

PROJECT MANUAL

FOR



***EXPANSION & REMODEL
18722 South Dixon Highway
Cutler Bay, FL 33157***

PROJECT NO. 2101445

CASCO

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**ROOMS TO GO
CUTLER BAY, FL**

**OWNER REVIEW: JUNE 6, 2022
BID: NOVEMBER 9, 2023**

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DIVISION 0 – BIDDING REQUIREMENTS

AIA FORM A101 – STANDARD FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR where the basis of payment is Stipulated Sum with modifications.

AIA FORM A201 – GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION with modifications.

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AIA[®] Document A101[®] – 2017

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)

11540 Highway 92 East
Seffner, FL 33584

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.

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.

The parties should complete A101[®]-2017, Exhibit A, Insurance and Bonds, contemporaneously with this Agreement. AIA Document A201[®]-2017, 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.

Init.

TABLE OF ARTICLES

- 1 THE CONTRACT DOCUMENTS
- 2 THE WORK OF THIS CONTRACT
- 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
- 4 CONTRACT SUM
- 5 PAYMENTS
- 6 DISPUTE RESOLUTION
- 7 TERMINATION OR SUSPENSION
- 8 MISCELLANEOUS PROVISIONS, INSURANCE AND BONDS
- 9 ENUMERATION OF CONTRACT DOCUMENTS

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 listed in the General Conditions 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:*

(Paragraphs deleted)

§ 3.1.1 The Contractor shall not proceed with the Work until the Owner receives a Certificate of Insurance with coverage as agreed upon in the Contract Documents.

§ 3.2 The Contract Time shall be measured from the date of commencement of the Work.

§ 3.3 Substantial Completion

§ 3.3.1 The Contractor shall achieve Substantial Completion of the entire

(Paragraphs deleted)

Work not later than NUMBER OF DAYS **TBD**) calendar days from the date of commencement of the

(Paragraphs deleted)

Work, subject to adjustments of this Contract Time as provided in the Contract Documents. § 3.3.2 If the Contractor fails to achieve Substantial Completion as provided in this Section 3.3, liquidated damages, if any, shall be assessed as set forth in Section 4.5.

(Table deleted)

(Paragraph deleted)

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 and .00/100 dollars (\$), subject to additions and deductions as provided in the Contract Documents. There shall be no additions to the Contract Sum as a result of any price increase in Contractor's cost of labor, services or materials that occur after the Contract is signed by Contractor.

Init.

§ 4.2 Alternates and Clarifications

§ 4.2.1 Alternates and Clarifications, if any, which are described in the Contract Documents are hereby accepted and included in the Contract Sum by the Owner:

DIVISION	CLARIFICATIONS
	1.
	1.

§ 4.2.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement.

(Paragraph deleted)

Item	Price	Conditions for Acceptance
------	-------	---------------------------

§ 4.3 Allowances, if any, included in the Contract Sum: None.

Item	Price
------	-------

§ 4.4 Unit prices, if any:

(Paragraph deleted)

Item	Units and Limitations	Price per Unit (\$0.00)
------	-----------------------	-------------------------

§ 4.5 Liquidated damages, if any:

(Paragraphs deleted)

See AIA Document A201-2007, Section 9.8 Substantial Completion.

§ 4.6 Other:

(Insert provisions for bonus or other incentives, if any, that might result in a change to the Contract Sum.)

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Owner by the Contractor and Certificates for Payment issued by the Owner, 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 Twenty-Fifth (25th) day of the month.

§ 5.1.3 Provided that a fully completed Application for Payment, together with required supporting documents, is received by the Owner not later than the twenty-fifth (25th) day of a month, the Owner shall make payment of the certified amount to the Contractor not later than the tenth (10th) day of the following month. If an Application for Payment is received by the Owner after the application date fixed above, payment shall be made by the Owner not later than twenty (20) days after the Owner receives the fully completed Application for Payment together with required supporting documents.

(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 Owner may require. This schedule of values, unless objected to by the Owner, shall be used as a basis for reviewing the Contractor's Applications for Payment.

Init.

§ 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 ten percent (10%). Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute shall be included as provided 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, less retainage of ten percent (10%);
- .3 Subtract the aggregate of previous payments made by the Owner;
- .4 Subtract amounts, if any, for which the Owner has withheld or nullified a Certificate for Payment as provided in Section 9.5 of AIA Document A201-2007;
- .5 Add, upon Substantial Completion of Work, a sum sufficient to increase the total payments to the ninety-five percent (95%) of the Contract Sum, less such amounts as the Owner shall determine for incomplete Work, retainage applicable to such work and unsettled claims; and
- .6 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.

(Paragraphs deleted)

§ 5.1.7 Retainage

§ 5.1.7.1

(Paragraphs deleted)

Reduction or limitation of retainage, if any, shall be as follows: None.

(Paragraphs deleted)

§ 5.1.8 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.

(Paragraph deleted)

§ 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 Article 12 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 approved and issued by the Owner.

§ 5.2.2 The Owner's final payment to the Contractor will be made within 30 days of Substantial Completion and receipt of the following:

- .1 fully executed lien documents from Contractor, subcontractors and suppliers;
- .2 two paper copy sets and two digital/electronic copy sets of as-built drawings, warranty and maintenance document manuals;
- .3 final unconditional Certificate of Occupancy;
- .4 all punch list work has been completed and accepted;
- .5 fully executed final change order(s); and
- .6 all warranty work through date of acceptance of items 1-5 has been completed and accepted from Contractor, subcontractors and suppliers.

§ 5.3 Interest

Payments due and unpaid under the Contract shall bear interest from the date payment is due at

Init.

(Paragraphs deleted)

Chase Manhattan Prime Rate plus two percent (2%).

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

(Paragraphs deleted)

There shall not be an Initial Decision Maker, and all references in the Contract Documents to an Initial Decision Maker are hereby void.

§ 6.2 Binding Dispute Resolution

For any Claim subject to, but not resolved by, mediation pursuant to Article 15 of AIA Document A201–2007, the method of binding dispute resolution shall

(Paragraphs deleted)

be litigation in a court of competent jurisdiction. OWNER AND CONTRACTOR WAIVE ANY RIGHT TO TRIAL BY JURY AND, INSTEAD, CHOOSE TO HAVE ANY SUCH DISPUTE RESOLVED BY A JUDGE.

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.

(Paragraphs deleted)

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2007.

ARTICLE 8 MISCELLANEOUS PROVISIONS, INSURANCE AND BONDS

§ 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 The Owner’s representatives:

(Name, address, email address, and other information)

Harmon H. Jones

§ 8.3 The Contractor’s representatives:

(Name, address, email address, and other information)

§ 8.4 Neither the Owner’s nor the Contractor’s representative shall be changed without ten days’ written notice to the other party.

§ 8.5 Insurance and Bonds

§ 8.5.1 The Contractor shall purchase and maintain insurance as set forth in Article 11 of AIA Document A201–2007, General Conditions of the Contract for Construction, as modified, including without limitation identified limits of liability.

Type of insurance or bond	Limit of liability or bond amount (\$0.00)
Workman’s Compensation	Coverage complying with all the requirements of the State the project is located and shall include Employer’s Liability Insurance at a limit of not less than \$1,000,000.
Comprehensive General Liability	\$3,000,000
Bodily Injury & Personal Injury	\$2,000,000
Motor Vehicle Liability	\$1,000,000
Property Damage	\$1,000,000

Init.

(Paragraph deleted)

§ 8.6

(Paragraphs deleted)

Other provisions:

(Paragraphs deleted)

§ 8.6.1 The Owner will contract directly with an independent testing agency for testing and inspections. The Contractor is responsible for coordinating tests and inspections as required in the specifications and for correcting any work identified as non-compliant with the Contract Documents. The Contractor shall be responsible for the additional costs of re-testing failures, re-scheduling inspections, tests and/or inspections beyond the required Scope of Work and/or the omission of any required test or inspection.

§ 8.6.2 Photographs of the following items shall be submitted with the Application for Payment for same; rigid perimeter insulation; stored insulation materials on job site and materials in-place; electrical ground rods and ground connections for building service and site lighting; stored copper rods and/or cable materials on job site and materials in-place; paint primer and finish paint products for exterior metal (e.g. canopy roofing, roof cap, and tube steel entrance truss framing); stored paint materials on job site and materials in-place. The Contractor shall, at the Contractor's expense, uncover in-place Work as necessary to confirm materials used. The Contractor is responsible for any costs associated with outside inspection and/or testing required to confirm concealed work. Payment to the Contractor will be withheld until these conditions are met.

§ 8.6.3 The Contractor is responsible for restoration of off-site areas disturbed in performance of the Work.

§ 8.6.4 The Owner will contract directly for items as clarified in the pre-bid conference notes.

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents, except for Modifications issued after execution of this Agreement, are enumerated in the sections below:

- .1 AIA Document A101™-2017, Standard Form of Agreement Between Owner and Contractor (as modified).

(Paragraph deleted)

- .2 AIA Document A201™-2007, General Conditions of the Contract for Construction (as modified).

- .3 Drawings: See Exhibit B.

- .4 Specifications: See Exhibit C.

- .5 Addenda, if any:

Number Date Pages

(Paragraphs deleted)

Portions of Addenda relating to bidding or proposal requirements are not part of the Contract Documents unless the bidding or proposal requirements are also enumerated in this Article 9.

- .6 Other documents forming part of the Contract Documents

Table with 4 columns: Document, Title, Date, Pages. Rows include Exhibit A (Schedule of Values), Exhibit B (List of Drawings), Exhibit C (General Index for the Specification Manual), and Exhibit D (Affidavits and Lien Waiver Forms).

(Paragraphs deleted)

.7 Other documents, if any, listed below:

(Paragraphs deleted)

None.

This Agreement entered into as of the day and year first written above. The undersigned company represents that the undersigned individual is duly authorized by the company to execute and deliver this instrument on behalf of the company and to bind the company in all matters addressed herein.

OWNER *(Signature)*

Harmon H. Jones, Sr. Vice President

(Printed name and title)

CONTRACTOR *(Signature)*

(Printed name and title)

Contractor's License Number

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AIA® Document A201® – 2007

General Conditions of the Contract for Construction

for the following PROJECT:

(Name and location or address)

Rooms To Go Forms

THE OWNER:

(Name, legal status and address)

THE ARCHITECT:

(Name, legal status and address)

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 BASIC DEFINITIONS

§ 1.1.1 THE CONTRACT DOCUMENTS

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Bidding Documents including without limitation the Advertisement or Invitation to Bid, the instructions to Bidders and Addenda or portions thereof relating to any Bidding Documents, Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Bid Proposal or any portion therein shall not be a Contract document. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Owner. A Change Order Request shall not be a Modification to the Contract.

§ 1.1.2 THE CONTRACT

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

§ 1.1.3 THE WORK

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor, Subcontractor, material supplier or other entity to fulfill the Contractor's obligations whether on or off the site of the Project. The Work may constitute the whole or a part of the Project.

§ 1.1.4 THE PROJECT

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by separate contractors.

