Finish Blended, (see drawings) as provided by Genest, Wilson Street, Sanford, Maine 04073 1-800-649-4773, or equal. Product of other manufacturers may be considered subject to compliance with the requirements as judged by the Landscape Architect, and or Owner’s Representative.

C. Concrete Paver Joint Sand shall be Gator XP, color Beige, as manufactured by Alliance Designer Products, Inc. www.alliancegator.com and provided by Genest Wilson Street, Sanford, Maine 04073 1-800-649-4773 or approved equal

D. Paver Edge Restraint system listed as follows as provided by Permaloc Corporation, 13505 Barry Street, Holland, MI 49424.

2.2 MATERIAL:

A. Pavers for sidewalk/plaza shall be three stone option, All pavers shall be 80mm thick with average minimum compressive strength of 8,000 psi with no individual unit under 7,200 psi, and absorption rate of 5 percent, and shall meet or exceed (ASTM C 936). Paver shall be “Tradeport Stone Antique” color to be Granite Blend”.

B. Pavers for Bathhouse Pass Through shall be 4" x 3 5/8” x 24” nominal. All pavers shall be 80mm thick with average minimum compressive strength of 8,000 psi with no individual unit under 7,200 psi, and absorption rate of 5 percent, and shall meet or exceed (ASTM C 936). Paver shall be “Portland Plank” color to be Granite Blend with Blended Finish”.

Concrete Paver Joint Sand shall be Gator XP, color Beige, as manufactured by Alliance Designer Products, Inc. www.alliancegator.com and provided by Genest Wilson Street, Sanford, Maine 04073 1-800-649-4773 or approved equal

C. Paver Edge Restraint shall be "Permaloc" vertical aluminum interlocking edge restraint system 3/" x 3", Mill Finish, 8' lengths. Anchors shall be Heavy Duty 12" stakes.

PART 3 EXECUTION

3.1 INSTALLATION:

A. Base shall be compacted bituminous paving, or compacted gravel as indicated on Drawings, set to 5-1/2 inches below desired finished grade. The concrete sand setting bed shall be screeded loose to a thickness of 1-1/2 inches. After sand has been screeded, it shall not be disturbed or pre-compacted.

B. Pavers shall be laid in a running bond pattern or as indicated on the Drawings, hand tight with care taken to maintain straight and true lines as shown on the Drawings. All necessary cutting shall be accomplished with a masonry saw.

C. Compaction: After the area of pavers is placed, it should be compacted with a vibrating plate compactor, with a 5000 lbs. (22kN) centrifugal compaction force and as required by manufactures requirements (**Refer to manufacture requirements**). We recommend using a mat fastened to the vibrating plate to compact the pavers. At least two passes should be made across the pavers to seat them in the bedding sand. Make sure the pavers’ side and top surfaces are dry before applying the polymeric sand.

D. Paver Joint Sand:

1. Spread **Gator XP Sand** over the pavers then use a hard bristle brush to sweep the sand into the joints and filling them completely. Run a vibrating plate over the pavers in several directions to compact the sand inside the joints (this action is not appropriate for slabs). Repeat this step (spreading the sand, then compacting) at least two more times. If a vibrating plate compactor cannot be used, tamp the stones with a rubber mallet and make sure that the **Gator XP Sand** is densely packed in the joints.

2. Using a leaf blower, blow off all **Gator XPSand** residues lying on the paver surface. Depending on the physical layout present, it may be more appropriate to remove the residue by using a vacuum unit.

3. First Phase: At a height of 4 feet (1.2 meter), use a water gun connected to a hose to direct a fine mist (setting of water gun: “mist” or equivalent) of water on a certain paver area for 10 to 15 seconds. Wait 3 to 4 minutes (not longer). Proceed to Second Phase.

4. Second Phase: From a height of 2 feet (0.6) meter, aim the water mist directly at the paver surface. Mist and rinse simultaneously so as to eliminate and **Gator XP Sand** residue left on the pavers. The **Gator XP Sand** residue should go directly into the paver joints. Wait 3 to 4 minutes (not longer). Proceed to Third Phase.

5. Third Phase: From a height of 2 feet (0.6 meter), aim the water mist again directly at the paver surface. Again, mist and rinse simultaneously so as to eliminate any **Gator XP Sand** residue left on the pavers. The **Gator XP Sand** residue should go directly in the paver joints. However, stop misting (ALERT) when you see a minimal amount of water retention on the joints. Repeat the directions of step 4, 5, & 6 for all other areas that have not been misted with water.

3.2 INSPECTION:

A. Surface tolerance: Upon completion of a section of pavers, the surface of the pavers shall be checked with a ten (10) foot straight edge. Variation exceeding 1/8 inch between adjacent stones shall be corrected by relaying.

3.3 CLEAN-UP:

A. Use a leaf blower to remove excess surface water that is lying in the pores and crevices of the pavers. This blowing action is necessary to help remove any remaining **Gator XP Sand** residue that was left on the paver surface from the previous steps. Depending on the physical layout present, it may be more appropriate to remove remaining residue with a vacuum unit.

END OF SECTION

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SECTION 32 32 23

SEGMENTAL RETAINING WALLS

GENEST CONCRETE WORKS, INC.
GUIDE SPECIFICATIONS FOR ANCHOR WALL SYSTEMS RETAINING WALL

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Concrete segmental retaining wall units.

B. Geosynthetic reinforcement.

C. Leveling pad base.

D. Drainage aggregate.

E. Reinforced Backfill.

F. Drainage pipe.

G. Pre-fabricated Drainage Composite.

H. Geotextile Filter.

I. Impervious Materials.

J. Construction Adhesive.

1.2 RELATED SECTIONS

A. Section 31 05 12 - Site Earthwork.

1.3 REFERENCES

A. American Association of State Highway Transportation Officials (AASHTO):

1. AASHTO M288 Geotextile Specification for Highway Applications.

2. AASHTO Standard Specifications for Highway Bridges.

B. ASTM International (ASTM):

1. ASTM C 140 - Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.

2. ASTM C 1262 - Standard Test Method for Evaluating the Freeze-Thaw Durability of Manufactured Concrete Masonry Units and Related Concrete Units.

3. ASTM C 1372 - Standard Specification for Segmental Retaining Wall Units.

4. ASTM D 448 - Standard Classification for Sizes of Aggregate for Road and Bridge Construction.

5. ASTM D 698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu ft) (600 kN-m/cu.m.).

6. ASTM D 1556 - Standard Test Method for Density and Unit Weight of Soil In Place by the Sand Cone Method

7. ASTM D 1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu ft) (2700 kN-m/cu.m.).

8. ASTM D 2487 - Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).

9. ASTM D 2922 - Standard Test Methods for Density of Soil and Soil-Aggregate In Place by Nuclear Methods (Shallow Depth).

10. ASTM D 3034 - Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer pipe and Fittings.

11. ASTM D 4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

12. ASTM D 4491 - Standard Test Method for Water Permeability of Geotextiles by the Permittivity Method.

13. ASTM D 4595 - Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.

14. ASTM D 4873 - Standard Guide for Identification, Storage and Handling of Geosynthetics.

15. ASTM D 5084 - Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter.

16. ASTM D 5262 - Standard Test Method for Evaluating the Unconfined Tension Creep Behavior of Geosynthetics.

17. ASTM D 5321 - Standard Test Method for Determining the Coefficient of Soil and Geosynthetic or Geosynthetic and Geosynthetic Friction by the Direct Shear Method.

18. ASTM D 5818 - Standard Practice for Obtaining Samples of Geosynthetics from a Test Section for Assessment of Installation Damage.

19. ASTM D 6637 - Standard Test Method for Determining Tensile Properties of Geogrids by the Single or Multi-Rib Tensile Method.

20. ASTM D 6638 - Standard Test Method for Determining Connection Strength Between Geosynthetic Reinforcement and Segmental Concrete Units.

21. ASTM D 6916 - Standard Test Method for Determining the Shear Strength Between Segmental Concrete Units.

22. ASTM D 6706 - Standard Test Method for Measuring Geosynthetic Pullout Resistance in Soil.

23. ASTM F 405 - Standard Specification for Corrugated Polyethylene (PE) Tubings and Fittings.

24. ASTM G 51 - Standard Test Method for Measuring pH of Soil for Use in Corrosion Testing.

C. Federal Highway Administration

1. Elias, V., Christopher, B., and Berg, R., "Mechanically Stabilized Earth Walls and Reinforced Soil Slopes Design and Construction Guidelines", Federal Highway Administration Report No. FHWA-NHI-00-043, March 2001.

2. Elias, V., Christopher, B., and Berg, R., "Corrosion/Degradation of Soil Reinforcements for Mechanically Stabilized Earth Walls and Reinforced Soil Slopes", Federal Highway Administration Report No. FHWA-NHI-00-044, March 2001.

D. National Concrete Masonry Association (NCMA)

1. NCMA Design Manual For Segmental Retaining Walls, Second Edition, Second Printing (1997).

1.4 DEFINITIONS

A. Concrete Segmental Retaining Wall (SRW) Units: Dry-stacked masonry units used as the retaining wall fascia.

B. Reinforced Backfill: Soil which is used as fill behind the SRW unit, and within the reinforced soil mass (if applicable).

C. Drainage Aggregate: Material used (if applicable) within, between, and directly behind the concrete retaining wall units.

D. Stabilized Aggregate: A formulated mix design of clean stone, cement, and water that creates a permeable homogeneous zone (mass). It is obtained by the elimination of fine aggregates (sand) from the normal concrete mix.

E. Geotextile Filter: Material used for separation and filtration of dissimilar soil types.

F. Foundation Soil: Soil mass supporting the leveling pad and reinforced soil zone of the retaining wall system.

G. Geosynthetic Reinforcement: Polymeric material designed specifically to reinforce the soil mass.

H. Pre-fabricated Drainage Composite: three-dimensional geosynthetic drainage medium encapsulated in a geotextile filter, used to transport water.

I. Impervious Materials: Clay soil or low permeability geosynthetic used to prevent water percolation into the drainage zone and reinforced backfill behind the wall.

J. Global Stability: The general mass movement of a soil reinforced segmental retaining wall structure and adjacent soil mass.

K. Project Geotechnical Engineer: A registered engineer who provides site observations, recommendations for foundation support, and verifies soil shear strength parameters.

1.5 SUBMITTALS

A. Submit under provisions of Submittals Section.

B. Product Data: Material description and installation instructions for each manufactured product specified.

C. Shop Drawings: Retaining wall system design, including wall elevation views, geosynthetic reinforcement layout, pertinent details, and drainage provisions. The shop drawings shall be signed by a registered professional engineer licensed in the state of wall installation.

D. Design Calculations: Engineering design calculations prepared in accordance with the NCMA Design Manual For Segmental Retaining Walls, or the AASHTO Standard Specifications for Highway Bridges, Section 5.8 (whichever is applicable). Analysis of global stability must be addressed and incorporated into the shop drawings.

E. Samples:

1. Furnish one unit in the color and face pattern specified, if requested.

2. Furnish 12 inch square or larger piece of the geosynthetic reinforcement specified.

F. Test Reports: Independent laboratory reports stating moisture absorption and compressive strength properties of the concrete retaining wall units meet the Project Specifications when tested in accordance with ASTM C140, Sections 6, 8 and 9.

1.6 QUALITY ASSURANCE

A. Manufacturer’s Qualifications

1. Member in good standing with the National Concrete Masonry Association.

2. Manufacturer shall provide systematic testing of retaining wall units during production by a National Concrete Masonry Association Certified Masonry Testing Technician.

3. Manufacturer shall provide independent quality assurance test results for retaining wall units manufactured and tested within a calendar year.

B. Installer Qualifications: All products listed in this section are to be installed by a single installer with a minimum of five (5) years demonstrated experience in installing products of the same type and scope as specified.

1.7 DELIVERY, STORAGE, AND HANDLING

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

B. Concrete Retaining Wall Units and Accessories: Deliver, store, and handle materials in accordance with manufacturer's recommendations, in such a manner as to prevent damage. Check the materials upon delivery to assure that proper material has been received. Store above ground on wood pallets or blocking. Remove damaged or otherwise unsuitable material, when so determined, from the site.

1. Exposed faces of concrete wall units shall be free of chips, cracks, stains, and other imperfections detracting from their appearance, when viewed from a distance of 10 feet.

2. Prevent mud, wet cement, adhesives and similar materials that may harm appearance of units, from coming in contact with system components.

C. Geosynthetics (including geosynthetic reinforcement, geotextile filter, pre-fabricated drainage composite) shall be delivered, stored, and handled in accordance with ASTM D4873.

1.8 WARRANTY

A. At project closeout, provide to Owner or Owners Representative a copy of the Anchor Wall Systems Inc. standard limited warranty against manufacturing defect, outlining its terms, conditions, and exclusions from coverage.

1.9 EXTRA MATERIALS

A. Furnish Owner with 3 replacement units identical to those installed on the Project.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Manufacturer: Genest Concrete Works, Inc.

1. Contact: Genest Concrete Works, Inc. 36 Wilson Street, Sanford, Maine 04073, phone: 1-800-332-4773, fax: 1-207-490-5076, www.GenestConcrete.com. Email: sales@genest-concrete.com

B. Physical Requirements: Meet ASTM C 1372, except the unit height dimension shall not vary more than plus or minus 1/16 inch.

C. Substitutions: Not permitted.

D. Product: Subject to compliance with requirements: [provide the following:] [provide one of the following:] [available products that maybe incorporated into the work include, the following:]

2.2 HIGHLAND STONE RETAINING WALLS

**** NOTE TO SPECIFIER ** Retain only products required on this project and delete all others.**

A. Highland Stone - 3 inch (76mm):

1. Face: Random.

2. Color: As selected from manufacturer's full range of available colors.

3. Texture: Split Rock Face.

4. Dimensions:

a. Front Height: 3 inches (76mm).

b. Front Length / Weight - Small: 6 inches (152mm) / 14 lbs. (6.4 kg).

c. Front Length / Weight - Medium: 12 inches (305mm) / 28 lbs (12.7 kg).

d. Front Length / Weight - Large: 18 inches (457mm) / 41 lbs. (18.6 kg).

e. Front Depth: 11 1/2 inches (292mm).

f. Setback: 9/16 inch (14mm).

B. Highland Stone - 6 inch (152mm):

1. Face: Random.

2. Color: As selected from manufacturer's full range of available colors.

3. Texture: Split Rock Face.
4. Dimensions:
    a. Front Height: 6 inches (152mm).
    b. Front Length / Weight - Small: 6 inches (152mm) / 30 lbs. (13.6 kg).
    c. Front Length / Weight - Medium: 12 inches (305mm) / 59 lbs (26.8 kg).
    d. Front Length / Weight - Large: 18 inches (457mm) / 73 lbs. (33.1 kg)
    e. Front Depth: 12 inches (305mm).
    f. Setback: 1 1/8 inches (29mm).

C. Highland Stone Cap:
1. Front Height: 3 inches (76mm).
2. Front Length: 17 inches (431mm).
3. Front Depth: 12 inches (305mm).
4. Back Length: 15-1/2 inches (374 mm).
5. Weight: 44 lbs. (20 kg) per unit.
6. Coverage: 1.25 lin. ft (381mm).

D. Highland Stone Step:
1. Front Height: 6 inches (152mm).
2. Front Length: 16 inches (406mm).
3. Front Depth: 12 inches (305mm).
4. Weight: 85 lbs. (38.6 kg) per unit.

2.3 DIAMOND RETAINING WALLS

**** NOTE TO SPECIFIER ** Retain only products required on this project and delete all others.**

A. Diamond - 6 inch (152mm) Straight Face:
1. Color: As selected from manufacturer's full range of available colors.
2. Texture: Split Rock Face.
3. Dimensions:
    a. Front Height: 6 inches (152mm)
    b. Front Length: 17 1/8 inches (435mm).
    c. Front Depth: 12 inches (305mm).
    d. Weight: 72 lbs. (32.7 kg) per unit.

e. Setback: 1 1/8 inches (29mm).

B. Diamond - 6 inch (152mm) Beveled Face:

1. Color: As selected from manufacturer's full range of available colors.

2. Texture: Split Rock Face.

3. Dimensions:

a. Front Height: 6 inches (152mm).

b. Front Length: 15 7/8 inches (403mm).

c. Front Depth: 12 inches (305mm).

d. Weight: 68 lbs. (30.8 kg) per unit.

e. Setback: 1 1/8 inches (29mm).

C. Diamond Cap:

1. Front Height: 3 inches (76mm).

2. Front Length: 17 inches (431mm).

3. Front Depth: 12 inches (305mm).

4. Back Length: 15-1/2 inches (374 mm).

5. Weight: 32 lbs. (14.5 kg) per unit.

6. Coverage: 1.13 lin. ft (344mm).

D. Diamond Step:

1. Front Height: 6 inches (152mm).

2. Front Length: 16 inches (406mm).

3. Front Depth: 12 inches (305mm).

4. Weight: 89 lbs (40.4 kg) per unit.

2.4 DIAMOND STONE CUT RETAINING WALLS

**** NOTE TO SPECIFIER ** Retain only products required on this project and delete all others.**

A. Diamond Stone Cut - 6 inch (152mm) Casual Face:

1. Color: As selected from manufacturer's full range of available colors.

2. Texture: Split Rock Face

3. Dimensions:

a. Front Height: 6 inches (152mm).

b. Front Length: 15 7/8 inches (403mm).

c. Front Depth: 12 inches (305mm).

d. Weight: 68 lbs. (30.8 kg) per unit.

e. Setback: 1 1/8 inches (29mm).

B. Diamond Cap:

1. Front Height: 3 inches (76mm).

2. Front Length: 17 inches (431mm).

3. Front Depth: 12 inches (305mm).

4. Back Length: 15-1/2 inches (374 mm).

5. Weight: 32 lbs. (14.5 kg) per unit.

6. Coverage: 1.13 lin. ft (344mm).

C. Diamond Step:

1. Front Height: 6 inches (152mm).

2. Front Length: 16 inches (406mm).

3. Front Depth: 12 inches (305mm).

4. Weight: 89 lbs (40.4 kg) per unit.

2.5 DIAMOND PRO RETAINING WALLS

A. Diamond Pro - 8 inch (203mm) Straight Face:

1. Color: As selected from manufacturer's full range of available colors.

2. Texture: Split Rock Face.

3. Dimensions:

a. Front Height: 8 inches (203mm).

b. Front Length: 18 inches (457mm).

c. Front Depth: 12 inches (305mm).

d. Weight: 74 lbs. (32.7 kg) per unit.

e. Setback: 1 inch (25mm).

2.6 DIAMOND PRO STONE CUT RETAINING WALLS

**** NOTE TO SPECIFIER ** Retain only products required on this project and delete all others.**

A. Diamond Pro Stone Cut - 8 inch (203mm):

1. Face: Random.

2. Color: As selected from manufacturer's full range of available colors.

3. Texture: Split Rock Face.

4. Dimensions:

a. Front Height: 8 inches (203mm).

**** NOTE TO SPECIFIER ** Retain only size(s) required on this project from the next three options and delete all others.**

b. Front Length / Weight - Small: 7 inches (457mm) / 34 lbs. (15 kg).

c. Front Length / Weight - Medium: 11 inches (279mm) / 45 lbs (20 kg).

d. Front Length / Weight - Large: 18 inches (457mm) / 77 lbs. (35 kg).

e. Front Depth: 12 inches (305 mm).

f. Setback: 1 inch (25mm).

B. Diamond Pro Stone Cut Cap:

1. Front Height: 3 inches (76mm).

2. Front Length: 17 inches (431mm).

3. Front Depth: 12 inches (305mm).

4. Back Length: 15-1/2 inches (374 mm).

5. Weight: 40 lbs. (18.1 kg) per unit.

6. Coverage: 1.13 lin. ft (344mm).

C. Diamond Pro Stone Cut Corner:

1. Front Height: 8 inches (203mm).

2. Front Length: 18 inches (457mm).

3. Front Depth: 9 inches (229mm).

4. Weight: 101 lbs. (46 kg) per unit.

2.7 VERTICA RETAINING WALLS

**** NOTE TO SPECIFIER ** Retain only products required on this project and delete all others.**

A. Vertica:

**** NOTE TO SPECIFIER ** Select required face type. Delete one of the next two paragraphs.**

1. Face: Straight.

2. Face: Beveled.

3. Color: As selected from manufacturer's full range of available colors.

4. Texture: Split Rock Face.

5. Dimensions:
    a. Front Height: 7-1/2 inches (191mm).
    b. Front Length: 18 inches (457mm).
    c. Front Depth: 12 inches (304mm).
    d. Weight: 86 lbs. (39 kg) per unit.
    e. Setback: 1/2 inch (13mm).