§ 1.1.5 THE DRAWINGS

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

§ 1.1.6 THE SPECIFICATIONS

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 INSTRUMENTS OF SERVICE

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 INTENTIONALLY OMITTED

§ 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results. Computed dimensions shall take precedence over scale dimensions and large scale drawings shall take precedence over small scale drawings.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.2.4 If there is an inconsistency in the Drawings, Specifications, or between the Drawings and the Specifications, or between existing site conditions and the Drawings and Specifications, unless otherwise ordered in writing by the Architect or the Owner, the Contractor shall provide the better quality of, or the greater quantity of, more stringent, or higher standard of Work or materials. The Contractor shall promptly, and no later than 48 hours after discovery, notify the Owner and Architect of any inconsistency found in the Drawings, Specifications, or between the Drawings and the Specifications and any existing site condition.

§ 1.2.5 Where a typical or representative detail is shown on the Drawings, such detail shall constitute the standard of workmanship and materials throughout corresponding portions of the Work. Where necessary, the Contractor shall adopt such detail for use in said corresponding portions of the Work in a manner that is satisfactory to the Architect.

§ 1.3 CAPITALIZATION

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 INTERPRETATION

In the interest of brevity, the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE

§ 1.5.1 The Drawings, Specifications and other documents prepared by the Architect and the Architect's consultants are instruments of the Architect's service through which the Work to be executed by the Contractor is described. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce the Instruments of Service provided to them solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner. All copies of the Instruments of Services, except the Contractor's record set, shall be returned or suitably accounted for to the Owner, on request, upon completion of the Work.

§ 1.5.3 Drawings issued by the Architect concerning clarifications, proposed changes (in form of "bulletins") or changes will be in the form of a reproducible print of each such Drawing. The Contractor, at his expenses, shall do all printing or duplication and distribution of such reproducible prints as necessary for the proper performance of the Work.

§ 1.6 TRANSMISSION OF DATA IN DIGITAL FORM

If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

ARTICLE 2 OWNER

§ 2.1 GENERAL

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express

authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.1.2 The Owner shall furnish to the Contractor within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

§ 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

§ 2.2.1 Prior to commencement of the Work, the Contractor may request in writing that the Owner provide a written statement acknowledging that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract.

§ 2.2.2 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.2.3 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work, provided, however, Contractor shall review any such surveys, soil tests, or legal descriptions submitted by the Owner and notify the Owner within twenty (20) days of receipt of any inaccuracies.

§ 2.2.4 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.2.5 The Owner shall furnish to the Contractor one electronic copy of the Drawings and one electronic copy of the Specifications for purposes of making reproductions pursuant to Section 1.5.2. The Contractor shall furnish all other copies of the Drawings and Specifications necessary to perform the Work.

§ 2.3 OWNER'S RIGHT TO STOP THE WORK

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3. This right shall be in addition to and not in restriction or derogation of the Owner's rights under Article 14 hereof and shall not relieve the Contractor of any of his responsibilities and obligations under the Contract Documents.

§ 2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents, including the Contract Time, and fails within a five-day period after receipt of written notice from the Owner by letter, email, or progress meeting minutes to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, immediately correct such deficiencies, including supplementing the Contractor's forces to achieve Substantial Completion within the Contract Time. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies and/or supplementing Contractor's forces, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect or failure. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, at the Owner's option, the excess shall be deducted from any payment thereafter due or shall be paid by the Contractor immediately upon the demand of the Owner.

§ 2.5 ADDITIONAL RIGHTS

The rights stated in Article 2 shall be in addition to and not in limitation of any other rights of the Owner granted in the Contract Documents or at law or in equity.

ARTICLE 3 CONTRACTOR

§ 3.1 GENERAL

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Owner or Architect in their administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local and on-site conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before commencing the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor. The Contractor shall promptly report to the Owner any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect or Owner may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor shall also ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of any governmental body or public or quasi-public authority. The Contractor shall promptly report to the Owner any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect or Owner may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Owner or Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall make Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities unless the Contractor should have recognized such error, inconsistency, omission, difference or nonconformity and failed to report it to the Owner. If the Contractor performs any construction activity when Contractor should have known it involves a recognized error, inconsistency, omission, difference or nonconformity in the Contract Documents or with existing site conditions without such notice to the Owner, the Contractor shall assume appropriate responsibility for such performance and shall bear an appropriate amount of the attributable costs for correction.

§ 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give

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other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect and shall not proceed with that portion of the Work without further written instructions from the Owner or Architect. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any loss or damage arising solely from those Owner-required means, methods, techniques, sequences or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors or claiming by, through or under the Contractor and for any damages, losses, costs and expenses resulting from such acts or omissions.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.4 LABOR AND MATERIALS

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.2 Except in the case of minor changes in the Work authorized by the Architect in accordance with Sections 3.12.8 or 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.4.4 All manufactured articles, and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned as directed by the respective manufacturers, unless otherwise specified.

§ 3.4.5 Contractor shall provide all manpower and deliver all materials at such times and in such quantities as will insure the speedy and uninterrupted progress of the Work and achieve Substantial Completion within the Contract Time. All materials shall be delivered to the Site in proper order and quantity. Contractor shall handle and protect all materials used in performance of the Work furnished by Contractor as the same are delivered to the Site, or to any applicable off-site storage location, and shall be solely responsible for the security and condition of the same. After final completion and acceptance of the Work, or sooner if requested by the Owner, Contractor shall remove all surplus materials, equipment, temporary structures and scaffolding furnished by it which have not been incorporated into the Work.

§ 3.4.6 Title to all materials shall immediately vest to the Owner upon payment in respect of such materials, whether or not then incorporated or installed into the Project, subject to the right of the Owner, or Architect to reject same for failure to conform to the standards of any of the Contract Documents. Title to all Work and materials shall be in owner, free and clear of all liens, claims, security interests or encumbrances.

§ 3.4.7 All materials furnished shall be new unless stated otherwise. When materials are specified to conform to any standard, the materials delivered to the Site shall bear manufacturers' labels stating that the materials meet such standards. The above requirements shall not restrict or affect Owner's right to test materials as provided in the Contract Documents.

§ 3.5 WARRANTY

The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants

that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Owner or Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. The warranty given in this Paragraph shall survive and exceed any warranty limitation period set forth elsewhere in the Contract Documents.

§ 3.6 TAXES

The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.7 PERMITS, FEES, NOTICES AND COMPLIANCE WITH LAWS

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Owner shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work and will keep the Owner informed of any changes in applicable laws, ordinances, codes or permits affecting the Project. A photocopy of the building permit shall be delivered to the Architect and Owner as soon as it is obtained. Upon final completion, the Contractor shall deliver all original permits, licenses and certificates to the Owner and shall deliver photocopies to the Architect.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 **Concealed or Unknown Conditions.** If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 2 days after first observance of the conditions. The Owner will promptly investigate such conditions and, if the Owner determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will make an equitable adjustment in the Contract Sum or Contract Time, or both. If the Owner determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Owner shall promptly notify the Contractor in writing, stating the reasons. If the Contractor disputes the Owner's determination or recommendation, the Contractor may proceed as provided in Article 15. The Contractor shall not receive an adjustment in the Contract Sum or the Contract Time if such unknown or concealed condition is: (i) of a usual nature or does not differ materially from those ordinarily encountered and generally recognized as inherent in construction activities of the character provided for in the Contract Documents; (ii) located below the surface of the ground and does not differ materially from those generally encountered in the general area in which the site of the Project is located or does not differ materially from conditions encountered in any sub-surface investigation completed prior to the date of the Agreement; (iii) not materially different from those conditions disclosed or which reasonably should have been discerned by the Contractor's prior observations, field measurements, work, inspection, tests and reviews; and (iv) of a nature which the Contractor or any Subcontractor should reasonably know or anticipate based on any of the foregoing.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall

continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 ALLOWANCES

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

- .1 Allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- .2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- .3 Whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 SUPERINTENDENT

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner the name and qualifications of a proposed superintendent. The Owner may reply within 14 days to the Contractor in writing stating (1) whether the Owner has reasonable objection to the proposed superintendent or (2) that the Owner requires additional time to review. Failure of the Owner to reply within the 14-day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed. The Contractor shall provide the Owner with seventy-two (72) hours' notice of its intent to replace the superintendent.

§ 3.9.4 The Contractor shall require each Subcontractor for principal portions of the Work to provide a competent superintendent authorized to represent and speak on behalf of the Subcontractor at the Project site during the progress of the Work.

§ 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

§ 3.10.1 The Contractor, promptly and no later than twenty-one days after being awarded the Contract, shall prepare and submit for the Owner's information a Contractor's construction schedule for the Work. The schedule shall not exceed the Contract Time set forth in the Contract Documents plus or minus any adjustments made to the Contract Time by an executed Change Order, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

§ 3.10.2 The Contractor shall prepare a submittal schedule, promptly and no later than twenty-one days after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule and shall submit the schedule(s) for the Owner's and Architect's approval. The Owner's and Architect's approval shall not unreasonably be delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Owner and Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule or fails to submit according to the schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in strict accordance with the most recent schedules submitted to the Owner and Architect.

§ 3.10.4 The Contractor also acknowledges and represents that it is aware that it will be required to accommodate the Owner's fixturing personnel up to four (4) weeks prior to Substantial Completion, which acknowledgment shall be reflected in the approved schedule. The Contractor shall coordinate the work of the Owner's fixturing personnel with the Work.

§ 3.11 DOCUMENTS AND SAMPLES AT THE SITE

The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the Architect and shall be delivered to the Owner in good condition upon completion of the Work and before final payment is made as a record of the Work as constructed.

§ 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. Their purpose is to demonstrate the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Architect Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the Owner or Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Owner's or Architect's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Owner or Architect in writing of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Owner's or Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Owner or Architect on previous submittals. In the absence of such written notice, the Owner's or Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop 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 the Architect and Owner. The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

§ 3.13 USE OF SITE

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.14 CUTTING AND PATCHING

§ 3.14.1 The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting, and patching shall be restored to the condition existing prior to the cutting, fitting and patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work.

§ 3.15 CLEANING UP

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials from and about the Project. The Contractor shall thoroughly wash and clean all glass and mirror surfaces, and shall leave the Work neat and broom clean. The Contractor shall, not less than two times each week, clean up by removing rubbish, including old and surplus materials. The Contractor shall use its best efforts to prevent dust. The Contractor shall be responsible for the overall cleanliness and neatness of Work.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and Owner shall be entitled to reimbursement from the Contractor and, at the option of the Owner, shall be deducted from the next payment to the Contractor or be paid by the Contractor to the Owner.

§ 3.15.3 Refer to the specification section pertaining to Final Cleaning for additional requirements and information.

§ 3.16 ACCESS TO WORK

The Contractor shall provide the Owner and Architect access to the Work in preparation and progress where ever located.

§ 3.17 ROYALTIES, PATENTS AND COPYRIGHTS

The Contractor shall pay all royalties and license fees. The Contractor shall defend all suits or claims for infringement of copyrights and patent rights and shall save the Owner and Architect harmless from loss (including but not limited to, attorneys' fees and any litigation expenses) unless particular design, process or product of a particular manufacturer or manufacturers is specified in the Contract Documents; provided, however, if the Contractor has reason to believe that the required design, process or product specified is an infringement of a copyright or a patent, the Contractor shall be responsible for such loss unless the Contractor promptly gives such information to the Architect and Owner.