B. Vertica Stone Cut:
1. Face: Stone Cut.
2. Color: As selected from manufacturer's full range of available colors.
3. Texture: Split Rock Face.
4. Dimensions:
    a. Front Height: 7-1/2 inches (191mm).
    b. Front Length: 18 inches (457mm).
    c. Front Depth: 12 inches (305mm).
    d. Weight: 95 lbs. (43.1 kg) per unit.
    e. Setback: 1/2 inch (13mm).

C. Vertica Pro:

**** NOTE TO SPECIFIER ** Select required face type. Delete one of the next two paragraphs.**

1. Face: Straight.
2. Face: Beveled.
3. Color: As selected from manufacturer's full range of available colors.
4. Texture: Split Rock Face.
5. Dimensions:
    a. Front Height: 7-1/2 inches (191mm).
    b. Front Length: 18 inches (457mm).
    c. Front Depth: 20 inches (508mm).
    d. Weight: 115 lbs. (52.2 kg) per unit.
    e. Setback: 1/2 inch (13mm).

D. Vertica Cap:
1. Front Height: 3 inches (76mm).

2. Front Length: 17 inches (431mm).
3. Front Depth: 12 inches (305mm).
4. Back Length: 15-1/2 inches (374 mm).
5. Weight: 40 lbs. (18.1 kg) per unit.
6. Coverage: 1.13 lin. ft (344mm).

E. Vertica Corner:

1. Front Height: 7-1/2 inches (191mm).
2. Front Length: 18 inches (457mm).
3. Front Depth: 9 inches (229mm).
4. Weight: 101 lbs. (45.8 kg) per unit.

2.8 LANDMARK RETAINING WALLS

**** NOTE TO SPECIFIER ** Retain only products required on this project and delete all others.**

A. Landmark Full Component:

1. Face: Straight.
2. Front Height: 15 inches (381mm).
3. Front Length: 8 inches (203mm).
4. Front Depth: 12 5/8 inches (321mm).
5. Weight: 85 lbs. (38.6 kg) per unit.

B. Landmark Tapered Full Component:

1. Face: Straight.
2. Front Height: 15 inches (381mm).
3. Front Length: 8 inches (203mm).
4. Front Depth: 11 7/8 inches (302mm).
5. Weight: 80 lbs. (36.3 kg) per unit.

C. Landmark Half High Component:

1. Face: Straight.
2. Front Length: 8 inches (203mm).
3. Front Depth: 12 3/16 inches (310mm).
4. Weight: 50 lbs. (22.7 kg) per unit.

D. Landmark Foundation Component:

1. Face: Straight.
2. Front Height: 7 1/2 inches (191mm).
3. Front Length: 8 inches (203mm).
4. Front Depth: 11 3/4 inches (298mm).
5. Weight: 48 lbs. (21.8 kg) per unit.

E. Landmark Cap:

1. Front Height: 7 1/2 inches (191mm).
2. Front Length: 17 1/4 inches (438mm).
3. Front Depth: 10 3/8 inches (264mm).
4. Weight: 43 lbs. (19.5 kg) per unit.
5. Coverage: 1.15 lin. ft (351mm).

F. Landmark Corner:

1. Front Height: 8 inches (203mm).
2. Front Length: 18 inches (457mm).
3. Front Depth: 9 inches (229mm).
4. Weight: 101 lbs. (45.8 kg) per unit.

2.9 RELATED PRODUCTS

A. Geosynthetic Reinforcement: Polyester fiber geogrid or geotextile, HDPE or polypropylene woven geotextile, as shown on the Drawings.

1. Geotextile fabric: Manufactured by Ten Cate Nicolon, Mirafi Construction Products, Pendergrass, GA 706-693-2226. www.mirafi.com

a. Material Type and Description: [Specify material type and description].

b. Material Standard: [Specify material standard.].

c. Manufacturer: Acceptable to concrete retaining wall unit manufacturer.

2. Or approved equal.

B. Leveling Pad Base:

1. Aggregate Base: Crushed stone or granular fill meeting the following gradation as determined in accordance with ASTM D448:

a. Sieve: 1 inch - 100 percent passage.

b. Sieve: No. 4 - 35 to 70 percent passage.

c. Sieve: No. 40 - 10 to 35 percent passage.

d. Sieve: No. 200 - 3 to 10 percent passage.

e. Base Thickness: 6 inch (152mm) minimum compacted thickness.

2. Concrete Base: Nonreinforced lean concrete base.

a. Compressive Strength: 3000 psi (minimum).

b. Base Thickness: At least 2 inches (52mm).

C. Drainage Aggregate: Clean crushed stone or granular fill meeting the following gradation as determined in accordance with ASTM D448:

1. Sieve: 1 inch - 100 percent passage.

2. Sieve: 3/4 inch - 75 to 100 percent passage.

3. Sieve: No. 4 - 0 to 60 percent passage.

4. Sieve: No. 40 - 0 to 50 percent passage.

5. Sieve: No. 200 - 0 to 5 percent passage

D. Backfill: Soil free of organics and debris and consisting of either GP, GW, SP, SW, or SM type, classified in accordance with ASTM D2487 and the USCS classification system.

1. Soils classified as SC, ML and CL are considered suitable soils for segmental retaining walls with a total height of less than 10 feet unless the Plasticity Index (PI) is 20 or more.

2. Maximum particle size for backfill is 4 inches.

3. Unsuitable soils are organic soils and those soils classified as CH, OH, MH, OL, or PT.

E. Impervious Material: Clayey soil or other similar material which will prevent percolation into the drainage zone behind the wall.

F. Drainage Pipe: Perforated or slotted PVC or corrugated HDPE pipe manufactured in accordance with D3034 and/or ASTM F405. The pipe may be covered with a geotextile filter fabric to function as a filter.

G. Construction Adhesive: Exterior grade adhesive as recommended by the retaining wall unit manufacturer.

1. Construction Adhesive Manufacturer: SRW Products, Princeton, MN, 763-389-2722. www.srwproducts.com

a. Material Type and Description: [specify material type and description]

b. Material Standard: [specify material standard]

c. Manufacturer: Acceptable to concrete retaining wall unit manufacturer.

2. Or approved equal.

PART 3 EXECUTION

A. Examine the areas and conditions under which the retaining wall system is to be erected, and notify the Architect/Engineer/Owner/Contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.

B. Promptly notify the wall design engineer of site conditions which may affect wall performance, soil conditions observed other than those assumed, or other conditions that may require a reevaluation of the wall design.

C. Verify the location of existing structures and utilities prior to excavation.

3.2 PREPARATION

A. Ensure surrounding structures are protected from the effects of wall excavation.

B. Excavation support, if required, is the responsibility of the Contractor, including the stability of the excavation and its influence on adjacent properties and structures.

3.3 EXCAVATION

A. Excavate to the lines and grades shown on the Drawings. Over-excavation not approved by the Architect will not be paid for by the Architect/Engineer/Owner/Contractor. Replacement of these soils with compacted fill and/or wall system components will be required at the Contractor's expense. Use care in excavating to prevent disturbance of the base beyond the lines shown.

3.4 FOUNDATION PREPARATION

A. Excavate foundation soil as required for footing or base dimension shown on the Contract Drawings, or as directed by the Project geotechnical engineer.

B. The Project geotechnical engineer will examine foundation soil to ensure that the actual foundation soil strength meets or exceeds that indicated on the Drawings. Remove soil not meeting the required strength. Oversize resulting space sufficiently from the front of the block to the back of the reinforcement, and backfill with suitable compacted backfill soils.

C. The Project geotechnical engineer will determine if the foundation soils will require special treatment or correction to control total and differential settlement.

D. Fill over-excavated areas with suitable compacted backfill, as recommended by the Project geotechnical engineer.

3.5 BASE COURSE PREPARATION

A. Place base materials to the depths and widths shown on the Contract Drawings, upon undisturbed soils, or foundation soils prepared as specified in this section.

1. Extend the leveling pad laterally at least 6 inches in front and behind the lowermost concrete retaining wall unit.

2. Provide aggregate base compacted to 6 inches thick (minimum).

3. The Contractor may at their option, provide a concrete leveling pad as specified in Subparagraph 2.01.C.2, in lieu of the aggregate base.

4. Where a reinforced footing is required by local code official, place footing below frost depth.

B. Compact aggregate base material to provide a level, hard surface on which to place the first course of units.

C. Prepare base materials to ensure complete contact with retaining wall units. Gaps are not allowed.

3.6 ERECTION

A. General: Erect units in accordance with manufacturer's instructions and recommendations, and as specified herein.

B. Place first course of concrete wall units on the prepared base material. Check units for level and alignment. Maintain the same elevation at the top of each unit within each section of the base course.

C. Ensure that foundation units are in full contact with natural or compacted soil base.

D. Place concrete wall units side-by-side for full length of wall alignment. Alignment may be done by using a string line measured from the back of the block. Gaps are not allowed between the foundation concrete wall units.

E. Place at least 12 inches (305mm) of drainage aggregate between, and directly behind the concrete wall units. Fill voids in retaining wall units with drainage aggregate. Provide a drainage zone behind the wall units to within 9 inches of the final grade. Cap the backfill and drainage aggregate zone with 12 inches (305mm) of impervious material.

F. Install drainage pipe at the lowest elevation possible, to maintain gravity flow of water to outside of the reinforced zone. Slope the main collection drainage pipe, located just behind the concrete retaining wall units, 2 percent grade minimum to provide gravity flow to the daylighted areas. Daylight the main collection drainage pipe through the face of the wall, and/or to an appropriate location away from the wall system at each low point and at 50 foot (15.25 m) maximum intervals along the wall. Alternately, the drainage pipe can be connected to a storm sewer system at 50 foot (15.25 m) maximum intervals.

G. Remove excess fill from top of units and install next course. Ensure drainage aggregate and backfill are compacted before installation of next course.

H. Check each course for level and alignment. Adjust units as necessary to maintain level and alignment prior to proceeding with each additional course.

I. Install each succeeding course placing units in a random pattern. Backfill as each course is completed. Pull the units forward until the locating surface of the unit contacts the locating surface of the units in the preceding course. Interlock wall segments that meet at corners by overlapping successive courses. Attach concrete retaining wall units at exterior corners with adhesive specified.

J. Install geosynthetic reinforcement in accordance with geosynthetic manufacturer's recommendations and the Contract Drawings.

1. Orient geosynthetic reinforcement with the highest strength axis perpendicular to the wall face.

2. Prior to geosynthetic reinforcement placement, place the backfill and compact to the elevation of the top of the wall units at the elevation of the geosynthetic reinforcement.

3. Place geosynthetic reinforcement at the elevations and to the lengths shown on the Contract Drawings.

4. Lay geosynthetic reinforcement horizontally on top of the concrete retaining wall units and the compacted backfill soils. Place the geosynthetic reinforcement within one inch of the face of the concrete retaining wall units. Place the next course of concrete retaining wall units on top of the geosynthetic reinforcement.

5. The geosynthetic reinforcement shall be in tension and free from wrinkles prior to placement of the backfill soils. Pull geosynthetic reinforcement hand-taut and secure in place with staples, stakes, or by hand-tensioning until the geosynthetic reinforcement is covered by 6 inches (152mm) of loose fill.

6. The geosynthetic reinforcements shall be continuous throughout their embedment lengths. Splices in the geosynthetic reinforcement strength direction are not allowed.

7. Do not operate tracked construction equipment directly on the geosynthetic reinforcement.

8. At least 6 inches of compacted backfill soil is required prior to operation of tracked vehicles over the geosynthetic reinforcement. Keep turning of tracked construction equipment to a minimum.

9. Rubber-tired equipment may pass over the geosynthetic reinforcement at speeds of less than 5 miles per hour. Turning of rubber-tired equipment is not allowed on the geosynthetic reinforcement.

3.7 BACKFILL PLACEMENT

A. Place reinforced backfill, spread and compact in a manner that will minimize slack in the reinforcement.

B. Place fill within the reinforced zone and compact in lifts not exceeding 6 to 8 inches (loose thickness) where hand-operated compaction equipment is used, and not exceeding 12 inches (loose thickness) where heavy, self-propelled compaction equipment is used.

1. Only lightweight hand-operated compaction equipment is allowed within 4 feet of the back of the retaining wall units. If the specified compaction cannot be achieved within 4 feet of the back of the retaining wall units, replace the reinforced soil in this zone with drainage aggregate material.

C. Compaction testing shall be done in accordance with ASTM D1556 or ASTM D2922.

**** NOTE TO SPECIFIER ** In the paragraph below, select revised modified Proctor densities if necessary, in lieu of standard Proctor densities specified**

D. Minimum Compaction Requirements for Fill Placed in the Reinforced Zone

1. The minimum compaction requirement shall be determined by the project geotechnical engineer testing the compaction. At no time shall the soil compaction requirements be less than 95 percent of the soil's standard Proctor maximum dry density (ASTM D698) [modified Proctor maximum dry density (ASTM D1557)] for the entire wall height

2. Utility Trench Backfill: Compact utility trench backfill in or below the reinforced soil zone to 98 percent of the soil's standard Proctor maximum dry density (ASTM D698) [modified Proctor maximum dry density (ASTM D1557)], or as recommended by the Project geotechnical engineer. If the height from the utility to finish grade is higher than 30 feet, increase compaction to 100 percent of the standard Proctor density [modified Proctor

density].

a. Utilities must be properly designed (by others) to withstand all forces from the retaining wall units, reinforced soil mass, and surcharge loads, if any.

3. Moisture Content: Within 2 percentage points of the optimum moisture content for all wall heights.

4. These specifications may be changed based on recommendations by the Project geotechnical engineer.

a. If changes are required, the Contract Sum will be adjusted by written Change Order.

E. At the end of each day's operation, slope the last level of compacted backfill away from the interior (concealed) face of the wall to direct surface water runoff away from the wall face.

1. The General Contractor is responsible for ensuring that the finished site drainage is directed away from the retaining wall system.

2. In addition, the General Contractor is responsible for ensuring that surface water runoff from adjacent construction areas is not allowed to enter the retaining wall area of the construction site.

F. Refer to Article 3.10 for compaction testing.

3.8 CAP UNIT INSTALLATION

A. Apply adhesive to the top surface of the unit below and place the cap unit into desired position.

B. Cut cap units as necessary to obtain the proper fit.

C. Backfill and compact to top of cap unit.

3.9 SITE CONSTRUCTION TOLERANCES

A. Site Construction Tolerances:

1. Vertical Alignment: Plus or minus 1 1/2 inches (38mm) over any 10 foot (3048mm) distance, with a maximum differential of 3 inches (76mm) over the length of the wall.

2. Horizontal Location Control From Grading Plan

a. Straight Lines: Plus or minus 1 1/2 inches (38mm) over any 10 foot (3048mm) distance.

b. Corner and Radius Locations: Plus or minus 12 inches (305mm).

c. Curves and Serpentine Radii: Plus or minus 2 feet (610mm).

3. Immediate Post Construction Wall Batter: Within 2 degrees of the design batter of the concrete retaining wall units.

4. Bulging: Plus or minus 1 1/4 inches (32mm) over any 10 foot (3048mm) distance.

3.10 FIELD QUALITY CONTROL

A. Installer is responsible for quality control of installation of system components.

B. The Owner or General Contractor, at their expense, will retain a qualified professional to perform quality assurance checks of the installer's work.

C. Correct work which does not meet these specifications or the requirements shown on the Drawings at the installer's expense.

D. Perform compaction testing of the reinforced backfill placed and compacted in the reinforced backfill zone.

1. Testing Frequency:

a. One test for every 2 vertical feet (610mm) of fill placed and compacted, for every 50 lineal feet (15.25 lm) of retaining wall.

b. Vary compaction test locations to cover the entire area of the reinforced soil zone, including the area compacted by the hand-operated compaction equipment.

3.11 ADJUSTING AND CLEANING

A. Replace damaged units with new units as the work progresses.

B. Remove debris caused by wall construction and leave adjacent paved areas broom clean.

END OF SECTION

SECTION 329300 - PLANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. The provision and installation of all plant materials and products specified, including all supervision, labor, equipment and materials necessary to complete the project.

2. General maintenance of stored and installed materials until Acceptance.

3. Provision of Landscaping Warranty.

B. Description of Work:

1. Provide all materials and equipment, and do all work required to transplant existing trees and shrubs, and to install new plants, as indicated on the Drawings and as specified.

C. Related Sections:

1. Examine Contract Documents for requirements that affect work of this Section. Other Specification Sections that directly relate to work of this Section include, but are not limited to:

a. Section 312000 – EARTH MOVING

1.3 REFERENCES

A. Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

1. American National Standards Institute, Inc. (ANSI):

Z60.1 American Standard for Nursery Stock - 2004
(Sponsor: American Nursery & Landscape Association)

2. American Society for Testing and Materials (ASTM):

C 136 Sieve Analysis of Fine and Coarse Aggregates
E 11 Wire-Cloth Sieves for Testing Purposes

3. American Wood Preservers' Association (AWPA):

   C2 Lumber, Timbers, Bridge Ties and Mine Ties – Preservative Treatment By Pressure Processes

4. National Arborist Association, 3537 Stratford Rd., Wantagh, NY 11793 (NAA):

   Ref. 1 Transplanting of Trees and Shrubs in the Northeastern and North Central United States

5. Hortus Third, A Concise Dictionary of Plants Cultivated in the United States and Canada, Cornell University, L.H. Bailey Hortorium, MacMillian Publishing Co., New York, NY.

6. Manual of Woody Landscape Plants: Their Identification, Ornamental Characteristics, Culture, Propagation and Uses, Michael A. Dirr, Stipes Publishing Company, Champaign, Illinois, 1975, Revised 1998.

7. "A Field Guide: Standards for Urban Forestry Data Collection." 2010. By the USDA Forest Service, ISA and the IUFRO (International Union of Forest Research Organizations.

1.4 DEFINITIONS

A. Backfill: The earth used to replace or the act of replacing earth in an excavation.

B. Compaction: A loss of soil aggregates; destroyed aeration pore spaces; crushed or collapsed pore spaces; and, undergone extensive resorting and packing of soil particles.

C. Duff Layer: The surface layer of native topsoil that is composed of mostly decayed leaves, twigs, and detritus.

D. Finish Grade: Elevation of finished surface of planting soil.

E. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.

F. Planting Media: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

G. Root Flare: Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.

H. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

I. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

J. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.

1.5 SUBMITTALS

A. Product certificates: Labels from the manufacturer's container or manufacturer's cutsheets certifying that the product meets the specified requirements shall be submitted for the following materials:

Anti-desiccant
Chemical Products
Erosion Control Fabric
Fertilizers
Filter Fabric
Mycorrhizal Fungi
Organic Soil Amendments
Root Control Barrier
Structural Soil
Weed Control Barrier
Inorganic Soil Amendments

B. Test Reports: Test reports from an approved testing agency indicating compliance with the specifications shall be submitted for:

Compost
Manufactured soil
Manue
Mulch
Planter Soil
Planting Media
Topsoil
Any other materials designated by the Landscape Architect.

C. Samples* of the following:

Mulch
Compost
Landscape edging w/ finish as specified
Planting Media
Planter soil mix
Root ball stabilization materials

*Bulk materials in quantities sufficient to demonstrate range of color, texture, particle size, etc.

D. List of Plant Materials: Species to be installed, noting any discrepancies with Drawings. This list does NOT imply permission for substitutions unless approved in writing by Landscape Architect.

E. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of plants during a calendar year.

1.6 QUALITY ASSURANCE

A. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project Site when work is in progress.