§ 3.18 INDEMNIFICATION

§ 3.18.1 To the fullest extent permitted by law the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

§ 3.19 MEETINGS

The Contractor shall send his qualified representative to meetings held at the Project site every two weeks or at such time as the Architect or Owner shall designate.

§ 3.20 REPRESENTATIONS AND WARRANTIES

The Contractor represents and warrants the following to the Owner (in addition to the other representations and warranties contained in the Contract Documents), as an inducement to the Owner to execute the Agreement, which representations and warranties shall survive the execution and delivery of the Agreement and the final completion of the Work:

.1 that the Contractor is financially solvent, able to pay his debts as they mature and possessed of sufficient working capital to complete the Work and perform his obligations under the Contract Documents;

2 that the Contractor is able to furnish the plant, tools, materials, supplies, equipment and labor required to complete the Work and perform his obligations hereunder and has sufficient experience and competence to do so;

3 that the Contractor is authorized to do business in the State where the Project is located and properly licensed by all necessary governmental and public and quasi- public authorities having jurisdiction over the Contractor and over the Work and the site of the Project;

.4 that the execution of the Agreement and performance thereof is within the Contractor's duly authorized powers; and

.5 that the Contractor's duly authorized representative has visited the site of the Work, familiarized himself with the existing conditions under which the Work is to be performed and correlated his observations with the requirements of the Contract Documents and that Contractor is competent to perform the Work within the Contract Time and Contract Sum.

§ 3.21 SURETIES

The Contractor shall keep its surety and any surety for any Subcontractor informed of all information and occurrences as required by any surety bond on the Project.

ARTICLE 4 ARCHITECT

§ 4.1 GENERAL

§ 4.1.1 The Owner shall retain an architect lawfully licensed to practice architecture or an entity lawfully practicing architecture in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 4.1.2 Duties, responsibilities and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner. Consent shall not be unreasonably withheld.

§ 4.1.3 If the employment of the Architect is terminated, the Owner shall employ a successor architect whose status under the Contract Documents shall be that of the Architect.

§ 4.2 ADMINISTRATION OF THE CONTRACT

§ 4.2.1 The Owner and Architect will provide administration of the Contract as described in the Contract Documents during construction until the date the final payment is issued. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Owner and Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Owner or Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. Neither the Owner nor the Architect will have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1.

§ 4.2.3 The Owner will exercise care and diligence in discovering and promptly reporting any defects or deficiencies in the Work of the Contractor or any of his subcontractors or their agents or employees, or any other person performing any of the Work in the construction of the Project to the Contractor. The Owner and Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Owner and Architect will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 COMMUNICATIONS FACILITATING CONTRACT ADMINISTRATION

Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner.

§ 4.2.5 Based on the Owner's evaluations of the Contractor's Applications for Payment, the Owner will review and approve the amounts due the Contractor.

§ 4.2.6 The Owner and Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Owner or Architect consider it necessary or advisable, the Owner or Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed. However, neither this authority of the Owner or Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Owner or Architect to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Owner or Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Owner's or Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Owner's or Architect's judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Owner's or Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Owner's or Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Owner or Architect, of any construction means, methods, techniques, sequences or procedures. The Owner's or Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Owner will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Owner will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion and will receive written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10

§ 4.2.10 Intentionally Omitted.

§ 4.2.11 The Owner or Architect as applicable will initially interpret and initially decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Owner's or Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Architect or Owner will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Owner or Architect as applicable will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions rendered in good faith and without negligence.

§ 4.2.13 The Owner's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.14 The Owner or Architect will review and respond to requests for information about the Contract Documents. The Owner's or Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 DEFINITIONS

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

§ 5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed

for each principal portion of the Work. The Owner or Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to any such proposed person or entity or (2) that the Owner or Architect requires additional time for review. Failure of the Owner or Architect to reply within the 14 day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person or entity previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.3 SUBCONTRACTUAL RELATIONS

§ 5.3.1 By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.3.2 Contractor shall furnish to Owner a copy of the master Subcontract form to be used within ten (10) days after the signing of this agreement.

§ 5.3.3 Any part of the Work performed for the Contractor by a Subcontractor shall be pursuant to a written Subcontract between the Contractor and such Subcontractor, which shall be prepared on a master form of Subcontract which contains provisions that:

.1 require that such portion of the Work be performed in accordance with the requirements of the Contract Documents;

.2 require timely submission of Subcontractor applications for payment with lien waivers/releases in order to enable the Contractor to apply for payment in accordance with the provisions of Article 9;

.3 waive all rights the subcontracting parties may have against one another or that the Subcontractor may have against the Owner for damages caused by fire or other perils covered by the property insurance described in Paragraph 11.3, except for such rights as they may have to the proceeds of such insurance held by the Owner under Subparagraph 11.3.9;

.4 recognize the rights of the Owner pursuant to the Contingent Assignment of Subcontracts under Subparagraph 5.4.1 and require the Subcontractor (upon notice by the Owner that the Owner has terminated the

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Agreement with the Contractor pursuant to the terms of Article 14, and that the Owner has elected, pursuant to Subparagraph 5.4.1, to retain the Subcontractor pursuant to the terms of its Subcontract with the Contractor) to complete the unperformed obligations under such Subcontract and, if requested by the Owner, to enter into an appropriate agreement evidencing the fact that the Subcontractor is bound to the Owner under his Subcontract in the manner in which he had been bound to the Contractor;

.5 require the Subcontractor to carry and maintain insurance in accordance with the requirements of the Contract Documents; and

.6 contain no provisions inconsistent with any of the foregoing Subparagraphs .1 through .6 of this Subparagraph 5.3.3.

§ 5.3.4 Contractor's use of Subcontractors and Materialmen shall not diminish Contractor's obligation to complete the Work in accordance with the Contract Documents. Contractor shall control and coordinate the Work of its Subcontractors and Materialmen and shall provide and supervise sufficient and competent manpower and materials to perform the Work in accordance with the Contract Documents. Nothing contained in this Agreement shall create any contractual relationship between Subcontractors or Materialmen and Owner. Nothing in this Article shall obligate Owner to pay or to see to the payment of any sums to any Subcontractor or Materialmen.

§ 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

- .1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; and
- .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation may be equitably adjusted for increases in cost resulting from the suspension if appropriate.

§ 5.4.3 Upon such assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

§ 5.5 PAYMENTS TO SUBCONTRACTORS BY THE CONTRACTOR

The Contractor shall pay each Subcontractor, no later than promptly upon receipt of payment from the Owner, an amount equal to the percentage of completion allowed to the Contractor on account of such Subcontractor's Work, less the percentage retained from payments to the Contractor. The Contractor shall also require each Subcontractor to make similar payments to its Sub-subcontractors.

§ 5.6 PAYMENTS TO SUBCONTRACTORS BY THE OWNER

§ 5.6.1 If the Owner fails to approve an Application for Payment for cause which the Owner determines is the fault of the Contractor and not the fault of a particular Subcontractor, or if the Contractor fails to make a payment which is properly due to a particular Subcontractor, the Owner may pay such Subcontractor directly, less the amount to be retained under his Subcontract. Any amount so paid by the Owner shall be repaid to the Owner by the Contractor in the manner set forth in Paragraph 2.4.

§ 5.6.2 The Owner shall have no obligation to pay, or to see to the payment of, any monies to any Subcontractor. Nothing contained in Paragraph 5.6 shall be deemed to create any contractual relationship between the Owner and any Subcontractor or to create any rights in any Subcontractor against the Owner.

§ 5.6.3 The Contractor shall promptly advise the Owner of any claim or demand by a Subcontractor claiming that any amount is due to such Subcontractor or claiming any default by the Contractor in any of its obligations to such Subcontractor.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to the construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, separate contractors and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights that apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6 and Articles 10, 11 and 12.

§ 6.2 MUTUAL RESPONSIBILITY

§ 6.2.1 The Contractor shall afford the Owner and separate contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Owner and Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner's or separate contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a separate contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a separate contractor's delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or separate contractors as provided in Section 10.2.5 and shall indemnify, defend and hold harmless the Owner from any such damages or claims.

§ 6.2.5 The Owner and each separate contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 OWNER'S RIGHT TO CLEAN UP

If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Owner or Architect will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 GENERAL

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner and Contractor; a Construction Change Directive is issued by the Owner and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work.

§ 7.2 CHANGE ORDERS

§ 7.2.1 A Change Order is a written instrument prepared by the Contractor and signed by the Owner and Contractor after execution of the Agreement stating their agreement upon all of the following:

- .1 The change in the Work;
- .2 The amount of the adjustment, if any, in the Contract Sum; and
- .3 The extent of the adjustment, if any, in the Contract Time.

§ 7.2.2 The compensation specified in a Change Order shall constitute an accord and satisfaction and full payment for the Work covered thereby and a complete release of and for all delay, impact and disruption costs or expenses occasioned by reason of said change in the Work.

§ 7.2.3 No time extension shall be granted Contractor by reason of the issuance of any Change Order unless expressly stated therein.

§ 7.2.4 Notwithstanding the generality of the foregoing, under no circumstances will the Contract Sum be adjusted on account or as a result of any occurrence or transaction arising out of or from the negligence or willful act or failure to act on the part of the Contractor.

§ 7.3 CONSTRUCTION CHANGE DIRECTIVES

§ 7.3.1 A Construction Change Directive is a written order prepared by the Owner or Architect and signed by the Owner or Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner or Architect may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly. Contractor shall immediately proceed with the change even if Contractor disagrees with the proposed adjustment, if any, to the Contract Sum or Contract Time so as to not delay completion of the Work. Any disagreement shall be resolved as set forth in 7.3.7 – 7.3.10 below.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 As provided in Section 7.3.7.

§ 7.3.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that

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application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 7.3.5 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with and complete the change in the Work involved. While proceeding with the change, Contractor shall also, within ten (10) days of receipt of the Construction Change Directive, advise the Owner of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum and/or Contract Time. If Contractor does not promptly proceed with the change in the Work, Contractor shall have waived and released any claim for any adjustment in the Contract Sum and/or Contract Time on account of the change and shall be liable to Owner for all direct and consequential damages incurred by Owner as a result of Contractor's delayed performance.

§ 7.3.6 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.7 If the Contractor does not respond within ten (10) days or disagrees with the method for adjustment in the Contract Sum, the Owner or Architect shall determine the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Owner may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

- .1 Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;
- .2 Costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;
- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and
- .5 Additional costs of supervision and field office personnel directly attributable to the change.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Owner or Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Owner will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Owner determines to be reasonably justified. The Owner's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Contractor will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 MINOR CHANGES IN THE WORK

The Architect and Owner have authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be effected by written order signed by the Architect and Owner and shall be binding on the Contractor.