B. Soil Analysis:

1. The Contractor shall engage an independent testing agency, experienced in the testing of agricultural soils and acceptable to the Landscape Architect, to perform the following tests and analyses:

Material	Tests and Analysis Required
Soils	Mechanical analysis of soil indicating the percent passing by weight of the following sieve sizes: 1 in., 1/2 in., No. 4, No. 10, No. 100, and No. 200. Determination of pH, organic content, and nutrient content. Recommendations shall be made by the testing agency as to the type and quantity of soil additives required to bring pH, organic content, and nutrient content to satisfactory levels for planting.
Organic Amendments	Determination of moisture absorption capacity, organic matter content, and pH.

2. Report presence of problem salts, minerals, or heavy metals; if present, provide additional recommendations for corrective action.

3. A Solvita test shall be performed to determine the maturity and stability of the compost.

4. Gradation of granular materials shall be determined in accordance with ASTM C 136. Sieves for determining material gradation shall be as described in ASTM E 11.

C. Soil Drainage:

1. Test drainage of adverse soils in three to five plant pit locations chosen by the Landscape Architect. Pits shall be excavated to a size suitable for a large tree, completely filled with water and observed to determine the length of time the soils take to completely drain. Landscape Architect shall then be notified of the time it takes for the pits to drain completely. Planting operations shall not proceed until Landscape Architect has reviewed drainage test results.

D. Plants:

1. The Contractor shall provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1.

2. The Contractor shall inspect all nursery materials to determine that the materials meet the requirements of this Section. Submit List of Plant Materials to be installed indicating discrepancies with Drawings. No changes or substitutions may be made without prior approval by the Landscape Architect, and municipal authority, if applicable.

3. When requested by the Landscape Architect, the Contractor shall submit the names and locations of nurseries proposed as sources of acceptable plant material.

4. Proposed materials shall be flagged at the nurseries by the Contractor prior to viewing by the Landscape Architect, when requested by the Landscape Architect.

5. When requested by the Landscape Architect, deliver photographs of plant material or representative samples of plants.

6. Schedule time with the Landscape Architect for viewing plant material at the source(s). Time spent at the nursery shall occur prior to the anticipated delivery time.

7. Viewing and/or sealing of plant materials by the Landscape Architect at the nursery does not preclude the Landscape Architect's right to reject material at the site of planting.

8. Identification of plant names shall be as listed in Hortus Third or M. Dirr's Manual of Woody Landscape Plants.

9. All plants shall be delivered to site with identifying tags that shall not be removed until Substantial Completion acceptance.

E. Owner's Inspection And Testing:

Work may be subject to inspection at any time by the Landscape Architect. The Owner reserves the right to engage an independent testing laboratory in accordance with requirements of Section 140000 – QUALITY CONTROL to analyze and test materials used in the construction of the work. Where directed by the Landscape Architect, the testing laboratory will make material analyses and will report to the Landscape Architect whether materials conform to the requirements of this specification.

1. Cost of tests and material analyses made by the testing laboratory will be borne by the Owner when they indicate compliance with the specification and by the Contractor when they indicate non-compliance.

2. Testing equipment will be provided by and tests performed by the testing laboratory. Upon request by the Landscape Architect or Owner, the Contractor shall provide such auxiliary personnel and services needed to accomplish the testing work and to repair damage caused thereto by the permanent work.

F. Contractor's Inspection And Testing:

1. Testing, analyses, and inspection required by the Contractor for his own information or guidance shall be at his own expense.

2. Materials shall not be used in construction until the test results have been reviewed by the Landscape Architect.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage.

B. Digging Plant Material: Plants shall not be dug at the nursery or approved source until the Contractor is ready to transport them from their original locations to the site of the work or acceptable storage location.

C. Handling of Plant Materials: Exercise care in handling plant materials to avoid damage or stress. Handle planting stock by root ball or container. Do not bend or bind-tie trees or shrubs

in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.

D. Deliver bare-root stock plants freshly dug. Immediately after digging up bare-root stock, pack root system in wet straw, hay, or other suitable material to keep root system moist until planting.

E. Deliver plants after preparations for planting have been completed, and install immediately.

F. Plants that are not planted immediately shall be protected as follows:

1. If planting is delayed more than six hours after delivery, set plants and trees in shade, protect from weather and mechanical damage, and keep roots moist. Plants shall not be allowed to dry out or freeze.

2. Bareroot plants shall be installed on the same day of delivery or placed in storage until installed. Injury and desiccation of plants on-site shall be prevented.

3. Earth balls shall be kept intact and moist.

4. Store bulbs, corms, and tubers in a dry place at 60° to 65°F (16° to 18°C) until planting.

5. Both the duration and method of storage of plant materials shall be subject to the approval of the Landscape Architect.

6. Extended storage at site: Plants shall then be protected and kept moist by "heeling-in" the roots or by placing the plant in a cool moist storage building. The "heeling-in" procedure shall require the plants to be separated and the roots heeled in a suitable moist soil. If plants are stored in a building, the roots shall be covered with suitable moist mulch.

G. In certain situations, and depending on plant species, apply anti-desiccant to trees and shrubs as needed to protect plant material.

H. The following shall be cause for rejection of materials by the Landscape Contractor or Landscape Architect:

1. Evidence of inadequate protection following digging, carelessness while in transit, or improper handling or storage, shall be cause for rejection.

2. Upon arrival at the temporary storage location or the site of the work, plants shall be inspected for proper shipping procedures. Should the roots be dried out, large branches be broken, balls of earth broken or loosened, or areas of bark be torn, the Landscape Architect will reject the injured plant.

3. When a plant has been rejected, remove it from the area of the work and replace it with one of the required size and quality.

1.8 PLANTING SEASONS AND CONDITIONS

A. Planting shall only be performed when weather and soil conditions are suitable for planting the material specified in accordance with locally accepted practice.

B. No planting shall occur if said activity results in permanent compaction of soil.

1.9 MAINTENANCE

A. Plant material shall be maintained by the Contractor until Substantial Completion, as described in Part 3 of this Section.

B. Following Substantial Completion until the completion of the warranty period and Final Acceptance, maintenance of the plant material shall become the Owner's responsibility. Provide instructions and service as follows.

1. The Contractor shall provide the Owner with written recommended maintenance program at time of Substantial Completion.

2. The Contractor may make as many periodic inspections as necessary during the guarantee period, at no additional cost to the Owner, to inspect the condition of all plant materials. Submit written report of each inspection to the Landscape Architect and Owner outlining corrective measures required to keep the guarantee valid.

1.10 ACCEPTANCE

A. The Landscape Architect will inspect all work for Substantial Completion upon written notice of completion. The request shall be received at least ten calendar days before the anticipated date of inspection.

B. Acceptance of plant material by the Landscape Architect will be for general conformance to specified size, character, and quality, and shall not diminish responsibility for full conformance to the Contract Documents.

C. Upon satisfactory completion and re-inspection of all repairs or renewals necessary in the judgment of the Landscape Architect, the Landscape Architect will recommend to the Owner that acceptance of the work of this Section be given.

D. Acceptance in Part

1. The work may be accepted in parts when it is deemed to be in the Owner's best interest to do so, and when permission is given to the Contractor in writing to complete the work in parts.

2. Acceptance and use of such areas by the Owner shall not waive any other provisions of this Contract.

1.11 WARRANTY

A. Plants shall be guaranteed for a period of one year after the date of Acceptance by the Owner and Landscape Architect.

1. When the work is accepted in parts, the guarantee periods shall extend from each of the partial acceptances to the terminal date of the last guarantee period. Thus, all guarantee periods terminate at one time.

B. Plants shall be healthy, free of pests and disease, and in flourishing condition at the end of the guarantee period. Plants shall be free of dead and dying branches and branch tips, and shall bear foliage of normal density, size, and color.

C. Replace dead plants and all plants not in a vigorous, thriving condition, as determined by the Landscape Architect during and at the end of the guarantee period, without cost to the Owner, as soon as weather conditions permit and within the specified planting period.

1. Replacements shall closely match adjacent specimens of the same species. Replacements shall be subject to all requirements stated in this Specification.

2. Make all necessary repairs due to plant replacements. Such repairs shall be done at no extra cost to the Owner.

3. The guarantee of all replacement plants shall extend for an additional one-year period from the date of their acceptance after replacement.

D. Guarantee does not cover defects resulting from abuse, lack of adequate maintenance, or neglect by Owner, or incidents that are beyond Contractor's control.

E. At the end of the guarantee period, and no less than five days prior to final inspection, staking and guying materials shall be removed from the site.

1.12 FINAL INSPECTION AND FINAL ACCEPTANCE

A. At the end of the guarantee period, the Landscape Architect will, upon written notice of end of guarantee period, inspect the work for Final Acceptance. Request shall be received at least ten calendar days before the anticipated date for Final Inspection.

B. Upon completion and re-inspection of full repairs or replacements necessary in the judgment of the Landscape Architect. At that time, the Landscape Architect will recommend to the Owner that Final Acceptance of the Work of this Section be given.

PART 2 - PRODUCTS

2.1 PLANT MATERIAL

A. Except as otherwise specified, form, size, and grade of plant materials shall conform to ANSI Z60.1.

B. Furnish trees and shrubs with root balls measured from top of root ball, which shall begin at root flare according to ANSI Z60.1. Root flare shall be visible before planting. Plants shall have, at a minimum, an acceptable form typical of species.

C. The Landscape Architect will be the final arbiter of plant form acceptability.

1. Trunk(s), Canes and Branches:
   a. Well-formed and sturdy with a straight, distinct leader where this is characteristic of species.
   b. Branching plentiful and uniformly distributed to form a well-balanced plant.
   c. Trees with leaders that are damaged, crooked, or crossed shall be rejected.
   d. Trees with multiple leaders shall be rejected, unless form is typical for the species or specifically indicated in the Drawings.
   e. Multiple leaders with narrow crotches (included bark) shall not be acceptable.
   f. Scars shall be free of rot and not exceed 1/4 the diameter of the wood beneath in greatest dimension unless completely healed (except pruning scars).
   g. Pruning scars clean cut leaving little or no protrusion from the trunk or branch.
   h. Graft union completely healed.
   i. No mechanical or pest damage.
   j. No excessive succulence or suckering atypical of species.

2. Foliage:
   a. Densely supplied with healthy, vigorous leaves of normal size, shape, color, and texture (except shrubs moved bare-root or deciduous shrubs when dormant).
   b. No chlorosis.
   c. Minimally perceptible pest or mechanical damage, affecting no more than 5 percent of foliage.

3. Root System:
   a. Plants shall have a well-developed fibrous root system.
   b. Sturdily established in container, but shall not be excessively root bound except plants deliberately grown root bound to produce a dwarf plant.
   c. No stem girdling roots.
   d. No weeds.

D. Plants shall be healthy and vigorous, free of disease, insect pests and their eggs and larvae.

E. Plants shall be free of physical damage such as scrapes, broken or split branches, large scars, bark abrasions, sunscalds, fresh limb cuts, disfiguring knots, or other defects.

F. Plants shall not be pruned for form (if needed to improve aesthetic appearance and/or growth habit) until Substantial Completion Acceptance.

G. Plants shall meet the sizes indicated on the Plant List or Schedule. Plants larger or smaller than specified may be used only if accepted by the Landscape Architect.

H. To the greatest extent practicable, plant material shall be obtained from sources located in similar climatic zones to the Project site.

I. Plants indicated as “B&B” shall be balled and burlapped.

1. Unless otherwise permitted by the Landscape Architect, plants shall be nursery grown.

2. Nursery grown plants shall be freshly dug or heeled-in. No plants from cold storage will be accepted unless permitted by the Landscape Architect.

J. Container stock, where specified or approved by Landscape Architect, shall meet the standards of ANSI Z60.1 and the following:

1. Container stock shall have a heavy fibrous root system that has been developed by proper cultural treatment, transplanting, and root pruning.

2. Container stock shall be sturdy, healthy and sufficiently vigorous to ensure plant growth.

K. Herbaceous Plants: Including, but not limited to, annuals, biennials, perennials, wetland or water plants, bulbs, tubers, and corms: Provide healthy, disease-free plants of species and variety shown or listed, with well-established root systems or well-formed root forms. Provide only plants that are acclimated to outdoor conditions before delivery.

L. Bareroot stock, where specified or approved by Landscape Architect, shall meet the standards of ANSI Z60.1 and the following:

1. Bareroot stock shall have a heavy fibrous root system that has been developed by proper cultural treatment, transplanting, and root pruning.

2. Bareroot stock shall be sturdy, healthy and sufficiently vigorous to ensure plant growth.

2.2 INORGANIC SOIL AMENDMENTS

A. Lime: ASTM C602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent, by weight. Class T is more finely ground and quicker acting but dustier than Class O.

B. Sulfur: Granular, biodegradable, and containing a minimum of 90 percent sulfur.

C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.

D. Aluminum Sulfate: Commercial grade, unadulterated.

E. Perlite: Horticultural perlite, soil amendment grade.

F. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through No. 50 (0.30-mm) sieve.

G. Sand: Clean, washed, natural or manufactured angular grains, free of toxic materials.

H. Diatomaceous Earth: Calcined, 90 percent silica, with approximately 140 percent water absorption capacity by weight.

2.3 ORGANIC SOIL AMENDMENTS

A. Compost: Well-composted, stable, and substantially weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; soluble salt content of <3 mmhos/cm or <3 decisiemens/m and free of substances toxic to plantings; and as follows:

1. The compost stock must mature for a minimum of 90 days. During this time, the compost stock shall achieve thermophilic temperatures (175° to 180°F, 79° to 82°C) for 15 days; multiple turnings may be required for the entire stockpile. A Solvita test may be requested to determine the maturity and stability of the compost.

2. Frozen or muddy compost shall be unacceptable for use.

B. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, debris, and material harmful to plant growth.

C. Mycorrhizal Fungi: Dry, organic, granular root stimulant/inoculant containing at least 5300 spores per pound (0.45 kg) of vesicular-arbuscular mycorrhizal fungi and 95 million spores per pound (0.45 kg) of ectomycorrhizal fungi, 33 percent hydrogel, and a maximum of 5.5 percent inert material.

1. Mycorrhizal fungi amendment shall be manufactured by one of the following, or approved equivalent:
   a. Roots
   b. Plant Health Care
   c. Mycorrhizal Applications of Oregon

D. Hydrogel: Shall be water absorbant crystals or granules manufactured by one of the following, or approved equal: Plant Health Care, Terra-Sorb, Viterra Gelscape.

2.4 FERTILIZERS

A. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde. Nitrogen (N), Phosphorus (P) and Potassium (K) in amounts recommended in soil test results.

B. Controlled-release fertilizer:

1. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium of equal proportions.

2. Planting Tablets: Tightly compressed chip type, long-lasting, slow-release, commercial-grade planting fertilizer in tablet form. Tablets shall break down with soil bacteria, converting nutrients into a form that can be absorbed by plant roots. Nutrient composition: nitrogen, phosphorous, potassium and micronutrients.

3. Controlled-release fertilizer shall be equal to the following:

Product	Manufacturer
Osmocote	Scotts Miracle-Gro Company
Agriform 20-10-5	Sierra Chemical Co.
Planting Tablets	Milpitas, CA 95035
EZY-Grow Fertilizer Packet	EZY-Grow - Landscape Specialties

2.5 PLANTING MEDIA

A. Topsoil

1. Topsoil shall be obtained from a previously established stockpile on the site, to the extent that suitable material is available. Additional topsoil required shall be obtained from off-site sources.

2. Topsoil, whether stripped from site or supplied from off-site, shall be a sandy loam as defined by the USDA Soil Conservation Service, Soil Classification System, and shall have the following mechanical analysis:

Textural Class	% of Total Weight	Average %
Sand (0.05-2.0 mm dia. range)	45 to 75	60
Silt (0.002-0.05 mm dia. range)	15 to 35	25
Clay (less than 0.002 mm dia. range)	5 to 25	15

   a. 95 percent of topsoil shall pass a No. 8 (2.0 mm) sieve.
   b. Topsoil shall be free of stones >1 inch (25 mm) in longest dimension, earth clods or clay, plant parts, weeds, debris, and other extraneous materials harmful to plant growth.
   c. Organic matter content shall be 4 to 12 percent of total dry weight.
   d. Range of pH: 5.5 to 7.

B. Compost Manufactured Topsoil: Uniform mixture of compost and base soil to achieve the compost manufactured topsoil product consisting of the following ingredients:

1. Compost: An organic substance produced by the biological and biochemical decomposition of source separated organic materials that may include leaves and lawn trimmings, food or industrial residuals, and/or municipal biosolids. The product shall not contain levels of substances toxic to plants and shall be reasonably free (< 1 percent by dry weight) of man-made foreign matter. Compost shall meet USEPA 40 CFR Part 503 standards for Class A, Exceptional Quality compost, as well as all applicable state standards for its intended use.

2. Base soil: Topsoil and/or other soils (clay, silt, sand sand, sandy loam, or loamy sand in texture according to USDA soil classification. It shall be free of stones, clods, plant parts, weeds, and other debris >2 inches (50 mm) in any dimension. It shall not contain levels of substances that shall inhibit or be harmful to plant growth.

3. Product Parameters:

Parameter	**Compost**	**Base Soil**	**Compost Manufactured Topsoil**
pH	6.0-8.5	5.0-8.0	6.0-7.8
% Organic Matter	<40%	0-5%	6-20%
Particle Size	<1” (25 mm)	<2” (50 mm), USDA Class: sand, sandy loam, loamy sand	<2” (50 mm), USDA Class: sand, sandy loam, loamy sand
Salts/conductivity	Varies; must be reported	<2mmhos/cm after handling, placement	<2mmhos/cm after handling, placement

		& rainfall	& rainfall
Carbon: Nitrogen Ratio	15-25:1	N/A	N/A

C. Plant bed media: Verify site conditions and suitability of native surface topsoil to produce viable planting soil. Modify and fertilize soil types to create acceptable planting media for specific site conditions, plant species, and proposed use in accordance with soil test reports. <**Select applicable options below**>

1. Plant bed media for largely unchanged site conditions, reusing on-site topsoil: Existing, native surface topsoil formed under natural conditions with the duff layer retained during excavation process and retained in-place or stockpiled on site. Supplement with standardized topsoil or imported topsoil if quantities are insufficient. Mix native topsoil with loose compost in the following quantities to produce plant bed media: Ratio of loose compost to topsoil by volume: [**1:4**] [**1:3**] [**1:2**] <**Insert ratio**>.

2. Plant bed media using imported topsoil from off-site sources if existing surface soil is not of suitable quality or quantity. Obtain topsoil from naturally well-drained construction or mining sites with topsoil at least 4 inches (100 mm) deep; do not obtain from agricultural land, bogs or marshes. Mix imported topsoil with loose compost in the following quantities to produce plant bed media: Ratio of loose compost to topsoil by volume: [**1:4**] [**1:3**] [**1:2**] <**Insert ratio**>.

3. Plant bed media using standardized topsoil: ASTM D 5268 topsoil, with pH range of 5.5 to 7, and minimum 6 percent organic material content. Mix ASTM D 5268 topsoil with loose compost in the following quantities to produce plant bed media: Ratio of loose compost to topsoil by volume: [**1:4**] [**1:3**] [**1:2**] <**Insert ratio**>.

D. Skeletal or Structural Soil: Patented and licensed, CU-Structural Soil™ or CU-Soil™ as developed by Cornell University and distributed by Amereq, Inc. licensed producers.

E. Container Plant Mix: Project specific. Designer to specify.

F. Lightweight Planting Soil: Project specific. Designer to specify.

2.6 WATER

A. Water shall be suitable for irrigation and free from ingredients harmful to seeded or sodded areas.

2.7 WEED-CONTROL BARRIERS

A. Weed control barriers are not recommended for planted areas as the materials prevent or slow water penetration required for plant growth. They may be beneficial for largely unplanted, mulched areas.

B. Nonwoven Geotextile Filter Fabric: Polypropylene or polyester fabric, 3 oz./sq. yd. (101g/sq.m) minimum.

C. Composite Fabric: Woven, needle-punched polypropylene substrate bonded to a nonwoven polypropylene fabric, 4.8 oz./sq. yd. (162g/sq.m).

2.8 MULCHES

A. Organic Mulch: Mulch shall be 100 percent [**fine-shredded pine or other softwood bark]** [**Pine straw**] [**Salt hay or threshed straw**] [**Pine needles**] <**Insert mulch type**>, of uniform size and free from rot, leaves, twigs, debris, stones, or any material harmful to plant growth. Bark shall have been shredded and stockpiled no less than two months and no more than two years before use. **<delete last sentence if not bark mulch>**

B. Compost Mulch: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1-inch (25-mm) sieve; soluble salt content less than 3 decisiemens/m or 3 mmhos/cm as measured for soil mixture electrical conductivity; not exceed 0.5 percent inert contaminants and free of substances toxic to plantings. Product must be cured for a minimum of 90 days and produce minimal heat or odor to be considered a stable, mature product suitable for use with plants.

C. Stone (Mineral) Mulch: **[Rounded riverbed gravel or smooth-faced stone] [Crushed stone or gravel] [Marble chips] [Granite chips][expanded shale]** <**Insert stone type**>.

1. Size Range: [**1-1/2 inches (38 mm) maximum, 3/4 inch (19 mm) minimum**] [**3/4 inch (19 mm) maximum, 1/4 inch (6.4 mm) minimum**] <**Insert size range**>.

2. Color: [**Uniform tan-beige color range acceptable to Landscape Architect**] [**Readily available natural gravel color range**] <**Insert color**>.

2.9 CHEMICAL PRODUCTS

A. General: Pesticides, herbicides, fungicides, bactericides or any other chemical compounds shall be registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

1. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.

2. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.

3. Anti-desiccant: Shall be an emulsion specifically manufactured for plant protection which provides a protective film over plant surfaces which is permeable enough to permit transpiration. Anti-desiccant shall be delivered in manufacturer's sealed containers and shall contain manufacturer's printed instructions for use. Anti-desiccant shall be Wilt-Pruf as manufactured by Wilt-Pruf Products, Inc. P.O. Box 469 Essex, CT 06426, or approved equal.

4. Fungicide: Shall be zinc ethylene bisdithiocarbonate (Zineb), or equal, appled at

manufacturer's suggested rates.

5. Chemical Root Control Barrier: Chemical compounds or fabric impregnated with growth-regulating chemicals designed to modify root growth. Manufacturers shall be Plant Health Care or Typar Biobarrier, or approved equal.

2.10 FILTER FABRIC OR SOIL SEPARATION FABRIC

A. Nonwoven geotextile made of polypropylene, polyolefin, or polyester fibers, or combination, 101 g/sq. m (3 oz./sq. yd.) minimum, Mirafi 140-N, or approved equal.

2.11 TREE SUPPORT MATERIALS

A. Install tree support materials only when conditions warrant. See Part 3. Rootball stabilization is preferred method.

B. Rootball Stabilization Materials:

1. At-grade or below-grade stabilization systems to secure each new tree planting by its rootball; sized per manufacturer's written recommendations unless otherwise indicated. Provide one of the following products, or approved equal:
   a. Tomahawk Tree Stabilizers by Border Concepts, Inc.
   b. Duckbill Rootball Fixing System by Foresight Products, LLC
   c. Tree Staples by Tree Staple, Inc.

C. Wood Stakes: For trees under 10 feet (3.05 m) in height, straight, sound, rough sawn lumber not less than 2 x 2 inch (50 mm x 50 mm), if square, or 2-1/2 inch (62 mm) diameter, if round. Wire for staking shall be 12-gauge steel.

D. Wire for Guying: Galvanized steel 1 x 19 preformed 3/16 inch (4.76 mm) diameter.

E. Turnbuckles: Galvanized steel fitted with locking eyebolts.

F. Deadman: Sound, rough sawn lumber 2 x 4 inch (50 mm x 100 mm) triangular galvanized steel plates, or other material approved by the Landscape Architect.

G. Hose: High quality braided rubber hose, 3/4 inch (19 mm) diameter and suitable length, black in color.

H. Polyethylene tie strapping may be used with 2 x 2 inch (50 mm x 50 mm) wood stakes.

2.12 ROOT CONTROL BARRIER (PHYSICAL)

A. Black, molded, modular panels manufactured with 50 percent recycled polyethylene plastic with ultraviolet inhibitors, 85 mils (2.2 mm) thick, with vertical root deflecting ribs protruding ½ inch (12 mm) to 3/4 inch (19 mm) out from panel, and each panel 24 inches (610 mm) wide by **[18 inches (450 mm)][24 inches (610 mm)][36 inches (900 mm)][48 inches (1210 mm)]** in depth. **<Insert measurement>.** Integrated zipper joining system for panel to panel connection.

2.13 LANDSCAPE EDGING

A. Wood: Western Red Cedar, Eastern White Cedar or pressure-treated Southern Yellow Pine with stakes of same type, 1 x 2 inch (25 mm x 50 mm) nominal by 18 inches (450 mm) long, with galvanized nails for anchoring the edging.

B. Steel: Standard commercial steel edging, rolled edge, fabricated in sections of standard lengths, with loops stamped from or welded to face of sections to receive stakes.

1. Provide products by one of the following manufacturers, subject to compliance with requirements, or approved equal:
   a. Sure-Loc Edging Corporation
   b. The J.D. Russell Company
   c. Collier Metal Specialties, Inc.
   d. Border Concepts, Inc.
   e. Ryerson Steel

2. Edging Size: **[3/16 inch (4.8 mm) wide by 4 inches (100 mm) deep] [1/4 inch (6.4 mm) wide by 5 inches (125 mm) deep][1/4 inch (6.4 mm) wide by 4 inches (100 mm) deep][1/8 inch (3.2 mm) wide by 4 inches (100 mm) deep][1/8 inches (3.2 mm) wide by 6 inches (150 mm) deep][0.1 inch (2.5 mm) wide by 4 inches (100 mm) deep] <insert dimensions>**

3. Stakes: Tapered steel, minimum of **[12 inches (300 mm)][15 inches (380 mm)] long. <Insert length>**

4. Accessories: Standard tapered ends, corners, and splicers.

5. Finish: **[Standard paint][Zinc coated][Unfinished].**

6. Paint color: **[Black][Green][Brown][Other].**

C. Aluminum: Standard-profile extruded aluminum edging, ASTM B 221 or ASTM B 221M, Alloy 6063-T6, fabricated in standard lengths of interlocking sections with loops stamped from face of sections to receive stakes.

1. Provide products by one of the following manufacturers, subject to compliance with requirements, or approved equal:
   a. Sure-Loc Edging Corporation
   b. The J.D. Russell Company
   c. Permaloc corporation
   d. Curv-Rite, Inc.

2. Edging Size: **[3/16 inch (4.8 mm) wide by 5 1/2 inches (140 mm) deep] [3/16 inch (4.8 mm) wide by 4 inches (100 mm) deep] [1/8 inches (3.2 mm) wide by 5 1/2 inches (140 mm) deep][1/8 inch (3.2 mm) wide by 4 inches (100 mm) deep]]<insert dimensions>**

3. Stakes: Aluminum, ASTM B 221 or ASTM B-221M, Alloy 6061-T6, 1 1/2 inches (38 mm) wide by 12 inches (300 mm) long.

4. Finish: **[Standard paint][Powdercoated][Mill – natural]{Black anodized].**

5. Paint color: **[Black][Green][Brown].**

D. Plastic: Standard-black polyethylene or vinyl edging **[V-lipped bottom][horizontally grooved]**, extruded in standard lengths, with 9 inch (225 mm) **[steel angle][plastic]** stakes.

1. Provide products by one of the following manufacturers, subject to compliance with requirements, or approved equal:
   a. Valley View Industries
   b. Oly-Ola Edgings, Inc.

2. Edging Size: **[0.1 inch (2.5 mm) wide by 5 inches (125 mm) deep][0.07 inch (1.8 mm) wide by 5 inches (125 mm) deep].<insert dimensions>**

3. Top profile: [**straight] [round]**.

4. Accessories: Manufacturer's standard alignment clips or plugs.

PART 3 - EXECUTION

3.1 APPROVAL OF EXISTING CONDITIONS

A. Prior to commencing installation, the Contractor shall be responsible for immediately notifying the Landscape Architect if any existing site or job conditions are observed which would negatively affect the character of the finished work, its future performance, or that would in any way be to the detriment of job progress and completion. If unobservable, substandard or unacceptable conditions are encountered during the course of work, the Contractor shall alert the Landscape Architect.

3.2 PLANT BED PREPARATION

A. Loosen subgrade of planting areas to a minimum depth of [**4 inches (100 mm)**] [**6 inches (150 mm)**] [**8 inches (200 mm)**] [**12 inches (300 mm)**] <Insert depth>. Remove stones larger than [**1 inch (25 mm)**] [**1-1/2 inches (38 mm)**] [**2 inches (50 mm)**] <Insert size> in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

1. Spread on rough grade, a thoroughly blended planting media consisting of a combination of compost, topsoil, inorganic soil amendments and fertilizer, as recommended by soil test results.

2. Spread planting media to a depth of [**4 inches (100 mm)**] [**6 inches (150 mm)**] [**8 inches (200 mm)**] [**12 inches (300 mm)**] <**Insert depth**> but not less than required to meet finish grades after natural settlement.

   a. Do not spread if planting media or subgrade is frozen, muddy, or excessively wet.

   b. Finish grade (below mulch, after settling) for planted areas shall be 3½ inches (87 mm) below adjacent pavement surfaces.

c. Finish grade after settling for seeded areas shall be ½ inch (12 mm) below adjacent pavement surfaces and 1 inch (25 mm) for sodded areas.

B. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades. Restore planting areas if eroded or disturbed after finish grading.

C. Application of Mychorrhizal Fungi, if specified: Broadcast dry product uniformly over prepared soil at the application rate suggested by the manufacturer. Mychorrhizal fungi shall not be used on herbaceous materials or in compacted soils.

3.3 LAYOUT OF PLANTING AREAS

A. Protect structures, utilities, sidewalks, pavements, other facilities, work by others, grassed areas, and existing plants from damage caused by planting operations. All damage caused by the Contractor or his work shall be the responsibility of the Contractor to repair or rectify at no additional cost to the Owner.

B. Lay out individual tree and shrub locations and areas for multiple or mass plantings. Stake locations, outline plant bed areas, adjust locations when requested, and obtain Landscape Architect's acceptance of layout before excavating or planting. Make subsequent adjustments as required.

3.4 EXCAVATION FOR TREES AND SHRUBS

A. Planting Pits and Trenches: Excavate circular planting pits with tapered sides. Excavations with vertical sides are not acceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit sheared or smoothed during excavation.

1. Excavate two times as wide as ball diameter.

2. Excavate at least 12 inches (300 mm) wider than root spread and deep enough to accommodate vertical roots for bare-root stock.

3. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.

B. Subsoil and topsoil removed from excavations [**may**] [**may not**] be used as planting media.

3.5 WOODY PLANT INSTALLATION

A. Before planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. **Remove excess soil from root ball to expose root flare as necessary.**

B. Remove injured roots by cutting cleanly; do not break.

C. Remove only dead, dying, or damaged branches. Pruning intent and procedure shall be reviewed with the Landscape Architect before proceeding.

D. Set stock plumb and in center of planting pit or trench with root flare a maximum of 2 inches (50 mm) above adjacent finish grades.

1. Use planting media as specified in Part 2 for backfill.

2. Add fertilizer and soil amendments in accordance with soil test recommendations and per manufacturers' recommendations.

3. If specified, add mycorrhizal fungi per manufacturer's recommendations if not incorporated during plant bed preparation.

4. Add water absorbent crystals or granules to backfill at rates recommended by the product manufacturer.

5. Balled and Burlapped Plants: After placing some backfill around root ball to stabilize plant, carefully cut and remove burlap, rope, wire baskets, and ties from at least the top 1/3 of root balls and as much as possible without comprising the integrity of the root ball. Non-biodegradable wrappings and ties shall be totally removed from root ball and plant pit.

6. Container-Grown Plants: Carefully remove root ball from container without damaging root ball or plant.

7. Fabric Bag-Grown Stock: Carefully remove root ball from fabric bag without damaging root ball or plant.

8. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When plant pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.

9. Continue backfilling process. Form water saucer around perimeter of plant pits of trees and large shrubs. Water again after placing and tamping final layer of soil.

E. Bare-Root Stock: Set and support bare-root stock in center of planting pit or trench with root a maximum of 2 inches (50 mm) above adjacent finish grade.

1. Use planting media as specified in Part 2 for backfill.

2. Add fertilizer and soil amendments in accordance with soil test recommendations and per manufacturers' recommendations.

3. If specified, add mycorrhizal fungi per manufacturer's recommendations if not incorporated during plant bed preparation.

4. Spread roots without tangling or turning toward surface, and carefully work backfill around roots by hand. Puddle with water until backfill layers are completely saturated. Plumb before backfilling, and maintain plumb while working backfill around roots and placing layers above roots.

5. Continue backfilling process. Water again after placing and tamping final layer of soil.

F. When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.

3.6 GROUND COVER AND HERBACEOUS PLANTS INSTALLATION

A. Use planting media as specified in Part 2 for backfill.

B. Excavate and place planting media to a depth of 18 inches (450 mm). Add fertilizer and soil amendments as recommended by soils test, and per manufacturers' recommendations.

C. If specified, add mycorrhizal fungi per manufacturer's recommendations if not incorporated during plant bed preparation.

a. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.

D. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.

3.7 TRANSPLANTING – GENERAL

A. Condition: Deciduous trees 4-inch (100 mm) caliper and larger shall be moved by boxing, be balled and burlapped, or with a tree spade during dormant periods. Deciduous trees smaller than 4-inch caliper (100 mm) shall be moved balled and burlapped, or moved with a tree spade during dormant periods. The size of the tree spade shall be no less than 11 inches (275 mm) diameter per inch (25 mm) of tree caliper.

B. Digging, Wrapping, and Handling: Plants shall be dug and prepared for moving in a manner that will not cause damage to branches, shape, root system, and development during storage.

C. Balled and Burlapped Plants: Balls shall be firmly wrapped with burlap or approved cloth substitute. No balled plant will be acceptable if the ball is cracked or broken, or if the stem is loose in the ball, either before or during transplanting. Balled plants shall be lifted and handled from the bottom of the ball. Protect ball and deliver to the relocation site, plant immediately, and water thoroughly. Ball sizes shall be as recommended in ANSI Z60.1.

D. Bare Root Plants: Plants shall be dug and prepared in such a manner as to provide optimum root mass. Material shall be dormant when dug and root systems shall be kept covered and moist at all times. Upon delivery to relocation site, plant immediately, and water thoroughly. Root spread shall be as recommended in ANSI Z60.1.

3.8 TRANSPLANTING WITH MECHANICAL TREE SPADE

A. Dig hole for tree with same sized equipment as will dig the plant material and transport it to site.

B. Thoroughly mix a slurry mix of the following in the tree pit:*

Material	Quantity*
Planting media	5 cu. ft. (0.14 cu. m.) as specified in Part 2 for backfill
Fertilizer	Per soil test recommendation and standard nursery practices for tree caliper
Water	Enough to fill bottom third of tree pit

* Quantities listed are for 66-inch (1.67 m) tree spade. For larger or smaller units, quantities shall be adjusted accordingly.

C. Prior to digging the plant material, all lower branches shall be tied up so that the machine will not damage any limbs during digging.

D. Tree trunk shall be centered in the unit prior to digging.

E. After digging plant material, and prior to transporting, tie tree limbs down and protect tree from drying out during transport. Trees shall be protected by anti-desiccant spray and/or a plastic or fabric cover.

F. Position tree in hole as directed by Landscape Architect or Owner and remove tree spade.

G. Immediately after removal of tree spade, the tree shall be watered completely; all air gaps in slurry mixture shall be filled by working a spade handle or other tool around the entire perimeter of the ball.

3.9 APPLICATION OF FERTILIZER

A. Provide supplements at application rates as recommended by soil test reports from a qualified soil-testing laboratory.

B. Fertilizer shall be applied when planting pits are backfilled two-thirds full. Fertilizer application shall be of the type, rate, and timing recommended by the testing agency for each plant type and in accordance with ANSI A300 (Part 2) standards for application.

C. Slow-release fertilizer:

1. Fertilization schedule for trees and shrubs using slow release 4-ounce (118 ml) packet system shall be per manufacturer’s recommendations.

2. Fertilizer packets shall be placed 6 to 8 inches (150 to 200 mm) deep below top of planting soil around root balls of plants. Packets shall be spaced evenly depending on the number of packets required.

3.10 MULCHING

A. For unplanted areas with large mulched areas, install weed-control barriers before mulching according to manufacturer's written instructions. Completely cover area to be mulched, overlapping edges a minimum of [**6 inches (150 mm)**] [**12 inches (300 mm)**] and secure seams with galvanized pins.

B. Mulch surfaces of plant beds, plant water saucers, and other areas indicated.

1. Trees and Shrubs in Grassed Areas: Create mulched rings 3 inches (75 mm) in depth to encompass plant pits, water saucers, and tree support systems (if applicable). Do not place mulch within 3 inches (75 mm) of trunks or stems. A continuous, linear mulched area shall be formed if plants are closely spaced to avoid grassed strips less than 2 feet (600 mm) wide or scallops of grass that are difficult to maintain.

2. [**Organic Mulch**] [**and**] [**Mineral Mulch**] in Planting Areas: Apply mulch to [**3 inches (75 mm)**] [**2 inches (50 mm)**] <**Insert dimension**> in depth throughout planting area extending to bedline indicated in Drawings, and at least 12 inches (300 mm) beyond edge of individual plant pit or trench. Do not place mulch within 3 inches (75 mm) of trunks or stems. Finished surface of settled mulch shall be ½ -1 inches (6-12 mm) below adjacent pavement or curb surfaces and flush with adjacent grassed areas.

3.11 CHEMICAL APPLICATIONS

A. In areas designated for plantings, remedial and preventative measures shall be taken well in advance of planting to eliminate competitive weed growth, to provide a weed-free and safe, non-toxic media for planting and as a finished landscape product.

B. If necessary, a systemic post-emergent herbicide shall be applied to existing and emergent weeds in prepared planting beds.

C. Pre-emergent herbicides are recommended for preventative use in areas not seeded.

3.12 FILTER FABRIC OR SOIL SEPARATION FABRIC

A. Soil separation fabric shall be installed where indicated on the Drawings. Unless otherwise indicated on the Drawings, soil separation fabric shall be overlapped 6 inches (150 mm) along all edges.

3.13 TREE SUPPORT

A. Trees shall not be staked or guyed except when absolutely necessary or under special conditions that warrant precautions be taken. Examples of special conditions that may pose a risk to public safety if trees were unsecured or unsupported include, and are not limited to:

1. High winds
2. Exceptional size and value
3. Steep slope locations (on slopes exceeding 3 Horizontal:1 Vertical)
4. High vandalism areas

B. When warranted, each tree shall be staked, guyed, or stabilized immediately following planting and in accordance with ANSI A300 (Part 3) standards for guying.

C. Root stabilization is preferred method, installed per manufacturer's instructions.

D. Plants shall stand plumb after staking, guying, or stabilizing.

E. Above-ground support systems shall be removed after one year if tree root system is

established.

F. Duckbill Tree Support Systems and Duckbill Root Ball Fixing Systems shall be installed in strict conformance with manufacturer's published installation instructions.

3.14 ROOT CONTROL BARRIER (PHYSICAL)

A. Install in accordance with manufacturer's instructions in areas indicated in the Drawings.

B. Do not install root barrier surrounding the root ball of tree.

3.15 LANDSCAPE EDGING

A. Wood Edging: Install edging where indicated in the Drawings**. [Mitre cut joints and connections at a 45° angle.] <Delete>** Fasten each cut joint or connection with two galvanized nails. Anchor with wood stakes spaced up to 36 inches (900 mm) apart, driven at least 1 inch (25 mm) below top elevation of edging. Use two galvanized nails per stake to fasten edging, of a length needed to penetrate through edging and stake. Pre-drill stakes if needed to avoid splitting. Stakes that crack or split during the installation process shall be replaced.

B. Steel or Aluminum Edging: Install steel edging where indicated according to manufacturer's written instructions, driven below top elevation of edging.

C. Plastic Edging: Install plastic edging where indicated according to manufacturer's written instructions, driven through upper base grooves or V-lip of edging.

3.16 MAINTENANCE OF PLANTINGS

A. Maintenance shall begin immediately after each plant is planted and shall continue until Substantial Completion Acceptance. The Contractor shall provide water for irrigation if none is available on site.