ARTICLE 8 TIME

§ 8.1 DEFINITIONS

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including adjustments authorized in writing by the Owner, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date of the final unconditional Certificate of Occupancy in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 PROGRESS AND COMPLETION

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work and that the Contractor is capable of properly completing the Work within the Contract Time.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 DELAYS AND EXTENSIONS OF TIME

§ 8.3.1 If the critical path of the Project is delayed at any time in the commencement or progress of the Work by an act of the Owner or Architect, or of an employee of either, or of a separate contractor employed by the Owner; or by changes ordered in the Work; or by labor disputes, fire outside of the Contractor's control, unusual delay in deliveries due solely to the acts of the carrier providing delivery, unavoidable casualties or other causes beyond the Contractor's control; or by delay authorized by the Owner pending mediation or by other causes that the Architect determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect or Owner may determine. Any change shall be an extension of the Contract Time only and the Contractor shall not seek or recover any damage for delay provided for in this Paragraph 8.3.1. The Contractor shall use best efforts to mitigate the effects of any such delay.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 CONTRACT SUM

The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.2 SCHEDULE OF VALUES AND INITIAL SWORN STATEMENT

§ 9.2.1 The Contractor shall submit to the Owner, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the Owner may require. This schedule, unless objected to by the Owner, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 9.2.2 Within thirty (30) days following commencement of the Work, the Contractor shall deliver to the Owner a Contractor's sworn statement, duly executed and acknowledge and in form satisfactory to the Owner, listing all Subcontracts.

§ 9.3 APPLICATIONS FOR PAYMENT

§ 9.3.1 No later than the date established for each progress payment, the Contractor shall submit to the Owner three copies of AIA Document G702, Application and Certificate for Payment and AIA Document G703, Continuation Sheet, itemized in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. Such application shall be notarized and supported by such data substantiating the Contractor's right to payment as the Owner may require, such as copies of requisitions from Subcontractors and material suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or material supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which payments have been received from the Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work. The Contractor shall satisfy or discharge and shall indemnify, defend and hold Owner harmless from any liens, claims, security interest or encumbrances filed by the Contractor, subcontractors, or anyone claiming by, through or under any of them, and will pay on demand any costs or attorneys' fees incurred by Owner if Contractor fails to satisfy, discharge or defend such liens, claims, security interest or encumbrance.

§ 9.3.4 Each Application for Payment shall be accompanied by the following, all in the form satisfactory to the Owner:

.1 duly executed waivers of construction mechanics' and materialmen's liens establishing payment or satisfaction of all such obligations to Subcontractors, required lower tier Subcontractors and Materialmen for the preceding pay period; and

.2 Contractor's affidavit of payment and waiver of lien for Work done and materials furnished through the date covered by the last preceding partial payment and shall furnish its affidavit certifying that all Subcontractors and Materialmen have been paid for Work performed and materials furnished through such date except for any permitted retainage. Contractor shall attach to each Application or Requisition affidavits of payment and waivers of lien from all Subcontractors, providing labor and/or materials and/or equipment in connection with the Work, and Sub-subcontractors and materialmen who have given notice to Owner for such Work performed and materials furnished. Contractor shall execute a waiver of lien at the time payment is made for a Requisition for all Work performed through the date of Requisition in respect of which payment is being made, as a condition of such payment.

§ 9.4 CERTIFICATES FOR PAYMENT

§ 9.4.1 The Owner will, within twenty days after receipt of a fully complete Contractor's Application for Payment and the documents required in Section 9.3.4 above, either pay such amount as the Owner determines is properly due, or notify the Contractor in writing of the reasons for withholding payment in whole or in part as provided in Section 9.5.1.

§ 9.4.2 Intentionally Omitted.

§ 9.5 DECISIONS TO WITHHOLD PAYMENT

§ 9.5.1 The Owner may withhold payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Owner's opinion the Work has not progressed to the point indicated in the Application for Payment or because of

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment, and/or to provide the duly executed waivers of construction mechanics' and materialmen's liens from Contractor, Subcontractors, required lower tier Subcontractors and Materialmen;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or a separate contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- .7 failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When the above reasons for withholding payment are removed, payment will be made for amounts previously withheld. The Owner shall not be deemed in default by reason of withholding payment while any of the above grounds remain uncured.

§ 9.5.3 If the Owner withholds payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered.

§ 9.6 PROGRESS PAYMENTS

§ 9.6.1 The Owner shall make payment in the manner and within the time provided in the Contract Documents.

§ 9.6.2 The Contractor shall pay each Subcontractor no later than seven days after receipt of payment from the Owner the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Owner may, on request by any Subcontractor and at the Owner's discretion, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor, except as may otherwise be required by law.

§ 9.6.5 Contractor payments to material and equipment suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

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§ 9.6.8 Because flexibility in funding a project is beneficial to the completion of a successful project, Contractor agrees, and will cause its subcontractor's and materialmen to agree, to subordinate its and their construction, mechanic's and/or materialmen's lien to the mortgage lien of any third-party institutional lender on the Project.

§ 9.7 FAILURE OF PAYMENT

If the Owner does not pay the Contractor within seven days after the date established in the Contract Documents the amount determined by the Owner, then the Contractor may, upon seven additional days' written notice to the Owner stop the Work until payment of the amount owing has been received.

§ 9.8 SUBSTANTIAL COMPLETION

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use. The date of Substantial Completion for this Project is and shall be the date of receipt of the final Unconditional Certificate of Occupancy. Owner and Contractor acknowledge that time is of the essence in completing the Project on time so that Owner can schedule the training and start date of its employees, schedule advertisements, deliver furniture and fixtures and so Owner's retail business can operate. They also acknowledge that Owner's damages from any failure to achieve Substantial Completion within the Contract Time will cause substantial damage to Owner and that the amount of that damage cannot be determined at this time. Owner and Contractor therefore agree to liquidate that damage as \$5,000 for each day beyond the Contract Time that the Project is not completed and Contractor agrees to pay Owner that amount for each such day.

§ 9.8.2 When the Owner considers that the Work, or a portion thereof which the Owner agrees to accept separately, is sufficiently complete to perform Punchlist Work, the Owner shall prepare and submit to the Contractor a comprehensive list of items to be completed or corrected (the "Punchlist"). Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. The Contractor shall complete all Punchlist work no later than fourteen (14) days after receipt of the Punchlist from the Owner. Contractor acknowledges that the Owner will suffer substantial harm after the Owner occupies the building and puts it to its intended use if the Punchlist work is not promptly performed. As such, the Contractor agrees to pay as liquidated damages, and not as a penalty, to the Owner \$350 per day for each day after the 14th day from receipt of that Punchlist that the Punchlist work is not complete. When the Punchlist work is completed, Contractor's Project Manager and Superintendent shall initial each item on the Punchlist indicating that each item has been performed.

§ 9.8.3 Upon receipt of the initialed Punchlist, the Owner will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Owner's inspection discloses any item, whether or not included on the Punchlist, which is not sufficiently complete in accordance with the Contract Documents the Contractor shall complete or correct such item upon notification by the Owner. In such case, the Contractor shall then submit a request for another inspection by the Owner to determine completion. The Contractor shall pay the Owner a reinspection fee ("Reinspection Fee") in the amount of \$400 for each reinspection required before the Work is complete and shall pay the travel costs for the Owner's representative to travel from their home office to the Project site for any reinspections.

§ 9.8.4 When the Work or designated portion thereof is complete, the Owner shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work.

§ 9.8.5 Upon Substantial Completion of the Work or designated portion thereof and upon application by the Contractor the Owner shall make payment of retainage applying to such Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 PARTIAL OCCUPANCY OR USE

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments,

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retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Owner as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner and Contractor shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 FINAL COMPLETION AND FINAL PAYMENT

§ 9.10.1 Upon receipt of the Contractor's written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Owner will promptly make such inspection and, when the Owner finds the Work acceptable under the Contract Documents and the Contract is fully performed, the Owner will within thirty (30) days issue final payment.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Owner in form and substance satisfactory to the Owner (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment; (5) final As-built drawings marked by the Contractor with record information as set forth in the Contract Documents; (6) warranty, maintenance and equipment operation documents; (7) a final Contractor's sworn statement from the Contractor duly executed and acknowledged showing all Subcontractors to be fully paid, and similar final sworn statements from Subcontractors and, where appropriate, from sub-subcontractors; and (8) other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor or sub-subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made and is not bonded over as provided in the previous sentence, the Contractor shall promptly pay to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, and if the Contractor has provided all documents and materials required in the Contract Documents but final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, the Owner shall, upon application by the Contractor, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted provided, however, that the retainage held following such payment shall be in an amount equal to two hundred percent (200%) of the cost of finally completing the Work, including without limitation the items included on the Punchlist. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Owner prior to such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- .1 liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents; or
- .3 terms of warranties required by the Contract Documents.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 SAFETY PRECAUTIONS AND PROGRAMS

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 10.2 SAFETY OF PERSONS AND PROPERTY

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

§ 10.2.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

§ 10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition. The Contractor shall review the structural capability of the structure prior to allowing installation of temporary lifting devices or staging equipment or the temporary off-loading and storage of materials, and shall not exceed design loads without making modifications to building structure to support such loads. All modifications to building structure to support temporary loading shall be submitted to the Architect for review. Costs associated with the Architect's review or redesign of structure to accept temporary construction loading shall be borne by the Contractor.

(Paragraphs deleted)

§ 10.2.8 The Contractor shall replace and make good any loss or injury to the Owner's property or the Owner's tenants' property, the site or adjacent property resulting from the Contractor's negligent acts or omissions.

§ 10.2.9 INJURY OR DAMAGE TO PERSON OR PROPERTY

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 HAZARDOUS MATERIALS

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Architect in writing.

§ 10.3.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up.

§ 10.3.3 The Contractor shall take all necessary precautions for the safety of the Owner, its representatives and all persons in use or occupancy of the building as well as their licensees.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred.

§ 10.3.7 The Contractor shall take all precautionary measures as required by all government authorities having jurisdiction over the Work as well as the Owner to prevent and correct fire causing conditions, and shall conduct all operations with due regard for the avoidance of fire hazards. The Contractor shall comply strictly with and enforce among all workmen on the job all fire and safety regulations of the Owner, including smoking regulations, as the same, from time to time, may be promulgated. Violation of any such regulations shall be cause for dismissal of the offender(s) from the Work. Nothing contained herein shall be construed to make the Owner responsible for the conduct of the Work by the Contractor.

§ 10.4 EMERGENCIES

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS
§ 11.1 CONTRACTOR'S LIABILITY INSURANCE

§ 11.1.1 The Contractor shall purchase from and maintain in a company or companies acceptable to the Owner and lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor, Owner and such other persons as the Owner may designate from time to time from claims set forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or sub-subcontractors or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- .1 Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed;
- .2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- .3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- .4 Claims for damages insured by usual personal injury liability coverage;
- .5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- .6 Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;
- .7 Claims for bodily injury or property damage arising out of completed operations; and
- .8 Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

§ 11.1.2 The insurance required by Subparagraph 11.1.1 shall include Personal Injury Liability, Broad Form Property Damage Liability endorsement, Explosion, Collapse and Underground Damage Liability endorsement, and contractual Liability (applicable to the Contractor's obligations under Paragraph 3.18) insurance, and shall be written on an occurrence basis for not less than the following limits of liability, or any limits required by law, whichever is greater:

.1 Workmen's compensation insurance shall be written for not less than the statutory limits and shall include Employer's Liability Insurance at a limit of not less than One Million Dollars (\$1,000,000);

.2 Comprehensive General Liability insurance indemnifying and holding harmless the Owner, and the Architect as additional insured, including contractual liability coverage, shall be written for not less than Three Million Dollars (\$3,000,000); Bodily injury and personal injury shall be insured at a limit of not less than Two Million Dollars (\$2,000,000) for each occurrence and Two Million Dollars (\$2,000,000) total aggregate liability; Motor Vehicle Liability Coverage, with coverage limits not less than One Million Dollars (\$1,000,000);

.3 Property damage shall be insured at a limit of not less than One Million Dollars (\$1,000,000) total aggregate liability; and

§ 11.1.3 Prior to the commencement of the Work, Contractor shall file with the Owner valid certificates of Insurance and amendatory riders or endorsements to Contractor's insurance policies, all in form and substance satisfactory to the Owner, naming Owner and any subsidiary, parent or affiliate corporations of Owner and their directors, officers, agents and employees or other persons or entities with an insurable interest designated by Owner as additional insured thereunder. Said endorsements or amendatory riders shall indicate that as respects said additional insured, there shall be severability of interests under said insurance policies for all coverage's provided under said insurance policies. The certificates and amendatory riders or endorsements shall clearly indicate the specific coverage (including the contractual liability for the Contractor's obligations under Paragraph 3.18) and shall contain a provision requiring the giving of written notice to Owner until at least thirty (30) days prior to the cancellation, non-renewal or material modification of any such policies, as evidenced by return receipt of United States Certified or Registered Mail.

§ 11.1.4 The Contractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Owner, the Architect and the Architect's consultants as additional insureds for claims caused in whole or in part

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by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations.

§ 11.1.5 If requested by the Owner after the date of the Agreement, the Contractor shall promptly procure, at the Owner's expense, liability insurance in such amounts as the Owner may request insuring against perils not listed in Subparagraph 11.1.1.

§ 11.1.6 If the Contractor fails to purchase or maintain or require to be purchased and maintained the liability insurance specified in Subparagraph 11.1.1, the Owner may (but shall not be obligated to) purchase such insurance on the Contractor's behalf and shall be entitled to be repaid for any premiums paid therefor by the Contractor in the manner set forth in Paragraph 2.4.

§ 11.1.7 When such insurance, due to the attainment of a normal expiration date or renewal date, shall expire, the Contractor shall, not less than thirty (30) days prior to such expiration or renewal date, supply the Owner with updated replacement certificates of insurance and amendatory riders or endorsements that clearly evidence the continuation of all coverage in the same manner, limits of protection, and scope of coverage, as was provided by the certificates and amendatory riders or endorsements originally supplied.

§ 11.2 OWNER'S LIABILITY INSURANCE

The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance.

§ 11.3 CONTRACTOR-SUPPLIED PROPERTY INSURANCE

§ 11.3.1 **Builder's Risk Insurance.** If required by the Contract, the Contractor shall purchase and maintain Builder's Risk insurance, in a form and with coverages acceptable to the Owner. Coverage shall be on an all-risk or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including theft, vandalism, malicious mischief, collapse, testing and startup, temporary buildings, and debris removal including demolition occasioned by the enforcement of law. Coverage shall be or 100% of the estimated completed replacement cost value of the Project (including all leasehold improvements, materials, and work to be incorporated into the Project). Such policy shall be written on a completed value form (100% non-reporting) without any coinsurance. In addition, the Builder's Risk policy shall:

a. Include coverage, in addition to the 100% completed replacement cost coverage, for at least 25% of the Project soft costs. Such soft costs coverage shall include without limitation advertising, design fees, professional fees, financing, lease administration, realty taxes, general administration, lease expenses, permit fees, insurance premiums, and including architects services and expenses as required as a result of a loss (including but not limited to interest expense; fees; and plans, specifications, blueprints and models, in connection with any restoration following an insured loss).

b. Include 100% coverage for flood unless the Project is located in a Flood Zone "A", as defined by the National Insurance Flood Plan. If the Project is located in a Flood Zone "A", Borrower shall maintain flood limits providing for the first 20% of the completed replacement cost, with a deductible not greater than 3% of completed replacement costs.

c. Include windstorm coverage with a deductible no greater than 5% of the estimated completed replacement cost value of the Project.

d. Include earthquake coverage with a sub-limit of no less than the first 25% of the completed replacement cost of the Project, unless the Project is located in Earthquake Mercalli Zone VII or greater. If the Project is located in an Earthquake Mercalli Zone VII or greater, Contractor shall maintain earthquake limits providing for the first 75% of the completed replacement cost, with a deductible not greater than 5% of completed replacement costs.

e. Include business income delay in completion coverage for a period of at least 6 months on an actual loss sustained basis, for benefit of Owner.

f. Include coverage for off-site storage of portions of the Work, portions of the Work in transit, and testing coverage for at least 90 days. Such coverage shall be for 100% of the replacement value of the completed property.

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g. Not include in its limits, unless by separate limits, any tools, apparatus, machinery, scaffolding, hoists, forms, staging, shoring and other similar items commonly referred to as construction equipment which may be on the Project site and the capital value of which is not included in the Work. Contractor shall make its own arrangements for any insurance it may require on any construction equipment, and all such policies shall include a waiver of subrogation provision in favor of Owner.

h. Not include an exclusion for sidewalks, retaining walls, or underground property, nor an exclusion for interior water damage of any type.

i. Not contain a "permission to occupy" limitation.

j. Other than as specified above, have a deductible no greater than 1% of the estimated completed replacement cost value of the Project.

k. If limits are to be met via a policy that covers other projects (for example, a blanket limit policy), then that policy shall be endorsed to provide segregated limits for each of the limits and coverages required herein.

§ 11.3.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss.

§ 11.3.1.2 If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance that will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor in writing, then the Owner shall bear all reasonable costs properly attributable thereto.

§ 11.3.1.3 If the property insurance requires minimum deductibles, the Contractor shall pay costs not covered because of such deductibles. If the Owner or insurer increases the required minimum deductibles above the amounts so identified or if the Owner elects to purchase this insurance with voluntary deductible amounts, the Owner shall be responsible for payment of the additional costs not covered because of such increased or voluntary deductibles. If deductibles are not identified in the Contract documents, the Owner shall pay costs not covered because of deductibles.

§ 11.3.1.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

(Paragraph deleted)

§ 11.3.2 EQUIPMENT BREAKDOWN/BOILER AND MACHINERY INSURANCE

If required by the Contract, the Contractor shall also maintain boiler and machinery insurance, which shall specifically cover loss or damage to any equipment to be installed or that is installed in the Project that is not otherwise covered by the Builders' Risk policy until final acceptance by the Owner. Such coverage shall specifically include hot and cold testing and start up coverage. This insurance shall include interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

§ 11.3.3 All of the policies set forth in this section 11.3 shall be obtained from companies authorized to do business in the jurisdiction in which the Project is located, and shall be procured from companies with at least an "A-" financial strength rating and "VIII" financial size category from A.M. Best.

§ 11.3.4 If the Owner requests in writing that insurance for special hazards that are not encompassed by this Section 11.3, the Contractor shall, if possible, include such insurance, and the cost thereof shall be charged to the Owner by appropriate Change Order.

§ 11.3.5 All policies required by this Section 11.3 shall contain waivers of subrogation by endorsement or otherwise in favor of the Owner.

§ 11.3.6 Prior to commencing the Work, Contractor shall 1) provide Owner with copies of each policy required by this Section 11.3; 2) cause an Accord 27 Evidence of Property Insurance form to be issued by each insurer and provided to Owner, naming Owner as Loss Payee and Additional Interest on the policies required by this section, and requiring that Owner receive 30 days prior written notice of cancellation of non-renewal of any such policy; and 3) shall cause each policy to be endorsed with Owner as both an additional insured and as loss payee (as Owner's interests appear). All insurance shall insure interests of Owner, Contractor, and Subcontractors of all tiers in the Work.

§ 11.3.7 WAIVERS OF SUBROGATION

The Owner and Contractor waive all rights against (1) each other, any of their wholly owned subsidiaries and agents, their members, principals, officers and employees, and any subcontractors of any tier, agents and employees, each of the other and their wholly owned subsidiaries and agents, and (2) the Architect, Architect's consultants, separate contractors described in the Agreement, if any, and any of their subcontractors of any tier, agents and employees, (3) Landlord and its agents, members, officers and employees, and (4) Lender and its subsidiaries, agents, participants, officers and employees for any loss or damages to the extent of actual recovery of any insurance obtained pursuant to this Section 11.3 or other applicable insurance, except such rights as they may have to proceeds of such insurance held by the Owner or Contractor. The Contractor shall require similar written waivers in favor of the Owner and Contractor from all Subcontractors of any tiers and their agents and employees, the Architect, Architect's consultants, and separate contractors, if any. The foregoing waivers of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, even though that person or entity did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

(Paragraph deleted)

§ 11.3.8. The Contractor shall promptly investigate and make a full written report to the Owner and any insurance carriers as to all alleged accidents and/or claims for damages relating to construction of the Project or relating to any other property of the Owner, including any damage or destruction to the Project or such other property and the estimated cost of repair and shall perform all necessary recordkeeping related to same. The Contractor shall do nothing to jeopardize the rights of the Owner and/or any other party insured under said policies. The Contractor shall notify Owner and any insurance carriers of any loss, and shall cooperate fully with any insurance carrier in connection with any such claim. A loss under any policy in this section 11.3 shall be diligently adjusted by the Contractor, at the Contractor's sole expense, in good faith on behalf of both Owner and Contractor, with loss made payable to either or both the Owner and Contractor as their interest may appear, subject, however, to requirements of any applicable mortgagee clause as may be required. The Contractor shall not settle any losses or portions of losses, complete loss reports, or endorse loss drafts without the prior written consent of the Owner. The Owner may at any time assume from the Contractor any or all rights and duties of adjustment and settlement, to the extent desired by the Owner at Owner's sole discretion, upon written notice to the Contractor.

§ 11.3.9 The Owner may, in its sole discretion, elect to receive all or any portion of any insurance payments, and will deposit in a separate account proceeds to received, which the Owner shall distribute in a good faith manner. In the event the Owner makes such election, the Contractor and Subcontractors of all tiers will, as necessary, instruct any insurer to make all payment directly to the Owner. If after such any loss no other special agreement is made, regarding loss payment that would cause sums to be paid to the Contractor (including Subcontractors of all tiers), then to that extent replacement of damaged property shall be covered by appropriate Change Order. Should any parties in interest (a term which does not include any insurer) object in writing, within 10 days of notice, to the manner of adjustment and/or settlement of any loss, resolution shall proceed as provided in Paragraph 15.3. The parties in interest shall, in that case, adjust and make settlement with insurers in accordance with the direction of tribunal. The Contractor shall pay Subcontractors their just share of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their sub-subcontractors in similar manner.

§ 11.3.10 Coverage under the policies required by this Section 11.3 shall be maintained for the full term of the Project until the acceptance of the completed Project by the Owner.

§ 11.4 PERFORMANCE BOND AND PAYMENT BOND

§ 11.4.1 The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract.