B. Note: Extend maintenance beyond Substantial Completion or Final Acceptance of Project if necessary to meet above requirements. Landscape Architect may withhold funds from Substantial and Final Completion payments as necessary to assure proper performance of maintenance operations.

C. Maintenance required:

1. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring water saucers, resetting to proper grade or vertical position, and performing other operations as required to establish healthy, viable plantings.

2. Planting areas shall be kept free of weeds, grass, and other undesired vegetative growth.

3. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of settling. Do not place mulch within 3 inches (75 mm) of trunks or stems. A continuous, linear mulched area shall be

maintained between closely spaced plants to avoid grassed strips less than 2 feet (600 mm) wide or scallops of grass that are difficult to maintain.

4. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use practices to minimize the use of chemicals and pesticides and reduce hazards.

5. Apply pesticides and other chemical products and biological control agents in accordance with authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.

6. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings without additional cost to the Owner.

7. Prune, thin, and shape woody materials according to standard professional horticultural and arboricultural practices and in accordance with ANSI A300 (Part 3) Pruning Standards. Unless otherwise indicated by Landscape Architect, do not cut tree leaders; remove only injured, dying, or dead branches from trees and shrubs. Prune to retain natural character.

8. Pruning shall be done with clean, sharp tools. Cuts shall be made at branch collars, leaving no stubs. No tree paint shall be used.

END OF SECTION 329300

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ATTACHMENT

AMERICAN INSTITUTE OF ARCHITECTS REPRESENATIVE – EXAMPLE FORMS

Project Specifications – Long Sands Beach Bathhouse,
Long Beach Avenue, York, Maine

Ransom Consulting, Inc.
Project 151.06011

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This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the controlling Laws and Regulations.

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters, including the term's singular and plural forms, will have the meaning indicated in the definitions below. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.

2. *Agreement*—The written instrument, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer, and designates the specific items that are Contract Documents.

3. *Application for Payment*—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

4. *Bid*—The offer of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

5. *Bidder*—An individual or entity that submits a Bid to Owner.

6. *Bidding Documents*—The Bidding Requirements, the proposed Contract Documents, and all Addenda.

7. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bid with any attachments.

8. *Change Order*—A document which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, or other revision to the Contract, issued on or after the Effective Date of the Contract.

9. *Change Proposal*—A written request by Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off against payments due; or seeking other relief with respect to the terms of the Contract.

10. *Claim*—(a) A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein: seeking an adjustment of Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer's decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract; or (b) a demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer's decision regarding a Change Proposal; or seeking resolution of a contractual issue that Engineer

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has declined to address. A demand for money or services by a third party is not a Claim.

11. *Constituent of Concern*—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to (a) the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §§9601 et seq. ("CERCLA"); (b) the Hazardous Materials Transportation Act, 49 U.S.C. §§5501 et seq.; (c) the Resource Conservation and Recovery Act, 42 U.S.C. §§6901 et seq. ("RCRA"); (d) the Toxic Substances Control Act, 15 U.S.C. §§2601 et seq.; (e) the Clean Water Act, 33 U.S.C. §§1251 et seq.; (f) the Clean Air Act, 42 U.S.C. §§7401 et seq.; or (g) any other federal, state, or local statute, law, rule, regulation, ordinance, resolution, code, order, or decree regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.

12. *Contract*—The entire and integrated written contract between the Owner and Contractor concerning the Work.

13. *Contract Documents*—Those items so designated in the Agreement, and which together comprise the Contract.

14. *Contract Price*—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents. .

15. *Contract Times*—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work.

16. *Contractor*—The individual or entity with which Owner has contracted for performance of the Work.

17. *Cost of the Work*—See Paragraph 13.01 for definition.

18. *Drawings*—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.

19. *Effective Date of the Contract*—The date, indicated in the Agreement, on which the Contract becomes effective.

20. *Engineer*—The individual or entity named as such in the Agreement.

21. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.

22. *Hazardous Environmental Condition*—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated in the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, does not establish a Hazardous Environmental Condition.

23. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

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24. *Liens*—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.

25. *Milestone*—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date or by a time prior to Substantial Completion of all the Work.

26. *Notice of Award*—The written notice by Owner to a Bidder of Owner's acceptance of the Bid.

27. *Notice to Proceed*—A written notice by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work.

28. *Owner*—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract.

29. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.

30. *Project*—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.

31. *Project Manual*—The written documents prepared for, or made available for, procuring and constructing the Work, including but not limited to the Bidding Documents or other construction procurement documents, geotechnical and existing conditions information, the Agreement, bond forms, General Conditions, Supplementary Conditions, and Specifications. The contents of the Project Manual may be bound in one or more volumes.

32. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative or "RPR" includes any assistants or field staff of Resident Project Representative.

33. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.

34. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer's review of the submittals and the performance of related construction activities.

35. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

36. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.

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37. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements, and such other lands furnished by Owner which are designated for the use of Contractor.

38. *Specifications*—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.

39. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work.

40. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

41. *Successful Bidder*—The Bidder whose Bid the Owner accepts, and to which the Owner makes an award of contract, subject to stated conditions.

42. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions.

43. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or a Subcontractor.

44. *Technical Data*—Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (a) subsurface conditions at the Site, or physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) or (b) Hazardous Environmental Conditions at the Site. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then the data contained in boring logs, recorded measurements of subsurface water levels, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical or environmental report prepared for the Project and made available to Contractor are hereby defined as Technical Data with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06.

45. *Underground Facilities*—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including but not limited to those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, fiber optic transmissions, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

46. *Unit Price Work*—Work to be paid for on the basis of unit prices.

47. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.

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48. *Work Change Directive*—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by Owner and recommended by Engineer, ordering an addition, deletion, or revision in the Work.

1.02 *Terminology*

A. The words and terms discussed in the following paragraphs are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

B. *Intent of Certain Terms or Adjectives*:

1. The Contract Documents include the terms "as allowed," "as approved," "as ordered," "as directed" or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives "reasonable," "suitable," "acceptable," "proper," "satisfactory," or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Article 10 or any other provision of the Contract Documents.

C. *Day*:

1. The word "day" means a calendar day of 24 hours measured from midnight to the next midnight.

D. *Defective*:

1. The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:

a. does not conform to the Contract Documents; or

b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or

c. has been damaged prior to Engineer's recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 15.03 or 15.04).

E. *Furnish, Install, Perform, Provide*:

1. The word "furnish," when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

2. The word "install," when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

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3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.

4. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words “furnish,” “install,” “perform,” or “provide,” then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.

F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

A. *Bonds*: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.

B. *Evidence of Contractor’s Insurance*: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract), the certificates and other evidence of insurance required to be provided by Contractor in accordance with Article 6.

C. *Evidence of Owner’s Insurance*: After receipt of the executed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or otherwise), the certificates and other evidence of insurance required to be provided by Owner under Article 6.

2.02 *Copies of Documents*

A. Owner shall furnish to Contractor four printed copies of the Contract (including one fully executed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies will be furnished upon request at the cost of reproduction.

B. Owner shall maintain and safeguard at least one original printed record version of the Contract, including Drawings and Specifications signed and sealed by Engineer and other design professionals. Owner shall make such original printed record version of the Contract available to Contractor for review. Owner may delegate the responsibilities under this provision to Engineer.

2.03 *Before Starting Construction*

A. *Preliminary Schedules*: Within 10 days after the Effective Date of the Contract (or as otherwise specifically required by the Contract Documents), Contractor shall submit to Engineer for timely review:

1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract;

2. a preliminary Schedule of Submittals; and

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3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.04 *Preconstruction Conference; Designation of Authorized Representatives*

A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.03.A, procedures for handling Shop Drawings, Samples, and other submittals, processing Applications for Payment, electronic or digital transmittals, and maintaining required records.

B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.05 *Initial Acceptance of Schedules*

A. At least 10 days before submission of the first Application for Payment a conference, attended by Contractor, Engineer, and others as appropriate, will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.03.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.

1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.

3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to the component parts of the Work.

2.06 *Electronic Transmittals*

A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may transmit, and shall accept, Project-related correspondence, text, data, documents, drawings, information, and graphics, including but not limited to Shop Drawings and other submittals, in electronic media or digital format, either directly, or through access to a secure Project website.

B. If the Contract does not establish protocols for electronic or digital transmittals, then Owner, Engineer, and Contractor shall jointly develop such protocols.

C. When transmitting items in electronic media or digital format, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items resulting from the recipient's use of software application packages, operating systems, or

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computer hardware differing from those used in the drafting or transmittal of the items, or from those established in applicable transmittal protocols.

ARTICLE 3 – DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 *Intent*

A. The Contract Documents are complementary; what is required by one is as binding as if required by all.

B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents.

C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic or digital versions of the Contract Documents (including any printed copies derived from such electronic or digital versions) and the printed record version, the printed record version shall govern.

D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.

E. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.

3.02 *Reference Standards*

A. Standards Specifications, Codes, Laws and Regulations

1. Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard specification, manual, reference standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard specification, manual, reference standard, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the part of the Contract Documents prepared by or for Engineer. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the part of the Contract Documents prepared by or for Engineer.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies*:

1. *Contractor's Verification of Figures and Field Measurements*: Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict,

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error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.

2. *Contractor's Review of Contract Documents*: If, before or during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) actual field conditions, (c) any standard specification, manual, reference standard, or code, or (d) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 7.15) until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.

3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies*:

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the part of the Contract Documents prepared by or for Engineer shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between such provisions of the Contract Documents and:

   a. the provisions of any standard specification, manual, reference standard, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference as a Contract Document); or

   b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Requirements of the Contract Documents*

A. During the performance of the Work and until final payment, Contractor and Owner shall submit to the Engineer all matters in question concerning the requirements of the Contract Documents (sometimes referred to as requests for information or interpretation—RFIs), or relating to the acceptability of the Work under the Contract Documents, as soon as possible after such matters arise. Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work thereunder.

B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.

C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work under the Contract Documents, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly give written notice to Owner and Contractor that Engineer is unable to provide a decision or interpretation. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Article 12.

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3.05 *Reuse of Documents*

A. Contractor and its Subcontractors and Suppliers shall not:

1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions, or reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer; or

2. have or acquire any title or ownership rights in any other Contract Documents, reuse any such Contract Documents for any purpose without Owner's express written consent, or violate any copyrights pertaining to such Contract Documents.

B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK

4.01 *Commencement of Contract Times; Notice to Proceed*

A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Contract or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Contract. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Contract, whichever date is earlier.

4.02 *Starting the Work*

A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to such date.

4.03 *Reference Points*

A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.04 *Progress Schedule*

A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.05 as it may be adjusted from time to time as provided below.

1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.

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2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 11.

B. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, or during any appeal process, except as permitted by Paragraph 16.04, or as Owner and Contractor may otherwise agree in writing.

4.05 *Delays in Contractor's Progress*

A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Times and Contract Price. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.

C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:

1. severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;

2. abnormal weather conditions;

3. acts or failures to act of utility owners (other than those performing other work at or adjacent to the Site by arrangement with the Owner, as contemplated in Article 8); and

4. acts of war or terrorism.

D. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5.

E. Paragraph 8.03 governs delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.

F. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor.

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G. Contractor must submit any Change Proposal seeking an adjustment in Contract Price or Contract Times under this paragraph within 30 days of the commencement of the delaying, disrupting, or interfering event.

ARTICLE 5 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

5.01 *Availability of Lands*

A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work.

B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which permanent improvements are to be made and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.

C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

5.02 *Use of Site and Other Areas*

A. *Limitation on Use of Site and Other Areas*:

1. Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor's operations; (c) damage to any other adjacent land or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.

2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.12, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or at law; and (c) to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claim, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused directly or indirectly, in whole or in part

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by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.

B. *Removal of Debris During Performance of the Work*: During the progress of the Work the Contractor shall keep the Site and other adjacent areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

C. *Cleaning*: Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site and adjacent areas all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

D. *Loading of Structures*: Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent structures or land to stresses or pressures that will endanger them.

5.03 *Subsurface and Physical Conditions*

A. *Reports and Drawings*: The Supplementary Conditions identify:

1. those reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site;

2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities); and

3. Technical Data contained in such reports and drawings.

B. *Reliance by Contractor on Technical Data Authorized*: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

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5.04 *Differing Subsurface or Physical Conditions*

A. *Notice by Contractor*: If Contractor believes that any subsurface or physical condition that is uncovered or revealed at the Site either:

1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate; or

2. is of such a nature as to require a change in the Drawings or Specifications; or

3. differs materially from that shown or indicated in the Contract Documents; or

4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.

B. *Engineer's Review*: After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine the necessity of Owner's obtaining additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A above; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.

C. *Owner's Statement to Contractor Regarding Site Condition*: After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.

D. *Possible Price and Times Adjustments*:

1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, or both, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

a. such condition must fall within any one or more of the categories described in Paragraph 5.04.A;

b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03; and,

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c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:

a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise; or

b. the existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or

c. Contractor failed to give the written notice as required by Paragraph 5.04.A.

3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.

4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.

5.05 *Underground Facilities*

A. *Contractor's Responsibilities*: The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or adjacent to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. Owner and Engineer do not warrant or guarantee the accuracy or completeness of any such information or data provided by others; and

2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:

a. reviewing and checking all information and data regarding existing Underground Facilities at the Site;

b. locating all Underground Facilities shown or indicated in the Contract Documents as being at the Site;

c. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and

d. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.

B. *Notice by Contractor*: If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, then Contractor shall, promptly after

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becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer.

C. *Engineer's Review*: Engineer will promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the Underground Facility in question; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and advise Owner in writing of Engineer's findings, conclusions, and recommendations. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

D. *Owner's Statement to Contractor Regarding Underground Facility*: After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Underground Facility in question, addressing the resumption of Work in connection with such Underground Facility, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations in whole or in part.

E. *Possible Price and Times Adjustments*:

1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, or both, to the extent that any existing Underground Facility at the Site that was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

    a. Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated the existence or actual location of the Underground Facility in question;

    b. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03;

    c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times; and

    d. Contractor gave the notice required in Paragraph 5.05.B.

2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.

3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.

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5.06 *Hazardous Environmental Conditions at Site*

A. *Reports and Drawings*: The Supplementary Conditions identify:

1. those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and

2. Technical Data contained in such reports and drawings.

B. *Reliance by Contractor on Technical Data Authorized*: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions or information.

C. Contractor shall not be responsible for removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.

D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.

E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.

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F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.

G. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off.

H. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work, following the contractual change procedures in Article 11. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 8.

I. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.H shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

J. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

K. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

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ARTICLE 6 – BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

A. Contractor shall furnish a performance bond and a payment bond, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of all of Contractor's obligations under the Contract. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the Supplementary Conditions, or other specific provisions of the Contract. Contractor shall also furnish such other bonds as are required by the Supplementary Conditions or other specific provisions of the Contract.

B. All bonds shall be in the form prescribed by the Contract except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (as amended and supplemented) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. A bond signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.

C. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds in the required amounts.

D. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or its right to do business is terminated in any state or jurisdiction where any part of the Project is located, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the bond and surety requirements above.

E. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner's termination rights under Article 16.

F. Upon request, Owner shall provide a copy of the payment bond to any Subcontractor, Supplier, or other person or entity claiming to have furnished labor or materials used in the performance of the Work.

6.02 *Insurance—General Provisions*

A. Owner and Contractor shall obtain and maintain insurance as required in this Article and in the Supplementary Conditions.

B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue insurance policies for the required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.

C. Contractor shall deliver to Owner, with copies to each named insured and additional insured (as identified in this Article, in the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Contractor has obtained and is

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maintaining the policies, coverages, and endorsements required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Contractor may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

D. Owner shall deliver to Contractor, with copies to each named insured and additional insured (as identified in this Article, the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Owner has obtained and is maintaining the policies, coverages, and endorsements required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Owner may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

E. Failure of Owner or Contractor to demand such certificates or other evidence of the other party's full compliance with these insurance requirements, or failure of Owner or Contractor to identify a deficiency in compliance from the evidence provided, shall not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.

F. If either party does not purchase or maintain all of the insurance required of such party by the Contract, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage.

G. If Contractor has failed to obtain and maintain required insurance, Owner may exclude the Contractor from the Site, impose an appropriate set-off against payment, and exercise Owner's termination rights under Article 16.

H. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect to obtain equivalent insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and the Contract Price shall be adjusted accordingly.

I. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests.

J. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner and other individuals and entities in the Contract.

6.03 *Contractor's Insurance*

A. *Workers' Compensation*: Contractor shall purchase and maintain workers' compensation and employer's liability insurance for:

1. claims under workers' compensation, disability benefits, and other similar employee benefit acts.

2. United States Longshoreman and Harbor Workers' Compensation Act and Jones Act coverage (if applicable).

3. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees (by stop-gap endorsement in monopolist worker's compensation states).

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4. Foreign voluntary worker compensation (if applicable).

B. *Commercial General Liability—Claims Covered*: Contractor shall purchase and maintain commercial general liability insurance, covering all operations by or on behalf of Contractor, on an occurrence basis, against:

1. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees.

2. claims for damages insured by reasonably available personal injury liability coverage.

3. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom.

C. *Commercial General Liability—Form and Content*: Contractor's commercial liability policy shall be written on a 1996 (or later) ISO commercial general liability form (occurrence form) and include the following coverages and endorsements:

1. Products and completed operations coverage:

   a. Such insurance shall be maintained for three years after final payment.

   b. Contractor shall furnish Owner and each other additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract) evidence of continuation of such insurance at final payment and three years thereafter.

2. Blanket contractual liability coverage, to the extent permitted by law, including but not limited to coverage of Contractor's contractual indemnity obligations in Paragraph 7.18.

3. Broad form property damage coverage.

4. Severability of interest.

5. Underground, explosion, and collapse coverage.

6. Personal injury coverage.

7. Additional insured endorsements that include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 10 01 and CG 20 37 10 01 (together); or CG 20 10 07 04 and CG 20 37 07 04 (together); or their equivalent.

8. For design professional additional insureds, ISO Endorsement CG 20 32 07 04, "Additional Insured—Engineers, Architects or Surveyors Not Engaged by the Named Insured" or its equivalent.

D. *Automobile liability*: Contractor shall purchase and maintain automobile liability insurance against claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle. The automobile liability policy shall be written on an occurrence basis.

E. *Umbrella or excess liability*: Contractor shall purchase and maintain umbrella or excess liability insurance written over the underlying employer's liability, commercial general liability, and automobile liability insurance described in the paragraphs above. Subject to industry-standard exclusions, the coverage afforded shall follow form as to each and every one of the underlying policies.

F. *Contractor's pollution liability insurance*: Contractor shall purchase and maintain a policy covering third-party injury and property damage claims, including clean-up costs, as a result

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of pollution conditions arising from Contractor's operations and completed operations. This insurance shall be maintained for no less than three years after final completion.

G. *Additional insureds*: The Contractor's commercial general liability, automobile liability, umbrella or excess, and pollution liability policies shall include and list as additional insureds Owner and Engineer, and any individuals or entities identified in the Supplementary Conditions; include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds; and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby (including as applicable those arising from both ongoing and completed operations) on a non-contributory basis. Contractor shall obtain all necessary endorsements to support these requirements.

H. *Contractor's professional liability insurance*: If Contractor will provide or furnish professional services under this Contract, through a delegation of professional design services or otherwise, then Contractor shall be responsible for purchasing and maintaining applicable professional liability insurance. This insurance shall provide protection against claims arising out of performance of professional design or related services, and caused by a negligent error, omission, or act for which the insured party is legally liable. It shall be maintained throughout the duration of the Contract and for a minimum of two years after Substantial Completion. If such professional design services are performed by a Subcontractor, and not by Contractor itself, then the requirements of this paragraph may be satisfied through the purchasing and maintenance of such insurance by such Subcontractor.

I. *General provisions*: The policies of insurance required by this Paragraph 6.03 shall:

1. include at least the specific coverages provided in this Article.
2. be written for not less than the limits of liability provided in this Article and in the Supplementary Conditions, or required by Laws or Regulations, whichever is greater.
3. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed, or renewal refused until at least 10 days prior written notice has been given to Contractor. Within three days of receipt of any such written notice, Contractor shall provide a copy of the notice to Owner, Engineer, and each other insured under the policy.
4. remain in effect at least until final payment (and longer if expressly required in this Article) and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract Documents.
5. be appropriate for the Work being performed and provide protection from claims that may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable.

J. The coverage requirements for specific policies of insurance must be met by such policies, and not by reference to excess or umbrella insurance provided in other policies.

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6.04 *Owner's Liability Insurance*

A. In addition to the insurance required to be provided by Contractor under Paragraph 6.03, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

B. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability policies for any of Contractor's obligations to the Owner, Engineer, or third parties.

6.05 *Property Insurance*

A. *Builder's Risk*: Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the full insurable replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:

1. include the Owner and Contractor as named insureds, and all Subcontractors, and any individuals or entities required by the Supplementary Conditions to be insured under such builder's risk policy, as insureds or named insureds. For purposes of the remainder of this Paragraph 6.05, Paragraphs 6.06 and 6.07, and any corresponding Supplementary Conditions, the parties required to be insured shall collectively be referred to as "insureds."

2. be written on a builder's risk "all risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire; lightning; windstorm; riot; civil commotion; terrorism; vehicle impact; aircraft; smoke; theft; vandalism and malicious mischief; mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; flood; collapse; explosion; debris removal; demolition occasioned by enforcement of Laws and Regulations; water damage (other than that caused by flood); and such other perils or causes of loss as may be specifically required by the Supplementary Conditions. If insurance against mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; or flood, are not commercially available under builder's risk policies, by endorsement or otherwise, such insurance may be provided through other insurance policies acceptable to Owner and Contractor.

3. cover, as insured property, at least the following: (a) the Work and all materials, supplies, machinery, apparatus, equipment, fixtures, and other property of a similar nature that are to be incorporated into or used in the preparation, fabrication, construction, erection, or completion of the Work, including Owner-furnished or assigned property; (b) spare parts inventory required within the scope of the Contract; and (c) temporary works which are not intended to form part of the permanent constructed Work but which are intended to provide working access to the Site, or to the Work under construction, or which are intended to provide temporary support for the Work under construction, including scaffolding, form work, fences, shoring, falsework, and temporary structures.

4. cover expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects).

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5. extend to cover damage or loss to insured property while in temporary storage at the Site or in a storage location outside the Site (but not including property stored at the premises of a manufacturer or Supplier).
6. extend to cover damage or loss to insured property while in transit.
7. allow for partial occupation or use of the Work by Owner, such that those portions of the Work that are not yet occupied or used by Owner shall remain covered by the builder's risk insurance.
8. allow for the waiver of the insurer's subrogation rights, as set forth below.
9. provide primary coverage for all losses and damages caused by the perils or causes of loss covered.
10. not include a co-insurance clause.
11. include an exception for ensuing losses from physical damage or loss with respect to any defective workmanship, design, or materials exclusions.
12. include performance/hot testing and start-up.
13. be maintained in effect, subject to the provisions herein regarding Substantial Completion and partial occupancy or use of the Work by Owner, until the Work is complete.

B. *Notice of Cancellation or Change*: All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 6.05 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured.

C. *Deductibles*: The purchaser of any required builder's risk or property insurance shall pay for costs not covered because of the application of a policy deductible.

D. *Partial Occupancy or Use by Owner*: If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will provide notice of such occupancy or use to the builder's risk insurer. The builder's risk insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy; rather, those portions of the Work that are occupied or used by Owner may come off the builder's risk policy, while those portions of the Work not yet occupied or used by Owner shall remain covered by the builder's risk insurance.

E. *Additional Insurance*: If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.05, it may do so at Contractor's expense.

F. *Insurance of Other Property*: If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, such as tools, construction equipment, or other personal property owned by Contractor, a Subcontractor, or an employee of Contractor or a Subcontractor, then the entity or individual owning such property item will be responsible for deciding whether to insure it, and if so in what amount.

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6.06 *Waiver of Rights*

A. All policies purchased in accordance with Paragraph 6.05, expressly including the builder's risk policy, shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any insureds thereunder, or against Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors. Owner and Contractor waive all rights against each other and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Engineer, its consultants, all Subcontractors, all individuals or entities identified in the Supplementary Conditions as insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.

B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, for:

1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and

2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06.

C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 6.06.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them.

D. Contractor shall be responsible for assuring that the agreement under which a Subcontractor performs a portion of the Work contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by builder's risk insurance and any other property insurance applicable to the Work.

6.07 *Receipt and Application of Property Insurance Proceeds*

A. Any insured loss under the builder's risk and other policies of insurance required by Paragraph 6.05 will be adjusted and settled with the named insured that purchased the

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policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.

B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.05 shall distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.

C. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the money so received applied on account thereof, and the Work and the cost thereof covered by Change Order, if needed.

ARTICLE 7 – CONTRACTOR'S RESPONSIBILITIES

7.01 *Supervision and Superintendence*

A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.

B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

7.02 *Labor; Working Hours*

A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.

B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with Owner's written consent, which will not be unreasonably withheld.

7.03 *Services, Materials, and Equipment*

A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start up, and completion of the Work, whether or not such items are specifically called for in the Contract Documents.

B. All materials and equipment incorporated into the Work shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and

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guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

7.04 *"Or Equals"*

A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or equal" item is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment, or items from other proposed suppliers under the circumstances described below.

1. If Engineer in its sole discretion determines that an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer shall deem it an "or equal" item. For the purposes of this paragraph, a proposed item of material or equipment will be considered functionally equal to an item so named if:

a. in the exercise of reasonable judgment Engineer determines that:

1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;

3) it has a proven record of performance and availability of responsive service; and

4) it is not objectionable to Owner.

b. Contractor certifies that, if approved and incorporated into the Work:

1) there will be no increase in cost to the Owner or increase in Contract Times; and

2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

B. *Contractor's Expense*: Contractor shall provide all data in support of any proposed "or equal" item at Contractor's expense.

C. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional data about the proposed "or-equal" item. Engineer will be the sole judge of acceptability. No "or-equal" item will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an "or-equal", which will be evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.

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D. *Effect of Engineer's Determination*: Neither approval nor denial of an "or-equal" request shall result in any change in Contract Price. The Engineer's denial of an "or-equal" request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents.

E. *Treatment as a Substitution Request*: If Engineer determines that an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer considered the proposed item as a substitute pursuant to Paragraph 7.05.

7.05 *Substitutes*

A. Unless the specification or description of an item of material or equipment required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment under the circumstances described below. To the extent possible such requests shall be made before commencement of related construction at the Site.

1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of material or equipment from anyone other than Contractor.

2. The requirements for review by Engineer will be as set forth in Paragraph 7.05.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.

3. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:

a. shall certify that the proposed substitute item will:

1) perform adequately the functions and achieve the results called for by the general design,

2) be similar in substance to that specified, and

3) be suited to the same use as that specified.

b. will state:

1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times,

2) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and

3) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty.

c. will identify:

1) all variations of the proposed substitute item from that specified, and

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2) available engineering, sales, maintenance, repair, and replacement services.

d. shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.

B. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer's determination will be evidenced by a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times. Engineer will advise Contractor in writing of any negative determination.

C. *Special Guarantee*: Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.

D. *Reimbursement of Engineer's Cost*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

E. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute at Contractor's expense.

F. *Effect of Engineer's Determination*: If Engineer approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer's denial of a substitution request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.05.D, by timely submittal of a Change Proposal.

7.06 *Concerning Subcontractors, Suppliers, and Others*

A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner.

B. Contractor shall retain specific Subcontractors, Suppliers, or other individuals or entities for the performance of designated parts of the Work if required by the Contract to do so.

C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against which Contractor has reasonable objection.

D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable, during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within five days.

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E. Owner may require the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors, Suppliers, or other individuals or entities for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor, Supplier, or other individual or entity so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity.

F. If Owner requires the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, or both, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.

G. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.

H. On a monthly basis Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.

I. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions.

J. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors, Suppliers, and all other individuals or entities performing or furnishing any of the Work.

K. Contractor shall restrict all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed herein.

L. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

M. All Work performed for Contractor by a Subcontractor or Supplier shall be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer.

N. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor on account of Work performed for Contractor by the particular Subcontractor or Supplier.

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O. Nothing in the Contract Documents:

1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier, or other individual or entity; nor

2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

7.07 *Patent Fees and Royalties*

A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.

B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.

C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

7.08 *Permits*

A. Unless otherwise provided in the Contract Documents, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of the submission of Contractor's Bid (or when Contractor became bound under a negotiated contract). Owner shall pay all charges of utility owners for connections for providing permanent service to the Work

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7.09 *Taxes*

A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

7.10 *Laws and Regulations*

A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.

B. If Contractor performs any Work or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work or other action. It shall not be Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.

C. Owner or Contractor may give notice to the other party of any changes after the submission of Contractor's Bid (or after the date when Contractor became bound under a negotiated contract) in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of such notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

7.11 *Record Documents*

A. Contractor shall maintain in a safe place at the Site one printed record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, written interpretations and clarifications, and approved Shop Drawings. Contractor shall keep such record documents in good order and annotate them to show changes made during construction. These record documents, together with all approved Samples, will be available to Engineer for reference. Upon completion of the Work, Contractor shall deliver these record documents to Engineer.

7.12 *Safety and Protection*

A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:

1. all persons on the Site or who may be affected by the Work;

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2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and

3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify Owner; the owners of adjacent property, Underground Facilities, and other utilities; and other contractors and utility owners performing work at or adjacent to the Site, when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.

C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.

D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.

E. All damage, injury, or loss to any property referred to in Paragraph 7.12.A.2 or 7.12.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

F. Contractor's duties and responsibilities for safety and protection shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 15.06.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

G. Contractor's duties and responsibilities for safety and protection shall resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

7.13 *Safety Representative*

A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

7.14 *Hazard Communication Programs*

A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or

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exchanged between or among employers at the Site in accordance with Laws or Regulations.

7.15 *Emergencies*

A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

7.16 *Shop Drawings, Samples, and Other Submittals*

A. *Shop Drawing and Sample Submittal Requirements*:

1. Before submitting a Shop Drawing or Sample, Contractor shall have:

a. reviewed and coordinated the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;

b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;

c. determined and verified the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and

d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.

2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review of that submittal, and that Contractor approves the submittal.

3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be set forth in a written communication separate from the Shop Drawings or Sample submittal; and, in addition, in the case of Shop Drawings by a specific notation made on each Shop Drawing submitted to Engineer for review and approval of each such variation.

B. *Submittal Procedures for Shop Drawings and Samples*: Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals. Each submittal will be identified as Engineer may require.

1. *Shop Drawings*:

a. Contractor shall submit the number of copies required in the Specifications.

b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to

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provide and to enable Engineer to review the information for the limited purposes required by Paragraph 7.16.D.

2. *Samples*:

   a. Contractor shall submit the number of Samples required in the Specifications.

   b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 7.16.D.

3. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. *Other Submittals*: Contractor shall submit other submittals to Engineer in accordance with the accepted Schedule of Submittals, and pursuant to the applicable terms of the Specifications.

D. *Engineer's Review*:

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction or to safety precautions or programs incident thereto.

3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

4. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will document any such approved variation from the requirements of the Contract Documents in a Field Order.

5. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 7.16.A and B.

6. Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, shall not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.

7. Neither Engineer's receipt, review, acceptance or approval of a Shop Drawing, Sample, or other submittal shall result in such item becoming a Contract Document.

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8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.D.4.

E. *Resubmittal Procedures*:

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

2. Contractor shall furnish required submittals with sufficient information and accuracy to obtain required approval of an item with no more than three submittals. Engineer will record Engineer's time for reviewing a fourth or subsequent submittal of a Shop Drawings, sample, or other item requiring approval, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges.

3. If Contractor requests a change of a previously approved submittal item, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

7.17 *Contractor's General Warranty and Guarantee*

A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on Contractor's warranty and guarantee.

B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or

2. normal wear and tear under normal usage.

C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:

1. observations by Engineer;

2. recommendation by Engineer or payment by Owner of any progress or final payment;

3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;

4. use or occupancy of the Work or any part thereof by Owner;

5. any review and approval of a Shop Drawing or Sample submittal;

6. the issuance of a notice of acceptability by Engineer;

7. any inspection, test, or approval by others; or

8. any correction of defective Work by Owner.

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D. If the Contract requires the Contractor to accept the assignment of a contract entered into by Owner, then the specific warranties, guarantees, and correction obligations contained in the assigned contract shall govern with respect to Contractor's performance obligations to Owner for the Work described in the assigned contract.

7.18 *Indemnification*

A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable.

B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 7.18.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

C. The indemnification obligations of Contractor under Paragraph 7.18.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:

1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or

2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

7.19 *Delegation of Professional Design Services*

A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable Laws and Regulations.

B. If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, and other submittals prepared by such professional. Shop

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Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.

C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.

D. Pursuant to this paragraph, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 7.16.D.1.

E. Contractor shall not be responsible for the adequacy of the performance or design criteria specified by Owner or Engineer.

ARTICLE 8 – OTHER WORK AT THE SITE

8.01 *Other Work*

A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.

B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any utility work at or adjacent to the Site, Owner shall provide such information to Contractor.

C. Contractor shall afford each other contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected.

D. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 8, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

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8.02 *Coordination*

A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be set forth in the Supplementary Conditions or provided to Contractor prior to the start of any such other work:

1. the identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;
2. an itemization of the specific matters to be covered by such authority and responsibility; and
3. the extent of such authority and responsibilities.

B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

8.03 *Legal Relationships*

A. If, in the course of performing other work at or adjacent to the Site for Owner, the Owner's employees, any other contractor working for Owner, or any utility owner causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment shall take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid or the final negotiation of the terms of the Contract. When applicable, any such equitable adjustment in Contract Price shall be conditioned on Contractor assigning to Owner all Contractor's rights against such other contractor or utility owner with respect to the damage, delay, disruption, or interference that is the subject of the adjustment. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due to Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this paragraph.

C. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due to Contractor.

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D. If Contractor damages, delays, disrupts, or interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor's failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor's actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claims, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such damage, delay, disruption, or interference.

ARTICLE 9 – OWNER'S RESPONSIBILITIES

9.01 *Communications to Contractor*

A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

9.02 *Replacement of Engineer*

A. Owner may at its discretion appoint an engineer to replace Engineer, provided Contractor makes no reasonable objection to the replacement engineer. The replacement engineer's status under the Contract Documents shall be that of the former Engineer.

9.03 *Furnish Data*

A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

9.04 *Pay When Due*

A. Owner shall make payments to Contractor when they are due as provided in the Agreement.

9.05 *Lands and Easements; Reports, Tests, and Drawings*

A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 5.01.

B. Owner's duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.

C. Article 5 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

9.06 *Insurance*

A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 6.

9.07 *Change Orders*

A. Owner's responsibilities with respect to Change Orders are set forth in Article 11.

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9.08 *Inspections, Tests, and Approvals*

A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 14.02.B.

9.09 *Limitations on Owner's Responsibilities*

A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

9.10 *Undisclosed Hazardous Environmental Condition*

A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 5.06.

9.11 *Evidence of Financial Arrangements*

A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents (including obligations under proposed changes in the Work).

9.12 *Safety Programs*

A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed.

B. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

ARTICLE 10 – ENGINEER'S STATUS DURING CONSTRUCTION

10.01 *Owner's Representative*

A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract.

10.02 *Visits to Site*

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 10.08. Particularly, but without limitation, during

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or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

10.03 *Project Representative*

A. If Owner and Engineer have agreed that Engineer will furnish a Resident Project Representative to represent Engineer at the Site and assist Engineer in observing the progress and quality of the Work, then the authority and responsibilities of any such Resident Project Representative will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 10.08. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent, or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

10.04 *Rejecting Defective Work*

A. Engineer has the authority to reject Work in accordance with Article 14.

10.05 *Shop Drawings, Change Orders and Payments*

A. Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, are set forth in Paragraph 7.16.

B. Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, are set forth in Paragraph 7.19.

C. Engineer's authority as to Change Orders is set forth in Article 11.

D. Engineer's authority as to Applications for Payment is set forth in Article 15.

10.06 *Determinations for Unit Price Work*

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor as set forth in Paragraph 13.03.

10.07 *Decisions on Requirements of Contract Documents and Acceptability of Work*

A. Engineer will render decisions regarding the requirements of the Contract Documents, and judge the acceptability of the Work, pursuant to the specific procedures set forth herein for initial interpretations, Change Proposals, and acceptance of the Work. In rendering such decisions and judgments, Engineer will not show partiality to Owner or Contractor, and will not be liable to Owner, Contractor, or others in connection with any proceedings, interpretations, decisions, or judgments conducted or rendered in good faith.

10.08 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 10 or under any other provision of the Contract, nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer, shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

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B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 15.06.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals, that the results certified indicate compliance with the Contract Documents.

E. The limitations upon authority and responsibility set forth in this Paragraph 10.08 shall also apply to the Resident Project Representative, if any.

10.09 *Compliance with Safety Program*

A. While at the Site, Engineer's employees and representatives will comply with the specific applicable requirements of Owner's and Contractor's safety programs (if any) of which Engineer has been informed.

ARTICLE 11 – AMENDING THE CONTRACT DOCUMENTS; CHANGES IN THE WORK

11.01 *Amending and Supplementing Contract Documents*

A. The Contract Documents may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.

1. *Change Orders*:

a. If an amendment or supplement to the Contract Documents includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order. A Change Order also may be used to establish amendments and supplements of the Contract Documents that do not affect the Contract Price or Contract Times.

b. Owner and Contractor may amend those terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, without the recommendation of the Engineer. Such an amendment shall be set forth in a Change Order.

2. *Work Change Directives*: A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.04 regarding change of Contract Price. Contractor must submit any Change Proposal seeking an

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adjustment of the Contract Price or the Contract Times, or both, no later than 30 days after the completion of the Work set out in the Work Change Directive. Owner must submit any Claim seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 60 days after issuance of the Work Change Directive.

3. *Field Orders*: Engineer may authorize minor changes in the Work if the changes do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

11.02 *Owner-Authorized Changes in the Work*

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work. Such changes shall be supported by Engineer's recommendation, to the extent the change involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters. Such changes may be accomplished by a Change Order, if Owner and Contractor have agreed as to the effect, if any, of the changes on Contract Times or Contract Price; or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved; or, in the case of a deletion in the Work, promptly cease construction activities with respect to such deleted Work. Added or revised Work shall be performed under the applicable conditions of the Contract Documents. Nothing in this paragraph shall obligate Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations.

11.03 *Unauthorized Changes in the Work*

A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents, as amended, modified, or supplemented, except in the case of an emergency as provided in Paragraph 7.15 or in the case of uncovering Work as provided in Paragraph 14.05.

11.04 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment of Contract Price shall comply with the provisions of Article 12.

B. An adjustment in the Contract Price will be determined as follows:

1. where the Work involved is covered by unit prices contained in the Contract Documents, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.04.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on

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the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.04.C).

C. *Contractor's Fee*: When applicable, the Contractor's fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or

2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

a. for costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2, the Contractor's fee shall be 15 percent;

b. for costs incurred under Paragraph 13.01.B.3, the Contractor's fee shall be five percent;

c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 11.01.C.2.a and 11.01.C.2.b is that the Contractor's fee shall be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.A.1 and 13.01.A.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of five percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted work the maximum total fee to be paid by Owner shall be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the work;

d. no fee shall be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;

e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and

f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 11.04.C.2.a through 11.04.C.2.e, inclusive.

11.05 *Change of Contract Times*

A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment in the Contract Times shall comply with the provisions of Article 12.

B. An adjustment of the Contract Times shall be subject to the limitations set forth in Paragraph 4.05, concerning delays in Contractor's progress.

11.06 *Change Proposals*

A. Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; appeal an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; contest a set-off against payment due; or seek other relief under

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the Contract. The Change Proposal shall specify any proposed change in Contract Times or Contract Price, or both, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents.

1. *Procedures*: Contractor shall submit each Change Proposal to Engineer promptly (but in no event later than 30 days) after the start of the event giving rise thereto, or after such initial decision. The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal. The supporting data shall be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event. Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal.