§ 11.4.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

§ 11.5 FAILURE TO PURCHASE OR MAINTAIN INSURANCE

If the Owner or the Contractor is damaged by failure of the other to purchase or maintain insurance required under Article 11 and so notifies the damaged party, then the party who failed to purchase or maintain the insurance shall bear all reasonable costs properly attributable thereto.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 UNCOVERING OF WORK

§ 12.1.1 If a portion of the Work is covered contrary to the Owner's or Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Owner or Architect, be uncovered for the Owner's or Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Owner or Architect has not specifically requested to examine prior to its being covered, the Owner or Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

§ 12.2 CORRECTION OF WORK

§ 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION

The Contractor shall promptly correct Work rejected by the Owner or Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Owner's or Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 AFTER SUBSTANTIAL COMPLETION

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall, at the Contractor's sole expense, correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition and of the Substantial Completion of the Work. The Owner shall give such notice promptly after discovery of the condition. The notice may be sent by the Owner, the Tenant in possession of the Project, or a successor owner of the Project. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.4.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.2.6 Eleven (11) months after the date of Substantial Completion of the Work or designated portion thereof, or after the date for commencement of warranties established under Subparagraph 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, or after any extended period as set forth in Subparagraph 12.2.2, and before any warranty or correction period can expire, Contractor shall notify Owner that the warranty is about to expire and Contractor and Owner shall attend an on-site meeting and perform a thorough walk-through of the Project. The purpose of the walk-through is to identify any Work that is not in accordance with the requirements of the Contract Documents or any issues relating to any warranty, regardless of whether any such Work was identified on any prior punch list or Notification of Warranty Work/Request for Correction of the Work. Contractor shall promptly correct all such Work identified by the Owner. Contractor's correction or warranty period and obligations shall be extended for any additional time period until this walk-through is performed and until Contractor completely performs those corrections.

§ 12.3 ACCEPTANCE OF NONCONFORMING WORK

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 GOVERNING LAW

The Contract shall be governed by the law of the place where the Project is located. The Work shall comply with all applicable laws, statutes, ordinances, codes, rules, regulations or orders during its performance and at its completion.

§ 13.2 SUCCESSORS AND ASSIGNS

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to covenants, agreements and obligations contained in the Contract Documents. The Contractor shall not assign the Contract as a whole or in part without written consent of the Owner. If the Contractor attempts to make such an assignment without such consent, the Contractor shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignment.

§ 13.3 WRITTEN NOTICE

Except as provided elsewhere in this Agreement, written notice shall be deemed to have been duly served if delivered in person to the individual, to a member of the firm or entity, or to an officer of the corporation for which it was intended; or if delivered at, or sent by registered or certified mail or by courier service providing proof of delivery to, the last business address known to the party giving notice.

§ 13.4 RIGHTS AND REMEDIES

§ 13.4.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available at law or in equity.

§ 13.4.2 No action or failure to act by the Owner, Architect or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach there under, except as may be specifically agreed in writing.

§ 13.4.3 No provision contained in the Contract Documents shall create or give to third parties any claim or right of action against the Owner or the Contractor except as specifically provided herein.

§ 13.5 TESTS AND INSPECTIONS

§ 13.5.1 If the Contract Documents, or any laws, statutes, ordinances, building codes, rules, regulations or orders of any governmental body or public or quasi-public authority having jurisdiction over the Work or the site of the Project require any portion of the Work to be inspected, tested or approved, the Contractor shall give the Architect and Owner timely notice thereof so the Architect and Owner may observe such inspection, testing or approval. The Owner shall bear all costs of such inspections, tests or approvals except where the Contract Documents provide otherwise. Contractor shall secure any required certificates of inspection, testing or approval and promptly deliver them to the Architect and the Owner as provided in Article 8.7 of the Agreement.

§ 13.5.2 If the Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the Owner will perform or instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Owner and Architect of when and where tests and inspections are to be made so that the Owner and Architect may be present for such procedures. Such costs, except as provided in Section 13.5.3, shall be at the Owner's expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Owner's and Architect's services and expenses shall be at the Contractor's expense.

§ 13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Owner and Architect.

§ 13.5.5 If the Owner or Architect is to observe tests, inspections or approvals required by the Contract Documents, the Owner or Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.5.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.5.7 No inspection or examination shall relieve the Contractor of the obligation to perform the Work in accordance with the Agreement. No payment, either partial or full, by the Owner to Contractor shall relieve Contractor of responsibility for complying with the Agreement. The Contractor shall remedy all defects and pay the cost of any damage to other work resulting therefrom.

§ 13.6 INTEREST

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at such rate as the parties may agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

§ 13.7 TIME LIMITS ON CLAIMS

No action or proceeding shall lie or shall be maintained by the Contractor against the Owner or Architect unless such action or proceeding shall be commenced within six (6) months after the date payment is mailed or otherwise made in respect of the Final Application for Payment or, if this Contract is terminated by the Owner, unless such action or proceeding is commenced within six (6) months of the date of such termination.

§ 13.8 CLOSEOUT OF PROJECT

The Contractor shall provide all warranty documents, operation and maintenance manuals and as-built drawings to Owner within thirty (30) days after Substantial Completion. The Owner and Contractor acknowledge that damages will be suffered by the Owner in its operation of the completed building without the benefit of this documentation is difficult to quantify and therefore agree that the Contractor will be assessed liquidated damages, not as a penalty, in the amount of \$250 per day for each day following the date of Substantial Completion that the Owner has not been provided with all warranty documents, maintenance and operation manuals and as-built drawings.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 TERMINATION BY THE CONTRACTOR

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

- .1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- .2 An act of government, such as a declaration of national emergency that requires all Work to be stopped;
- .3 because the Owner has not made payment on an Application for Payment within the time stated in the Contract Documents; or
- .4 The Owner has failed to furnish to the Contractor promptly, upon the Contractor's request, reasonable evidence as required by Section 2.2.1.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, repeated suspensions, delays or interruptions of the entire Work by the Owner as described in Section 14.3 constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' written notice to the Owner, terminate the Contract and recover from the Owner payment for Work executed.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' written notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 TERMINATION BY THE OWNER FOR CAUSE

§ 14.2.1

(Paragraphs deleted)

If the Contractor shall institute proceedings or consent to proceedings requesting relief or arrangement under the Federal Bankruptcy Act or any similar or applicable federal or state law, or if a petition under any federal or state bankruptcy or insolvency law is filed against the Contractor and such petition is not dismissed within sixty (60) days from the date of said filing, or if the Contractor admits in writing his inability to pay his debts generally as they become due, or if he makes a general assignment for the benefit of his creditors, or if a receiver, liquidator, trustee or assignee is appointed on account of his bankruptcy or insolvency; or if a receiver of all or any substantial portion of the Contractor's properties is appointed; or if the Contractor abandons the Work; or if he fails, except in cases for which extension of time is provided, to prosecute promptly and diligently the Work or to supply enough properly skilled workmen or proper materials for the Work; or if he submits an Application for Payment, sworn statement, waiver of lien, affidavit or document of any nature whatsoever which is intentionally falsified; or if he fails to make prompt payment to Subcontractors or Suppliers for materials or labor or otherwise breaches his obligations under any subcontract with a Subcontractor; or if a mechanic's or materialman's lien or notice of lien is filed against any part of the Work or the site of the Project and not promptly bonded or insured over by the Contractor in a manner satisfactory to the Owner; or if the Contractor disregards any laws, statutes, ordinances, rules, regulations or orders of any

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governmental body or public or quasi-public authority having jurisdiction of the Work or the site of the Project; or if he otherwise violates any provision of the Contract Documents; then the Owner, without prejudice to any right or remedy available to the Owner under the Contract Documents or at law or in equity, may, after giving the Contractor and the surety under the Performance Bond and under the Labor and Material Payment Bond described in Paragraph 11.4, seven (7) days' written notice, terminate the employment of the Contractor. If requested by the Owner, the Contractor shall remove any part or all of his equipment, machinery and supplies from the site of the Project within seven (7) days from the date of such request, and in the event of the Contractor's failure to do so, the Owner shall have the right to remove or store such equipment, machinery and supplies at the Contractor's expense. In case of such termination, the Contractor shall not be entitled to receive any further payment for Work performed by the Contractor through the date of termination. The Owner's right to terminate the Agreement pursuant to this Subparagraph 14.2.1 shall be in addition to and not in limitation of any rights or remedies existing hereunder or pursuant hereto or at law or in equity.

§ 14.2.2 When any of the above reasons exist, the Owner may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 Accept assignment of subcontracts pursuant to Section 5.4; and
- .3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds all costs to the Owner of completing the Work, then the Contractor shall be paid for all Work performed by the Contractor to the date of termination. If such costs to the Owner of completing the Work exceed such unpaid balance, the Contractor shall pay the difference to the Owner immediately upon the Owner's demand. The costs to the Owner of completing the Work shall include (but not be limited to) the cost of any additional architectural, managerial and administrative services required thereby, any costs incurred in retaining another contractor or other subcontractors, any additional interest or fees which the Owner must pay by reason of a delay in completion of the Work, attorney's fees and expenses, and any other damages, costs and expenses the Owner may incur by reason of completing the Work or any delay thereof. The amount, if any, to be paid to the Contractor shall survive the termination of the Contract.

§ 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption as described in Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

- .1 that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or
- .2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

§ 14.4.1 The Owner may, at any time, upon seven (7) days' written notice to the Contractor, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall

- .1 cease operations as directed by the Owner in the notice;
 - .2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work;
- and

- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed to the date of termination. The Owner shall, upon the Contractor executing such confirmatory assignments as the Owner shall request, accept and assume all of the Contractor's obligations under all Subcontracts executed in accordance with the terms of the Contract Documents that may accrue after the date of such termination and which the Contractor has incurred in good faith in connection with the Work. Adjustments made in the cost of performance may have a mutually agreed fixed or percentage fee.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 CLAIMS

§ 15.1.1 DEFINITION

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim.

§ 15.1.2 NOTICE OF CLAIMS

Claims by either the Owner or Contractor must be initiated by written notice to the other party with a copy sent to the Architect. Claims by either party must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3 CONTINUING CONTRACT PERFORMANCE

Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

§ 15.1.4 CLAIMS FOR ADDITIONAL COST

If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.5 CLAIMS FOR ADDITIONAL TIME

§ 15.1.5.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given within seven (7) days after the Contractor becomes aware of the condition causing or threatening to cause delay. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

§ 15.1.5.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction and shall be submitted to the Owner upon Substantial Completion of the Work.

§ 15.1.5.3 Should the Contractor be or anticipate being delayed or disrupted in performing the Work hereunder for any reason including, without limitations, its financial condition or Contractor's general nonpayment of its debts as such debts become due, it shall promptly, and in no event more than seven days after Contractor becomes aware of the commencement of any condition which is causing or is threatening to cause such delay or disruption, notify the Owner in writing of the condition and of the effect of such condition upon the progress schedule, stating why and in what respect the condition is causing or is threatening to cause delay, provided, however, that notwithstanding the above, if such delay or disruption, or anticipated change in the Contractor's financial condition, the Contractor shall notify the Owner forthwith of such cause or anticipated cause. Failure to comply strictly with this notice requirement shall be sufficient cause to deny the Contractor a change in schedule and to require it to conform to the progress schedule then in effect.

§ 15.1.6

(Paragraphs deleted)

INTENTIONALLY OMITTED.

§ 15.2 INTENTIONALLY OMITTED

(Paragraphs deleted)

§ 15.3 MEDIATION

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract except those waived as provided for in Sections 9.10.4 and 9.10.5 shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of litigation but, in such event, mediation shall proceed in advance of litigation, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order.

§ 15.3.3 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.4 MECHANICS LIEN AND CLAIMS

If any mechanic's lien or other claim shall be filed for or on account of the Work or if any Restraining Notices related to Contractor's performance of Work or Judgments shall be filed against such Contractor, then Contractor shall within fourteen (14) days after notification thereof, discharge or bond off such lien or claim or otherwise make provision satisfactory to Owner for its satisfaction. Any failure to comply with the terms of this provision shall constitute a material breach of this Agreement. If Owner discharges or bonds off any mechanic's lien after Contractor's failure to do so, all costs, including reasonable attorneys' fees related to said discharge, shall be chargeable to Contractor.

(Paragraphs deleted)

ARTICLE 16 ADDITIONAL PROVISIONS

§ 16.1 PAYMENT OF EMPLOYEES

The Contractor and each Subcontractor and Sub-subcontractor shall pay all employees engaged in the Work in full, less legally required deductions, in accordance with the applicable labor laws and all other applicable governmental regulations.

16.2 WAIVER OF REMEDIES

16.2.1 The Contractor acknowledges that he can be compensated adequately by money damages for any breach of the Contract which may be committed by the Owner. The Contractor agrees that no default, act or omission of the Owner shall constitute a material breach of the Contract entitling the Contractor to cancel or rescind the same or to suspend or abandon performance thereof, or entitle Contractor to an injunction or restraining order, except as otherwise provided in the Contract Documents; and the Contractor hereby waives any and all rights and remedies to which the Contractor might otherwise be or become entitled because of any wrongful act or omission of the Owner or Architect saving only the Contractor's right to money damages or statutory lien rights.

16.3 PROVISIONS REQUIRED BY LAW DEEMED INSERTED

Each and every provision of law and government regulation required by law to be inserted in the Contract Documents shall be deemed to be inserted therein and this Contract shall read and shall be enforced as though so included therein and if through mistake or otherwise any such provision is not inserted, or is not correctly inserted, then upon the application of either party this Contract shall be deemed to be amended to make such insertion or correction.

16.4 JURISDICTION AND VENUE

The Contract Documents and all disputes between the parties shall be governed by the laws of the place where the Project is located per Section 13.3 and the jurisdiction and venue for any action between the parties shall lie solely and exclusively in Federal or State Court in the county in which the Project is located.

16.5 SEVERABILITY

The invalidity or unenforceability of any particular provision in the Contract Documents shall not affect the other provisions in the Contract Documents and the Contract Documents shall be construed in all respects as if such invalid or unenforceable provision was omitted.

16.6 FLORIDA STATUTES, CHAPTER 558 NOTICE OF CLAIM

Owner and Contractor agree to opt out of the requirements of Chapter 558 in favor of the Notice and Cure provision agreed to and set forth in this Agreement.

DIVISION 0 - BIDDING REQUIREMENTS1. REFERENCES AND DEFINITIONS

- (A) Throughout the plans, specifications, addenda, and other Contract Documents, the term "Contractor(s)" shall be taken to mean the General Contractor or his Subcontractors.
- (B) In the plans, specifications, addenda, and other Contract Documents, the abbreviation GC is used. GC shall be taken to mean the General Contractor.
- (C) The term "Owner" or "Owner's Representative" shall be taken to mean the person or persons authorized by the Owner, Rooms To Go, to act in his behalf.
- (D) The words "plans" and "drawings" shall be taken to have the same meaning, unless in context specifically referencing plan view or views.
- (E) Where the word "provide" or "furnish" is used, this shall be taken to mean "supply and install", unless otherwise noted or specified.
- (F) The drawings and specifications are complementary each to the other and what is called for by one shall be as binding as if called for by both. However, the drawings and specifications shall be considered inseparable documents and each Contractor shall consider both instruments in order to perform the work in accordance with their combined intent.
- (G) References to the "Project Manager", "Architect", "A/E" in the specifications or on the drawings shall be taken to mean an authorized professional representative of the Owner.
- (H) In case of discrepancies in the Contract Documents, Contractor shall first consult with the Project Manager and the Owner for clarifications, revisions, or further action as may be required. Any discrepancy which results in any claim for additional time or money must be addressed to the Owner in writing.

2. DRAWINGS AND SPECIFICATIONS

- (A) Each Bidder will be authorized access to the Design Professional Plans Website to download one (1) complete set of Bid Documents including pdfs formats of Drawings and Specifications.
 - (1) It shall be the responsibility of each Bidder to obtain and pay for all further copies of drawings and specifications which he might require to prepare his bid, and in the case of the successful Bidder, to perform the work including Change Bulletins and change orders.
 - (2) The bid set shall be retained for use as construction documents. Revised sheets shall be issued at time of change issuance to the Contractor.

3. EXAMINATION OF CONTRACT DOCUMENTS

- (A) Before submitting proposal, each Bidder should carefully examine all drawings, specifications, addenda (if any), and all other Contract Documents.
- (B) All inquiries regarding the meaning of drawings, specifications, and/or other Contract Documents shall be addressed to:

Attention: Steve Dahms
CASCO Diversified Corporation
12 Sunnen Drive, Suite 100
St. Louis, Missouri 63143
Telephone: 314-960-7956
Email: rtg@theCDcompanies.com

Professional of Record: As indicated on the drawings.

BIDDERS NOTE:

- (1) INQUIRIES SHALL BE LIMITED TO CALLS FROM PRE-QUALIFIED GENERAL CONTRACTORS BIDDING THIS PROJECT. SUBCONTRACTORS SHALL MAKE CONTACTS ONLY THROUGH ONE OF THESE GENERAL CONTRACTORS.
- (2) BIDDERS SHALL NOT RELY ON VERBAL REPLIES. SHOULD CLARIFICATIONS OR REVISIONS BE REQUIRED, THE BIDDING DOCUMENTS WILL BE MODIFIED BY WRITTEN ADDENDUM DISTRIBUTED TO ALL BIDDING GENERAL CONTRACTORS
- (3) NO PRE-APPROVALS WILL BE GIVEN FOR SUBSTITUTE MATERIALS, EQUIPMENT, OR METHODS. REFER TO SEPARATE PARAGRAPH THIS SECTION FOR SUBSTITUTION PROCEDURE.
- (4) BIDDERS ARE HEREBY INSTRUCTED TO QUALIFY THEIR RESPECTIVE BIDS IN WRITING FOR ALL CONDITIONS NOT CLARIFIED BY THE BIDDING DOCUMENTS TO THEIR SATISFACTION. ANY SUCH QUALIFICATIONS MUST BE SUBMITTED IN WRITING WITH THE BID PROPOSAL.

4. SITE INSPECTION

- (A) Each bidder shall visit the project site prior to the preparation of his bid to investigate and determine all conditions on and near the site which could affect the execution of the work. Any Contractor's failure to fully acquaint himself with existing conditions under which the work is to be performed will not be justification for additional compensation.
- (B) The location of the underground utilities, such as sewers, electrical power, water piping, conduits, etc., indicated on the drawings is as exact as can be determined from available information but its accuracy or completeness cannot be guaranteed. Exact location of these utilities shall be verified by the Contractor prior to starting work. Contractor shall exercise special care when excavating at or near the general location of underground utilities for the safety of workers, as well as for protection of the utility services.
- (C) Any connections to or relocation of any existing utility line requiring temporary discontinuation of utilities which are in active use shall be scheduled and coordinated with the utility companies and/or the representatives of the Owner. All premium time required for the installation of any such connections and/or relocations shall be included in Contractor's bid. In no case shall the utilities be left disconnected at the end of a working day or weekend unless authorized by representatives of the utilities and the Owner. Any existing utilities damaged due to the operation of any Contractor shall be repaired to the satisfaction of the Owner and utility company or agency, by the Contractor causing the damage, at no increase in the contract cost.

5. INSURANCE

- (A) The Contractor shall provide and maintain during the life of the contract, insurance with insurers satisfactory to the Project Manager and the Owners. Coverages noted below should be provided. Any Contractor not having these limits should so state in his proposal, otherwise it will be assumed the noted coverages are to be provided.
 - (1) Workmen's Compensation and Employer's Liability - Workmen's Compensation as required by statute and, if such exposures exist, Contractor's liability under the Federal Longshoremen and Harbor Workers Act. Employer's liability shall be for a minimum limit of \$1,000,000. In case any work is sublet, each Contractor shall require any and all of his subcontractors similarly to provide such coverages for all the latter's employees employed in connection with the work, unless such employees are covered by the protection of the Contractor. Provide similar coverage for any class of employees engaged in work at the site who are not protected under the applicable workers' compensation statute.
 - (2) Comprehensive General Liability Insurance indemnifying and holding harmless the Property Owner, Rooms To Go and CASCO, the Project Manager as additional insured, including contractual liability coverage, in an amount not less than \$2,000,000 for personal and bodily injury to all persons in any one occurrence and for damage to property.

- (3) Motor Vehicle Liability Coverage, with coverage limits not less than \$1,000,000.
- (4) Certificates of insurance, satisfactory to Owner and naming Owner as a certificate holder and as an additional insured, shall be delivered to Owner prior to the commencement of work, and said certificates shall contain a provision that coverages afforded under the policies will not be canceled without thirty (30) days prior written notice to Owner. All insurance required to be carried by Contractor pursuant hereto shall be taken out with insurance companies approved by Owner in advance.
- (5) Builder's Risk Insurance – Unless noted otherwise, the Owner shall maintain a policy for the duration of the project upon all structures and upon all materials in or adjacent thereto which are to be made a part of the insured structure to the insurable value thereof less a deductible amount of \$10,000 (Contractor paid) for each occurrence. This coverage will not include Contractor's and subcontractor's equipment and may not necessarily be all inclusive as to Contractor's desired protection.
- (6) Equipment Breakdown Insurance. Contractor shall provide Equipment Breakdown/Boiler and Machinery insurance that covers loss or damage to any equipment to be installed or that is installed in the Project that is not otherwise covered by the Builders' Risk policy.

6. SPECIFIED MANUFACTURERS, SUBSTITUTIONS, AND ALTERNATES

- (A) The following provisions shall govern the bidding of the work. The provisions specified below shall not relieve the Contractor from meeting other requirements set forth elsewhere in the Bidding or Contract Documents.
- (B) When a brand name is not specified:
 - (1) Product used shall meet the specified standard, such as ASTM, etc., if specified, and shall be of the appropriate design, configuration, type, and finish as required to meet the requirements of the intended service.
- (C) When two (2) or more brand names are specified without further qualifying stipulations:
 - (1) In all cases, the first-named brand or manufacturer's equipment has been used for the basic design and to determine the space requirements.
 - (2) Any one of the specified brands or manufacturer's products equivalent to the first-named may be used for the base bid price.
 - (3) Should other than the first-named brand be used in preparation of the bid, the Contractor shall be responsible to determine and assure that the product or equipment being bid will fit and function in the space allocated.
 - (4) In all cases, the product used shall meet the requirements of the intended service, including specified optional accessories, performance, and basic features. Should one of the named manufacturers offer a range of quality for a particular item, the Contractor shall provide the selection of equal or greater quality compared with the first-named brand in the specifications. All equality determinations rest with the Engineer, and his decisions shall be final.
- (D) When one (1) brand name only is specified without further qualifying stipulations:
 - (1) Contractor's base bid price shall be based on the product specified.
 - (2) The Contractors are invited and encouraged to propose, as Substitutions, the products or equipment of other manufacturers potentially suitable for the intended services and/or applications. See paragraph below regarding Substitutions for further requirements.