2. *Engineer's Action*: Engineer will review each Change Proposal and, within 30 days after receipt of the Contractor's supporting data, either deny the Change Proposal in whole, approve it in whole, or deny it in part and approve it in part. Such actions shall be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.

3. *Binding Decision*: Engineer's decision will be final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.

B. *Resolution of Certain Change Proposals*: If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice shall be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.

11.07 *Execution of Change Orders*

A. Owner and Contractor shall execute appropriate Change Orders covering:

1. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive;

2. changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;

3. changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.02, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters; and

4. changes in the Contract Price or Contract Times, or other changes, which embody the substance of any final and binding results under Paragraph 11.06, or Article 12.

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B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of this Paragraph 11.07, it shall be deemed to be of full force and effect, as if fully executed.

11.08 *Notification to Surety*

A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

ARTICLE 12 – CLAIMS

12.01 *Claims*

A. *Claims Process*: The following disputes between Owner and Contractor shall be submitted to the Claims process set forth in this Article:

1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;

2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents; and

3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters.

B. *Submittal of Claim*: The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim shall rest with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, or both, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.

C. *Review and Resolution*: The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim shall be stated in writing and submitted to the other party, with a copy to Engineer.

D. *Mediation*:

1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate shall stay the Claim submittal and response process.

2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process shall resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim

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submittal and decision process shall resume as of the date of the conclusion of the mediation, as determined by the mediator.

3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.

E. *Partial Approval*: If the party receiving a Claim approves the Claim in part and denies it in part, such action shall be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.

F. *Denial of Claim*: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim shall be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.

G. *Final and Binding Results*: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim shall be incorporated in a Change Order to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

ARTICLE 13 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

13.01 *Cost of the Work*

A. *Purposes for Determination of Cost of the Work*: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:

1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or

2. To determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.

B. *Costs Included*: Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 13.01.C, and shall include only the following items:

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, and vacation and holiday pay applicable

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thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.

4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.

5. Supplemental costs including the following:

    a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.

    b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

    c. Rentals of all construction equipment and machinery, and the parts thereof, whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

    d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.

    e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

    f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 6.05), provided such losses and damages have resulted from causes

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other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

g. The cost of utilities, fuel, and sanitary facilities at the Site.

h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.

i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.

C. *Costs Excluded*: The term Cost of the Work shall not include any of the following items:

1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor's fee.

2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.

4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.

D. *Contractor's Fee*: When the Work as a whole is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 11.04.C.

E. *Documentation*: Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

13.02 *Allowances*

A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

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B. *Cash Allowances*: Contractor agrees that:

1. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

2. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

C. *Contingency Allowance*: Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

13.03 *Unit Price Work*

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities.

C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

D. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of the following paragraph.

E. Within 30 days of Engineer's written decision under the preceding paragraph, Contractor may submit a Change Proposal, or Owner may file a Claim, seeking an adjustment in the Contract Price if:

1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement;

2. there is no corresponding adjustment with respect to any other item of Work; and

3. Contractor believes that it is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price, and the parties are unable to agree as to the amount of any such increase or decrease.

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ARTICLE 14 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

14.01 *Access to Work*

A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and authorities having jurisdiction will have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply therewith as applicable.

14.02 *Tests, Inspections, and Approvals*

A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.

B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work shall be governed by the provisions of Paragraph 14.05.

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:

1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;

2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;

3. by manufacturers of equipment furnished under the Contract Documents;

4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and

5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

Such inspections and tests shall be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to Owner and Engineer.

E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.

F. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering shall be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to

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cover the same and Engineer had not acted with reasonable promptness in response to such notice.

14.03 *Defective Work*

A. *Contractor's Obligation*: It is Contractor's obligation to assure that the Work is not defective.

B. *Engineer's Authority*: Engineer has the authority to determine whether Work is defective, and to reject defective Work.

C. *Notice of Defects*: Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.

D. *Correction, or Removal and Replacement*: Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.

E. *Preservation of Warranties*: When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

F. *Costs and Damages*: In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs, losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

14.04 *Acceptance of Defective Work*

A. If, instead of requiring correction or removal and replacement of defective Work, Owner prefers to accept it, Owner may do so (subject, if such acceptance occurs prior to final payment, to Engineer's confirmation that such acceptance is in general accord with the design intent and applicable engineering principles, and will not endanger public safety). Contractor shall pay all claims, costs, losses, and damages attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness), and for the diminished value of the Work to the extent not otherwise paid by Contractor. If any such acceptance occurs prior to final payment, the necessary revisions in the Contract Documents with respect to the Work shall be incorporated in a Change Order. If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then Owner may impose a reasonable set-off against payments due under Article 15. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to Owner.

14.05 *Uncovering Work*

A. Engineer has the authority to require special inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.

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B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.

C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, and provide all necessary labor, material, and equipment.

1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and pending Contractor's full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.

2. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

14.06 *Owner May Stop the Work*

A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, then Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

14.07 *Owner May Correct Defective Work*

A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, then Owner may, after seven days written notice to Contractor, correct or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this paragraph.

C. All claims, costs, losses, and damages incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. Such claims, costs, losses and damages will

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include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 14.07.

ARTICLE 15 – PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD

15.01 *Progress Payments*

A. *Basis for Progress Payments*: The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.

B. *Applications for Payments*:

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens, and evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

C. *Review of Applications*:

1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to Owner, or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.

2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

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a. the Work has progressed to the point indicated;

b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and any other qualifications stated in the recommendation); and

c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.

3. By recommending any such payment Engineer will not thereby be deemed to have represented that:

a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract; or

b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:

a. to supervise, direct, or control the Work, or

b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or

c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or

d. to make any examination to ascertain how or for what purposes Contractor has used the money paid on account of the Contract Price, or

e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.

6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:

a. the Work is defective, requiring correction or replacement;

b. the Contract Price has been reduced by Change Orders;

c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or

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e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

D. *Payment Becomes Due*:

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended (subject to any Owner set-offs) will become due, and when due will be paid by Owner to Contractor.

E. *Reductions in Payment by Owner*:

1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:

a. claims have been made against Owner on account of Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages on account of Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;

b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;

c. Contractor has failed to provide and maintain required bonds or insurance;

d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;

e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;

f. the Work is defective, requiring correction or replacement;

g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

h. the Contract Price has been reduced by Change Orders;

i. an event that would constitute a default by Contractor and therefore justify a termination for cause has occurred;

j. liquidated damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;

k. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;

l. there are other items entitling Owner to a set off against the amount recommended.

2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, and promptly pay Contractor any amount

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remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, if Contractor remedies the reasons for such action. The reduction imposed shall be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.

3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 15.01.C.1 and subject to interest as provided in the Agreement.

15.02 *Contractor's Warranty of Title*

A. Contractor warrants and guarantees that title to all Work, materials, and equipment furnished under the Contract will pass to Owner free and clear of (1) all Liens and other title defects, and (2) all patent, licensing, copyright, or royalty obligations, no later than seven days after the time of payment by Owner.

15.03 *Substantial Completion*

A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.

B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.

C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a preliminary certificate of Substantial Completion which shall fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.

D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.

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E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.

F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

15.04 *Partial Use or Occupancy*

A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:

1. At any time Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through E for that part of the Work.

2. At any time Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 15.03 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 6.05 regarding builder's risk or other property insurance.

15.05 *Final Inspection*

A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work, or agreed portion thereof, is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

15.06 *Final Payment*

A. *Application for Payment*:

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of

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inspection, annotated record documents (as provided in Paragraph 7.11), and other documents, Contractor may make application for final payment.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:

   a. all documentation called for in the Contract Documents;

   b. consent of the surety, if any, to final payment;

   c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.

   d. a list of all disputes that Contractor believes are unsettled; and

   e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.

B. *Engineer's Review of Application and Acceptance*:

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the Application for Payment to Owner for payment. Such recommendation shall account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to the provisions of Paragraph 15.07. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. *Completion of Work*: The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment.

D. *Payment Becomes Due*: Thirty days after the presentation to Owner of the final Application for Payment and accompanying documentation, the amount recommended by Engineer (less any further sum Owner is entitled to set off against Engineer's recommendation,

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including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions above with respect to progress payments) will become due and shall be paid by Owner to Contractor.

15.07 *Waiver of Claims*

A. The making of final payment will not constitute a waiver by Owner of claims or rights against Contractor. Owner expressly reserves claims and rights arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 15.05, from Contractor's failure to comply with the Contract Documents or the terms of any special guarantees specified therein, from outstanding Claims by Owner, or from Contractor's continuing obligations under the Contract Documents.

B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted or appealed under the provisions of Article 17.

15.08 *Correction Period*

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents, or by any specific provision of the Contract Documents), any Work is found to be defective, or if the repair of any damages to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas used by Contractor as permitted by Laws and Regulations, is found to be defective, then Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. correct the defective repairs to the Site or such other adjacent areas;
2. correct such defective Work;
3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and
4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting therefrom.

B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others).

C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.

D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

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E. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

ARTICLE 16 – SUSPENSION OF WORK AND TERMINATION

16.01 *Owner May Suspend Work*

A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension. Any Change Proposal seeking such adjustments shall be submitted no later than 30 days after the date fixed for resumption of Work.

16.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule);

2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;

3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or

4. Contractor's repeated disregard of the authority of Owner or Engineer.

B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) ten days written notice that Owner is considering a declaration that Contractor is in default and termination of the contract, Owner may proceed to:

1. declare Contractor to be in default, and give Contractor (and any surety) notice that the Contract is terminated; and

2. enforce the rights available to Owner under any applicable performance bond.

C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and complete the Work as Owner may deem expedient.

D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within seven days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.

E. If Owner proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses,

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and damages exceeds such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

F. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.

G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond shall govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 *Owner May Terminate For Convenience*

A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and

3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.

B. Contractor shall not be paid on account of loss of anticipated overhead, profits, or revenue, or other economic loss arising out of or resulting from such termination.

16.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the contract and recover from Owner payment on the same terms as provided in Paragraph 16.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal for an adjustment in Contract Price or Contract Times or otherwise for

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expenses or damage directly attributable to Contractor's stopping the Work as permitted by this paragraph.

ARTICLE 17 – FINAL RESOLUTION OF DISPUTES

17.01 *Methods and Procedures*

A. *Disputes Subject to Final Resolution*: The following disputed matters are subject to final resolution under the provisions of this Article:

1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full; and

2. Disputes between Owner and Contractor concerning the Work or obligations under the Contract Documents, and arising after final payment has been made.

B. *Final Resolution of Disputes*: For any dispute subject to resolution under this Article, Owner or Contractor may:

1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions; or

2. agree with the other party to submit the dispute to another dispute resolution process; or

3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

ARTICLE 18 – MISCELLANEOUS

18.01 *Giving Notice*

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. delivered in person, by a commercial courier service or otherwise, to the individual or to a member of the firm or to an officer of the corporation for which it is intended; or

2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the sender of the notice.

18.02 *Computation of Times*

A. When any period of time is referred to in the Contract by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

18.03 *Cumulative Remedies*

A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract. The provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

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18.04 *Limitation of Damages*

A. With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither Owner nor Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

18.05 *No Waiver*

A. A party's non-enforcement of any provision shall not constitute a waiver of that provision, nor shall it affect the enforceability of that provision or of the remainder of this Contract.

18.06 *Survival of Obligations*

A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract, as well as all continuing obligations indicated in the Contract, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

18.07 *Controlling Law*

A. This Contract is to be governed by the law of the state in which the Project is located.

18.08 *Headings*

A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

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AIA® Document A101™ – 2007

Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum

AGREEMENT made as of the day of
in the year
(In words, indicate day, month and year.)

BETWEEN the Owner:
(Name, legal status, address and other information)

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

AIA Document A201™–2007, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

and the Contractor:
(Name, legal status, address and other information)

for the following Project:
(Name, location and detailed description)

The Architect:
(Name, legal status, address and other information)

The Owner and Contractor agree as follows.

Sample

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TABLE OF ARTICLES

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ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be the date of this Agreement unless a different date is stated below or provision is made for the date to be fixed in a notice to proceed issued by the Owner.
(Insert the date of commencement if it differs from the date of this Agreement or, if applicable, state that the date will be fixed in a notice to proceed.)

If, prior to the commencement of the Work, the Owner requires time to file mortgages and other security interests, the Owner's time requirement shall be as follows:

§ 3.2 The Contract Time shall be measured from the date of commencement.

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§ 3.3 The Contractor shall achieve Substantial Completion of the entire Work not later than
( ) days from the date of commencement, or as follows:
(Insert number of calendar days. Alternatively, a calendar date may be used when coordinated with the date of commencement. If appropriate, insert requirements for earlier Substantial Completion of certain portions of the Work.)

Portion of Work	Substantial Completion Date

, subject to adjustments of this Contract Time as provided in the Contract Documents.
(Insert provisions, if any, for liquidated damages relating to failure to achieve Substantial Completion on time or for bonus payments for early completion of the Work.)

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be
($), subject to additions and deductions as provided in the Contract Documents.

§ 4.2 The Contract Sum is based upon the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:
(State the numbers or other identification of accepted alternates. If the bidding or proposal documents permit the Owner to accept other alternates subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date when that amount expires.)

§ 4.3 Unit prices, if any:
(Identify and state the unit price, state quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit ($0.00)

§ 4.4 Allowances included in the Contract Sum, if any:
(Identify allowance and state exclusions, if any, from the allowance price.)

Item	Price

Sample

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ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the day of a month, the Owner shall make payment of the certified amount to the Contractor not later than the day of the month. If an Application for Payment is received by the Architect after the application date fixed above, payment shall be made by the Owner not later than ( ) days after the Architect receives the Application for Payment.
(Federal, state or local laws may require payment within a certain period of time.)

§ 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.6 Subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

.1 Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the Contract Sum allocated to that portion of the Work in the schedule of values, less retainage of percent (%). Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute shall be included as provided in Section 7.3.9 of AIA Document A201™–2007, General Conditions of the Contract for Construction;

.2 Add that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing), less retainage of percent (%);

.3 Subtract the aggregate of previous payments made by the Owner; and

.4 Subtract amounts, if any, for which the Architect has withheld or nullified a Certificate for Payment as provided in Section 9.5 of AIA Document A201–2007.

§ 5.1.7 The progress payment amount determined in accordance with Section 5.1.6 shall be further modified under the following circumstances:

.1 Add, upon Substantial Completion of the Work, a sum sufficient to increase the total payments to the full amount of the Contract Sum, less such amounts as the Architect shall determine for incomplete Work, retainage applicable to such work and unsettled claims; and
(Section 9.8.5 of AIA Document A201–2007 requires release of applicable retainage upon Substantial Completion of Work with consent of surety, if any.)

.2 Add, if final completion of the Work is thereafter materially delayed through no fault of the Contractor, any additional amounts payable in accordance with Section 9.10.3 of AIA Document A201–2007.

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§ 5.1.8 Reduction or limitation of retainage, if any, shall be as follows:
(If it is intended, prior to Substantial Completion of the entire Work, to reduce or limit the retainage resulting from the percentages inserted in Sections 5.1.6.1 and 5.1.6.2 above, and this is not explained elsewhere in the Contract Documents, insert here provisions for such reduction or limitation.)

§ 5.1.9 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.2 Final Payment

§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

.1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Section 12.2.2 of AIA Document A201–2007, and to satisfy other requirements, if any, which extend beyond final payment; and

.2 a final Certificate for Payment has been issued by the Architect.

§ 5.2.2 The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the Architect's final Certificate for Payment, or as follows:

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as Initial Decision Maker pursuant to Section 15.2 of AIA Document A201–2007, unless the parties appoint below another individual, not a party to this Agreement, to serve as Initial Decision Maker.
(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

§ 6.2 Binding Dispute Resolution

For any Claim subject to, but not resolved by, mediation pursuant to Section 15.3 of AIA Document A201–2007, the method of binding dispute resolution shall be as follows:
(Check the appropriate box. If the Owner and Contractor do not select a method of binding dispute resolution below, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.)

☐ Arbitration pursuant to Section 15.4 of AIA Document A201–2007

☐ Litigation in a court of competent jurisdiction

☐ Other: *(Specify)*

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ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2007.

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2007.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2007 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located. *(Insert rate of interest agreed upon, if any.)*

§ 8.3 The Owner's representative:
(Name, address and other information)

§ 8.4 The Contractor's representative:
(Name, address and other information)

§ 8.5 Neither the Owner's nor the Contractor's representative shall be changed without ten days written notice to the other party.

§ 8.6 Other provisions:

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 The Contract Documents, except for Modifications issued after execution of this Agreement, are enumerated in the sections below.

§ 9.1.1 The Agreement is this executed AIA Document A101–2007, Standard Form of Agreement Between Owner and Contractor.

§ 9.1.2 The General Conditions are AIA Document A201–2007, General Conditions of the Contract for Construction.

§ 9.1.3 The Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

Sample

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§ 9.1.4 The Specifications:
(Either list the Specifications here or refer to an exhibit attached to this Agreement.)

Section	Title	Date	Pages

§ 9.1.5 The Drawings:
(Either list the Drawings here or refer to an exhibit attached to this Agreement.)

Number	Title	Date

§ 9.1.6 The Addenda, if any:

Number	Date	Pages

Portions of Addenda relating to bidding requirements are not part of the Contract Documents unless the bidding requirements are also enumerated in this Article 9.

§ 9.1.7 Additional documents, if any, forming part of the Contract Documents:

.1 AIA Document E201™–2007, Digital Data Protocol Exhibit, if completed by the parties, or the following:

.2 Other documents, if any, listed below:
(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201–2007 provides that bidding requirements such as advertisement or invitation to bid, Instructions to Bidders, sample forms and the Contractor's bid are not part of the Contract Documents unless enumerated in this Agreement. They should be listed here only if intended to be part of the Contract Documents.)

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ARTICLE 10 INSURANCE AND BONDS

The Contractor shall purchase and maintain insurance and provide bonds as set forth in Article 11 of AIA Document A201–2007.

(State bonding requirements, if any, and limits of liability for insurance required in Article 11 of AIA Document A201–2007.)

Type of Insurance or Bond	Limit of Liability or Bond Amount ($0.00)

Sample

This Agreement entered into as of the day and year first written above.

OWNER *(Signature)*	**CONTRACTOR** *(Signature)*
(Printed name and title)	*(Printed name and title)*

CAUTION: You should sign an original AIA Contract Document, on which this text appears in RED. An original assures that changes will not be obscured.

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AIA® Document A310™ – 2010

Bid Bond

CONTRACTOR:
(Name, legal status and address)
TBD
TBD

SURETY:
(Name, legal status and principal place of business)
TBD
TBD

OWNER:
(Name, legal status and address)
TBD
TBD

BOND AMOUNT:

PROJECT:
(Name, location or address, and Project number, if any)
TBD
TBD

Project Number, if any:

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

The Contractor and Surety are bound to the Owner in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Owner accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Owner and Contractor, and the Contractor either (1) enters into a contract with the Owner in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise acceptable to the Owner, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect. The Surety hereby waives any notice of an agreement between the Owner and Contractor to extend the time in which the Owner may accept the bid. Waiver of notice by the Surety shall not apply to any extension exceeding sixty (60) days in the aggregate beyond the time for acceptance of bids specified in the bid documents, and the Owner and Contractor shall obtain the Surety's consent for an extension beyond sixty (60) days.

If this Bond is issued in connection with a subcontractor's bid to a Contractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

Signed and sealed this day of

(Witness)	*(Principal)* *(Seal)*
	(Title)
(Witness)	*(Surety)* *(Seal)*
	(Title)

Init.

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AIA® Document A312™ – 2010

Performance Bond

CONTRACTOR:
(Name, legal status and address)

SURETY:
(Name, legal status and principal place of business)

OWNER:
(Name, legal status and address)

CONSTRUCTION CONTRACT
Date:
Amount: $
Description:
(Name and location)
Uninterruptible Power Supply (UPS)

BOND
Date:
(Not earlier than Construction Contract Date)

Amount: $
Modifications to this Bond: ☐ None ☐ See Section 16

CONTRACTOR AS PRINCIPAL
Company: *(Corporate Seal)*

Signature: _____
Name and Title:

SURETY
Company: *(Corporate Seal)*

Signature: _____
Name and Title:

(Any additional signatures appear on the last page of this Performance Bond.)

(FOR INFORMATION ONLY — Name, address and telephone)
AGENT or BROKER:

OWNER'S REPRESENTATIVE:
(Architect, Engineer or other party:)

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

Init.
/
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User Notes:
(1382705251)

§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

§ 2 If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Section 3.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after

- **.1** the Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Section 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;
- **.2** the Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and
- **.3** the Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

§ 4 Failure on the part of the Owner to comply with the notice requirement in Section 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

§ 5 When the Owner has satisfied the conditions of Section 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

§ 5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

§ 5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

§ 5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Section 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

§ 5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

- **.1** After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or
- **.2** Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

§ 6 If the Surety does not proceed as provided in Section 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Section 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

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§ 7 If the Surety elects to act under Section 5.1, 5.2 or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication, for

- .1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;
- .2 additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Section 5; and
- .3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

§ 8 If the Surety elects to act under Section 5.1, 5.3 or 5.4, the Surety's liability is limited to the amount of this Bond.

§ 9 The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors and assigns.

§ 10 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 11 Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 12 Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

§ 13 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 14 Definitions

§ 14.1 Balance of the Contract Price. The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

§ 14.2 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

§ 14.3 Contractor Default. Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

§ 14.4 Owner Default. Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 14.5 Contract Documents. All the documents that comprise the agreement between the Owner and Contractor.

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§ 15 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 16 Modifications to this bond are as follows:

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:		Name and Title:	
Address:		Address:	

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AIA® Document A312™ – 2010

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AIA® Document D401™ – 2003

I, , hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with its associated Additions and Deletions Report and this certification at 15:25:48 on 01/10/2013 under Order No. 6871475021_1 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A312™ – 2010, Performance Bond, as published by the AIA in its software, other than those additions and deletions shown in the associated Additions and Deletions Report.

_____

(Signed)

_____

(Title)

_____

(Dated)

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AIA® Document A701™ – 1997

Instructions to Bidders

for the following PROJECT:
(Name and location or address)

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

THE OWNER:
(Name, legal status and address)

THE ARCHITECT:
(Name, legal status and address)

Sample

TABLE OF ARTICLES

1 DEFINITIONS

2 BIDDER'S REPRESENTATIONS

3 BIDDING DOCUMENTS

4 BIDDING PROCEDURES

5 CONSIDERATION OF BIDS

6 POST-BID INFORMATION

7 PERFORMANCE BOND AND PAYMENT BOND

8 FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

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ARTICLE 1 DEFINITIONS

§ 1.1 Bidding Documents include the Bidding Requirements and the proposed Contract Documents. The Bidding Requirements consist of the Advertisement or Invitation to Bid, Instructions to Bidders, Supplementary Instructions to Bidders, the bid form, and other sample bidding and contract forms. The proposed Contract Documents consist of the form of Agreement between the Owner and Contractor, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications and all Addenda issued prior to execution of the Contract.

§ 1.2 Definitions set forth in the General Conditions of the Contract for Construction, AIA Document A201™, or in other Contract Documents are applicable to the Bidding Documents.

§ 1.3 Addenda are written or graphic instruments issued by the Architect prior to the execution of the Contract which modify or interpret the Bidding Documents by additions, deletions, clarifications or corrections.

§ 1.4 A Bid is a complete and properly executed proposal to do the Work for the sums stipulated therein, submitted in accordance with the Bidding Documents.

§ 1.5 The Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents as the base, to which Work may be added or from which Work may be deleted for sums stated in Alternate Bids.

§ 1.6 An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or deducted from the amount of the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted.

§ 1.7 A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials, equipment or services or a portion of the Work as described in the Bidding Documents.

§ 1.8 A Bidder is a person or entity who submits a Bid and who meets the requirements set forth in the Bidding Documents.

§ 1.9 A Sub-bidder is a person or entity who submits a bid to a Bidder for materials, equipment or labor for a portion of the Work.

ARTICLE 2 BIDDER'S REPRESENTATIONS

§ 2.1 The Bidder by making a Bid represents that:

§ 2.1.1 The Bidder has read and understands the Bidding Documents or Contract Documents, to the extent that such documentation relates to the Work for which the Bid is submitted, and for other portions of the Project, if any, being bid concurrently or presently under construction.

§ 2.1.2 The Bid is made in compliance with the Bidding Documents.

§ 2.1.3 The Bidder has visited the site, become familiar with local conditions under which the Work is to be performed and has correlated the Bidder's personal observations with the requirements of the proposed Contract Documents.

§ 2.1.4 The Bid is based upon the materials, equipment and systems required by the Bidding Documents without exception.

ARTICLE 3 BIDDING DOCUMENTS

§ 3.1 Copies

§ 3.1.1 Bidders may obtain complete sets of the Bidding Documents from the issuing office designated in the Advertisement or Invitation to Bid in the number and for the deposit sum, if any, stated therein. The deposit will be refunded to Bidders who submit a bona fide Bid and return the Bidding Documents in good condition within ten days after receipt of Bids. The cost of replacement of missing or damaged documents will be deducted from the deposit. A Bidder receiving a Contract award may retain the Bidding Documents and the Bidder's deposit will be refunded.

§ 3.1.2 Bidding Documents will not be issued directly to Sub-bidders unless specifically offered in the Advertisement or Invitation to Bid, or in supplementary instructions to bidders.

§ 3.1.3 Bidders shall use complete sets of Bidding Documents in preparing Bids; neither the Owner nor Architect assumes responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

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§ 3.1.4 The Owner and Architect may make copies of the Bidding Documents available on the above terms for the purpose of obtaining Bids on the Work. No license or grant of use is conferred by issuance of copies of the Bidding Documents.

§ 3.2 Interpretation or Correction of Bidding Documents

§ 3.2.1 The Bidder shall carefully study and compare the Bidding Documents with each other, and with other work being bid concurrently or presently under construction to the extent that it relates to the Work for which the Bid is submitted, shall examine the site and local conditions, and shall at once report to the Architect errors, inconsistencies or ambiguities discovered.

§ 3.2.2 Bidders and Sub-bidders requiring clarification or interpretation of the Bidding Documents shall make a written request which shall reach the Architect at least seven days prior to the date for receipt of Bids.

§ 3.2.3 Interpretations, corrections and changes of the Bidding Documents will be made by Addendum. Interpretations, corrections and changes of the Bidding Documents made in any other manner will not be binding, and Bidders shall not rely upon them.

§ 3.3 Substitutions

§ 3.3.1 The materials, products and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution.

§ 3.3.2 No substitution will be considered prior to receipt of Bids unless written request for approval has been received by the Architect at least ten days prior to the date for receipt of Bids. Such requests shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitution including drawings, performance and test data, and other information necessary for an evaluation. A statement setting forth changes in other materials, equipment or other portions of the Work, including changes in the work of other contracts that incorporation of the proposed substitution would require, shall be included. The burden of proof of the merit of the proposed substitution is upon the proposer. The Architect's decision of approval or disapproval of a proposed substitution shall be final.

§ 3.3.3 If the Architect approves a proposed substitution prior to receipt of Bids, such approval will be set forth in an Addendum. Bidders shall not rely upon approvals made in any other manner.

§ 3.3.4 No substitutions will be considered after the Contract award unless specifically provided for in the Contract Documents.

§ 3.4 Addenda

§ 3.4.1 Addenda will be transmitted to all who are known by the issuing office to have received a complete set of Bidding Documents.

§ 3.4.2 Copies of Addenda will be made available for inspection wherever Bidding Documents are on file for that purpose.

§ 3.4.3 Addenda will be issued no later than four days prior to the date for receipt of Bids except an Addendum withdrawing the request for Bids or one which includes postponement of the date for receipt of Bids.

§ 3.4.4 Each Bidder shall ascertain prior to submitting a Bid that the Bidder has received all Addenda issued, and the Bidder shall acknowledge their receipt in the Bid.

ARTICLE 4 BIDDING PROCEDURES

§ 4.1 Preparation of Bids

§ 4.1.1 Bids shall be submitted on the forms included with the Bidding Documents.

§ 4.1.2 All blanks on the bid form shall be legibly executed in a non-erasable medium.

§ 4.1.3 Sums shall be expressed in both words and figures. In case of discrepancy, the amount written in words shall govern.

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§ 4.1.4 Interlineations, alterations and erasures must be initialed by the signer of the Bid.

§ 4.1.5 All requested Alternates shall be bid. If no change in the Base Bid is required, enter "No Change."

§ 4.1.6 Where two or more Bids for designated portions of the Work have been requested, the Bidder may, without forfeiture of the bid security, state the Bidder's refusal to accept award of less than the combination of Bids stipulated by the Bidder. The Bidder shall make no additional stipulations on the bid form nor qualify the Bid in any other manner.

§ 4.1.7 Each copy of the Bid shall state the legal name of the Bidder and the nature of legal form of the Bidder. The Bidder shall provide evidence of legal authority to perform within the jurisdiction of the Work. Each copy shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid by a corporation shall further give the state of incorporation and have the corporate seal affixed. A Bid submitted by an agent shall have a current power of attorney attached certifying the agent's authority to bind the Bidder.

§ 4.2 Bid Security

§ 4.2.1 Each Bid shall be accompanied by a bid security in the form and amount required if so stipulated in the Instructions to Bidders. The Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid and will, if required, furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Should the Bidder refuse to enter into such Contract or fail to furnish such bonds if required, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty. The amount of the bid security shall not be forfeited to the Owner in the event the Owner fails to comply with Section 6.2.

§ 4.2.2 If a surety bond is required, it shall be written on AIA Document A310™, Bid Bond, unless otherwise provided in the Bidding Documents, and the attorney-in-fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of the power of attorney.

§ 4.2.3 The Owner will have the right to retain the bid security of Bidders to whom an award is being considered until either (a) the Contract has been executed and bonds, if required, have been furnished, or (b) the specified time has elapsed so that Bids may be withdrawn or (c) all Bids have been rejected.

§ 4.3 Submission of Bids

§ 4.3.1 All copies of the Bid, the bid security, if any, and any other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope. The envelope shall be addressed to the party receiving the Bids and shall be identified with the Project name, the Bidder's name and address and, if applicable, the designated portion of the Work for which the Bid is submitted. If the Bid is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "SEALED BID ENCLOSED" on the face thereof.

§ 4.3.2 Bids shall be deposited at the designated location prior to the time and date for receipt of Bids. Bids received after the time and date for receipt of Bids will be returned unopened.

§ 4.3.3 The Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids.

§ 4.3.4 Oral, telephonic, telegraphic, facsimile or other electronically transmitted bids will not be considered.

§ 4.4 Modification or Withdrawal of Bid

§ 4.4.1 A Bid may not be modified, withdrawn or canceled by the Bidder during the stipulated time period following the time and date designated for the receipt of Bids, and each Bidder so agrees in submitting a Bid.

§ 4.4.2 Prior to the time and date designated for receipt of Bids, a Bid submitted may be modified or withdrawn by notice to the party receiving Bids at the place designated for receipt of Bids. Such notice shall be in writing over the signature of the Bidder. Written confirmation over the signature of the Bidder shall be received, and date- and time-stamped by the receiving party on or before the date and time set for receipt of Bids. A change shall be so worded as not to reveal the amount of the original Bid.

§ 4.4.3 Withdrawn Bids may be resubmitted up to the date and time designated for the receipt of Bids provided that they are then fully in conformance with these Instructions to Bidders.

§ 4.4.4 Bid security, if required, shall be in an amount sufficient for the Bid as resubmitted.

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ARTICLE 5 CONSIDERATION OF BIDS

§ 5.1 Opening of Bids

At the discretion of the Owner, if stipulated in the Advertisement or Invitation to Bid, the properly identified Bids received on time will be publicly opened and will be read aloud. An abstract of the Bids may be made available to Bidders.

§ 5.2 Rejection of Bids

The Owner shall have the right to reject any or all Bids. A Bid not accompanied by a required bid security or by other data required by the Bidding Documents, or a Bid which is in any way incomplete or irregular is subject to rejection.

§ 5.3 Acceptance of Bid (Award)

§ 5.3.1 It is the intent of the Owner to award a Contract to the lowest qualified Bidder provided the Bid has been submitted in accordance with the requirements of the Bidding Documents and does not exceed the funds available. The Owner shall have the right to waive informalities and irregularities in a Bid received and to accept the Bid which, in the Owner's judgment, is in the Owner's own best interests.

§ 5.3.2 The Owner shall have the right to accept Alternates in any order or combination, unless otherwise specifically provided in the Bidding Documents, and to determine the low Bidder on the basis of the sum of the Base Bid and Alternates accepted.

ARTICLE 6 POST-BID INFORMATION

§ 6.1 Contractor's Qualification Statement

Bidders to whom award of a Contract is under consideration shall submit to the Architect, upon request, a properly executed AIA Document A305™, Contractor's Qualification Statement, unless such a Statement has been previously required and submitted as a prerequisite to the issuance of Bidding Documents.

§ 6.2 Owner's Financial Capability

The Owner shall, at the request of the Bidder to whom award of a Contract is under consideration and no later than seven days prior to the expiration of the time for withdrawal of Bids, furnish to the Bidder reasonable evidence that financial arrangements have been made to fulfill the Owner's obligations under the Contract. Unless such reasonable evidence is furnished, the Bidder will not be required to execute the Agreement between the Owner and Contractor.

§ 6.3 Submittals

§ 6.3.1 The Bidder shall, as soon as practicable or as stipulated in the Bidding Documents, after notification of selection for the award of a Contract, furnish to the Owner through the Architect in writing:

- .1 a designation of the Work to be performed with the Bidder's own forces;
- .2 names of the manufacturers, products, and the suppliers of principal items or systems of materials and equipment proposed for the Work; and
- .3 names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.

§ 6.3.2 The Bidder will be required to establish to the satisfaction of the Architect and Owner the reliability and responsibility of the persons or entities proposed to furnish and perform the Work described in the Bidding Documents.

§ 6.3.3 Prior to the execution of the Contract, the Architect will notify the Bidder in writing if either the Owner or Architect, after due investigation, has reasonable objection to a person or entity proposed by the Bidder. If the Owner or Architect has reasonable objection to a proposed person or entity, the Bidder may, at the Bidder's option, (1) withdraw the Bid or (2) submit an acceptable substitute person or entity with an adjustment in the Base Bid or Alternate Bid to cover the difference in cost occasioned by such substitution. The Owner may accept the adjusted bid price or disqualify the Bidder. In the event of either withdrawal or disqualification, bid security will not be forfeited.

§ 6.3.4 Persons and entities proposed by the Bidder and to whom the Owner and Architect have made no reasonable objection must be used on the Work for which they were proposed and shall not be changed except with the written consent of the Owner and Architect.

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ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND

§ 7.1 Bond Requirements

§ 7.1.1 If stipulated in the Bidding Documents, the Bidder shall furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Bonds may be secured through the Bidder's usual sources.

§ 7.1.2 If the furnishing of such bonds is stipulated in the Bidding Documents, the cost shall be included in the Bid. If the furnishing of such bonds is required after receipt of bids and before execution of the Contract, the cost of such bonds shall be added to the Bid in determining the Contract Sum.

§ 7.1.3 If the Owner requires that bonds be secured from other than the Bidder's usual sources, changes in cost will be adjusted as provided in the Contract Documents.

§ 7.2 Time of Delivery and Form of Bonds

§ 7.2.1 The Bidder shall deliver the required bonds to the Owner not later than three days following the date of execution of the Contract. If the Work is to be commenced prior thereto in response to a letter of intent, the Bidder shall, prior to commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished and delivered in accordance with this Section 7.2.1.

§ 7.2.2 Unless otherwise provided, the bonds shall be written on AIA Document A312™, Performance Bond and Payment Bond. Both bonds shall be written in the amount of the Contract Sum.

§ 7.2.3 The bonds shall be dated on or after the date of the Contract.

§ 7.2.4 The Bidder shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the power of attorney.

ARTICLE 8 FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

Unless otherwise required in the Bidding Documents, the Agreement for the Work will be written on AIA Document A101™, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum.

Sample

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AIA® Document G701™ – 2001

Change Order

PROJECT: *(Name and address)*

CHANGE ORDER NUMBER:

DATE:

OWNER ☐
ARCHITECT ☐
CONTRACTOR ☐
FIELD ☐
OTHER ☐

TO CONTRACTOR: *(Name and address)*

ARCHITECT'S PROJECT NUMBER:

CONTRACT DATE:

CONTRACT FOR:

The Contract is changed as follows:
(Include, where applicable, any undisputed amount attributable to previously executed Construction Change Directives.)

The original (Contract Sum) (Guaranteed Maximum Price) was $ _____

The net change by previously authorized Change Orders $ _____

The (Contract Sum) (Guaranteed Maximum Price) prior to this Change Order was $ _____

The (Contract Sum) (Guaranteed Maximum Price) will be (increased) (decreased) (unchanged) by this Change Order in the amount of $ _____

The new (Contract Sum) (Guaranteed Maximum Price), including this Change Order, will be $ _____

The Contract Time will be (increased) (decreased) (unchanged) by ( ) days.

The date of Substantial Completion as of the date of this Change Order, therefore, is

NOTE: This Change Order does not include changes in the Contract Sum, Contract Time or Guaranteed Maximum Price that have been authorized by Construction Change Directive until the cost and time have been agreed upon by both the Owner and Contractor, in which case a Change Order is executed to supersede the Construction Change Directive.

NOT VALID UNTIL SIGNED BY THE ARCHITECT, CONTRACTOR AND OWNER.

ARCHITECT *(Firm name)*	CONTRACTOR *(Firm name)*	OWNER *(Firm name)*
ADDRESS	ADDRESS	ADDRESS
BY *(Signature)*	BY *(Signature)*	BY *(Signature)*
(Typed name)	*(Typed name)*	*(Typed name)*
DATE	DATE	DATE

CAUTION: You should sign an original AIA Contract Document, on which this text appears in RED. An original assures that changes will not be obscured.

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AIA® Document G709™ – 2001

Work Changes Proposal Request

PROJECT: *(Name and address)*

OWNER: *(Name and address)*

FROM ARCHITECT: *(Name and address)*

TO CONTRACTOR: *(Name and address)*

PROPOSAL REQUEST NUMBER:

DATE OF ISSUANCE:

CONTRACT FOR:

CONTRACT DATE:

ARCHITECT'S PROJECT NUMBER:

OWNER ☐

ARCHITECT ☐

CONSULTANT ☐

CONTRACTOR ☐

FIELD ☐

OTHER ☐

Please submit an itemized proposal for changes in the Contract Sum and Contract Time for proposed modifications to the Contract Documents described herein. Within (( ) days, the Contractor must submit this proposal or notify the Architect, in writing, of the date on which proposal submission is anticipated.

THIS IS NOT A CHANGE ORDER, A CONSTRUCTION CHANGE DIRECTIVE OR A DIRECTION TO PROCEED WITH THE WORK DESCRIBED IN THE PROPOSED MODIFICATIONS.

DESCRIPTION: *(Insert a written description of the Work.)*

ATTACHMENTS: *(List attached documents that support description.)*

REQUESTED BY THE ARCHITECT:

(Signature) *(Printed name and title)*

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AIA® Document G716™ – 2004

Request for Information (RFI)

TO:

FROM:

PROJECT:

ISSUE DATE:

RFI No.:

REQUESTED REPLY DATE:

PROJECT NUMBERS:

COPIES TO;

RFI DESCRIPTION: *(Fully describe the question or type of information requested:)*

REFERENCES/ATTACHMENTS: *(List specific documents researched when seeking the information requested.)*

SPECIFICATIONS **DRAWINGS** **OTHER**

SENDER'S RECOMMENDATION: *(If RFI concerns a site or construction condition, the sender may provide a recommended solution, including cost and/or schedule considerations.)*

RECEIVER'S REPLY: *(Provide answer to RFI, including cost and/or schedule considerations.)*

By:_____ **Date:**_____ **Copies to:**_____

NOTE: This reply is not an authorization to proceed with work involving additional cost, time or both. If any reply requires a change to the Contract Documents, a Change Order, Construction Change Directive or a Minor Change in the work must be executed in accordance with the Contract Documents.

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