- (E) Substitutions
- (1) Any material, product, or equipment (other than specified materials, brands, or manufacturers) proposed by the Contractor shall be considered a Substitution.
 - (2) Except as otherwise specified herein below, in order to qualify for review by the Project Manager for a decision on approval, a Substitution shall be submitted at the time of bidding a minimum of one week prior to receipt of bids. The proposed Substitution shall be clearly identified and shall include the respective add or deduct to the contract base bid amount as defined above. The Contractor shall submit complete data (including samples, if requested) regarding the Substitution to the Project Manager for review and decision.
 - (3) Substitutions requested or written approval during the bidding period and accepted by Addendum prior to award of the contract are to be included in the Contract Documents.
- (F) Alternates
- (1) When requested in the specifications or on the drawings, Contractor shall include the total appropriate add or deduct, including associated charges to the contract amount for the Alternate as specified.
 - (2) Requested Alternates shall be numbered and shall be clearly identified in the Contractor's bid.
 - (3) Omission of requested alternate pricing may invalidate the proposal.
 - (4) Each bidder is encouraged to submit any voluntary alternates or unit prices he feels appropriate.
- (G) Unit Prices
- (1) When requested in the specifications or by the Owner, the proposal shall include unit prices for certain classes of work, to be used as the basis of payment to the contractor.
 - (2) Unit prices shall cover all labor, material and related fees to perform the required work items. No additional adjustment will be allowed for general conditions, overhead, profit, insurance or other direct or indirect expense of the contractor or subcontractor.
- (H) Associated Costs and Delays
- (1) All additional costs associated with the use of any product, material, or equipment (other than the first-named brand, a specified material, or a requested Alternate) shall be the responsibility of the Contractor making the substitution or electing to use other than the first-named brand.
 - (2) For example, if a Contractor elects to use the third-named brand in the specifications covering a particular item of equipment, and the choice of that brand necessitates an increase in electrical feeder size, additional structural support, access panels, or any other changes whatsoever in this work and/or the work of others, the Contractor shall include in his bid the cost of all such changes.
 - (3) The approval of a Substitution and/or the discovery of associated costs during construction shall not relieve the Contractor from paying for changes in his work and/or the work of others.
 - (4) To avoid the associated costs as described above due to an untimely discovery of necessary changes, the Contractor may be permitted to revert to the use of the specified product, material, or equipment provided a delay in the project does not result. The Owner shall first be consulted and his decision regarding the interpretation of "delay" shall be final.

- (5) It shall be further understood that the use of any approved Substitution or other than the first-named brand in the specifications shall involve no extension of the project completion date and/or shall not cause delays in the work of other Contractors unless otherwise stipulated in writing with the respective Contractor's bid and/or proposal for Substitution.

7. PROPOSALS

- (A) Proposals shall be received by the Owner to the Attention of Mr. Harmon Jones no later than the time and date as designated in the "Invitation to Bid".
- (B) Proposals shall be submitted in duplicate on the enclosed "Proposal Form" sealed in an opaque envelope marked "Proposal". Proposals will not be accepted over the telephone. No exceptions to procedure will be allowed and any bid received after the specified time will be subject to rejection. To be considered a valid bid, proposals must be filled in completely including category breakdowns and qualification data.
- (C) All proposals shall be in accordance with all requirements of all contract documents and subject to all conditions provided in same.
- (D) All proposals shall be in a lump sum and shall cover and include all materials, accessories, tools, equipment, expendable equipment, insurance, taxes, overhead, profit and performance of all services and labor required to completely execute the work in accordance with the contract documents.
- (E) Each bidder shall break his proposal into the categories per page 4 of the enclosed Proposal Form. This categorization is requested only to further clarify bids as well as assure understanding of the scope of work. These categories will not be considered as fixing the basis for any contract adjustment. The completed bid proposal form shall be received by the Owner within two (2) hours following specified bid due time.

-END OF SECTION-

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DIVISION 0 - BIDDING REQUIREMENTS

PROPOSAL FORM

Date:

Rooms To Go
111 7th Avenue South, Suite 100,
Franklin, TN 37064.

Attn: Mr. Harmon Jones

Re: _____

Gentlemen:

The undersigned being familiar with the local conditions affecting the cost of the work with the drawings and specifications for the proposed above referenced project as prepared by CASCO, St. Louis, Missouri, hereby proposes and agrees if this proposal is accepted to enter into contract to supply labor, materials, services and equipment necessary for the complete execution of all general construction work in strict accordance with the plans and specifications for a lump sum of:

_____ Write Out in Words

DOLLARS (\$ _____)
Write in Figures

_____ Consecutive Calendar Days

This bid is based upon proprietary brands as shown on plans and/or specified.

The undersigned further proposes and agrees hereby to commence work with an adequate force and equipment immediately after being notified in writing to do so, and to complete all work as required by the plans and specifications within the number of consecutive calendar days as itemized above.

In submitting this bid, it is understood that the right is reserved by the Owner or his representative to reject any or all bids, and it is agreed that this bid may not be withdrawn for a period of thirty (30) days from bid due date.

It is further acknowledged that, after thorough examination of the site, drawings and specifications, the above quoted prices do not include any changes or substitutions to specified materials or methods. Any proposed changes or substitutions are itemized by attachment herewith for consideration noting the appropriate Add or Deduct amount. (Reference documents for specifically requested alternates.)

Alternate prices and unit prices as requested in the Specifications, if applicable to this proposal, are herewith included.

We propose to subcontract the following items of work to other firms as follows:

<u>Item of Work</u>	<u>Subcontractor Name and Address</u>
Sitework	
Landscaping and Irrigation	
Concrete	
Masonry	
Steel	
Millwork	
Roofing	
EIFS	
Composite Metal Panels	
Glass/Curtainwall	
Drywall	
Painting	
Decorative Metal	
Plumbing	
Fire Sprinkler	
HVAC	
Electrical	
Fire/Security Alarm	

At the time of submission of this proposal, the undersigned has received the following addenda (if any):

Addendum No.

Date

Name of Firm _____

By (Typed) _____

By (Signature) _____

Title _____

Official Address _____

Telephone No. _____

Attest:

Secretary

SEAL

List of Alternates

The following alternate prices, as requested in specification section 01030 and the Pre-Bid Conference are herewith included for consideration and made part of this proposal. Omission of requested alternate pricing will invalidate this proposal.

<u>No.</u>	<u>Description</u>	<u>Cost Adjustment/Time</u> <u>Note ADD or DEDUCT</u>
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List of Unit Prices

The following unit prices, as requested in the Pre-Bid Conference, are submitted as part of this Bid Proposal Form and shall hold for the duration of the project. Omission of requested unit prices will invalidate this proposal.

Should additional work be required, or should quantities of certain classes of work be increased or decreased from the base contract, by approval of the Owner, the Contractor agrees that the following unit prices may be used as a basis of payment to Contractor or credit to the Owner for such addition, increase or decrease in the work as determined by the Owner.

<u>No.</u>	<u>Description</u>	<u>Add</u>	<u>Deduct</u>
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Recommended Substitutions

The following substitutions and/or changes are herewith offered for consideration.

<u>Description</u>	<u>Cost Adjustment</u> <u>(Note ADD or DEDUCT)</u>
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Attach additional pages if necessary

PROPOSAL BREAKDOWN

ROOM TO GO
CUTLER BAY, FL

<u>DESCRIPTION</u>	<u>AMOUNT</u>
<u>DIVISION 1 - GENERAL CONDITIONS</u>	
Contractor General Conditions	\$ _____
Contractor Fee	\$ _____
TOTAL GENERAL CONDITIONS	\$ _____
<u>DIVISION 2 - SITEWORK (As Applicable)</u>	
Demolition/Site Clearing/Earthwork	\$ _____
Drainage/Utilities	\$ _____
-Storm Water	
-Sanitary Sewer	
-Water	
-Electrical	
-Fire Line Backflow/Underground	
Roads/Parking/Walks	\$ _____
-Paving	
-Striping	
-Curbs	
-Sidewalks	
Soil Treatment	\$ _____
Landscaping/Lawn Irrigation	\$ _____
Site Lighting	\$ _____
TOTAL SITEWORK	\$ _____
<u>DIVISION 3 - CONCRETE</u>	
Concrete	\$ _____
-Foundations/Footings	
-Floor Slab	
Column Covers	\$ _____
<u>DIVISION 4 - MASONRY</u>	
Masonry	\$ _____
-Concrete Block/Brick	
-Glass Block	
<u>DIVISION 5 - METALS</u>	
Structural Metals	\$ _____
-Joists	
-Joist Girders	
-Roof Deck	
-Beams	
-Columns	
-Lintels	
-Miscellaneous Metals	
<u>DIVISION 6 - CARPENTRY</u>	
Carpentry	\$ _____
-Wood Blocking/Nailers	
-Millwork	
-Toilet Room Vanities	
-Showroom Window Sill	
-Solid Polymer Fabrications	

-Miscellaneous Carpentry

DIVISION 7 - THERMAL & MOISTURE PROTECTION

EIFS	\$ _____
Roofing & Accessories	\$ _____
-Roofing	
-Flashing & Sheet Metal	
-Roof Hatch	
-Roof Drains/Downspouts	
Metal Roofing	\$ _____
Skylight (if applicable)	\$ _____
Metal Siding	\$ _____

DIVISION 8 - DOORS & WINDOWS

Doors/Frames/Hardware	\$ _____
Glass/Glazing/Curtainwall	\$ _____
Mirror	\$ _____

DIVISION 9 - FINISHES

Drywall	\$ _____
-Steel Studs, Furring	
-Rigid Insulation	
-Wall Board	
Ceramic/Tile	\$ _____
Acoustic Ceilings	\$ _____
Resilient Flooring and Base	\$ _____
Carpet	\$ _____
Wood Flooring	\$ _____
Painting	\$ _____

DIVISION 10 - SPECIALTIES

Toilet Partitions	\$ _____
Toilet Accessories	\$ _____
-Soap Dispensers	
-Grab Rails	
-Toilet Paper Dispensers	
-Waste Receptacles	
Decorative Metals (if applicable)	\$ _____
Interior Space Frame (Installation Only)	\$ _____
Fire Extinguishers and Accessories	\$ _____

DIVISION 15 - MECHANICAL

Plumbing	\$ _____
-Basic Materials	
-Domestic Water Piping	
-Sanitary Waste Piping	
-Vent Piping	
-Water Heater	
-Water Cooler	
-Lavatories	
-Urinal	
-Water Closet	
-Pipe Insulation	
-Floor Drains	
Fire Sprinklers (Building Only)	\$ _____
HVAC	\$ _____
-Basic Materials	
-Roof Top Units	
-Exhaust Fan	
-Air Distribution	
-Insulation	
-Controls	

DIVISION 16 - ELECTRICAL

Electrical/Lighting \$ _____
-Basic Materials
-Power Distribution Systems
-Interior Lighting
-Building Mounted Exterior Lighting
-Exit Signage
-Emergency Lighting
-Grounding
-Telephone Service

Fire/Security Alarm \$ _____

TOTAL BUILDING (DIVISIONS 3 - 16) \$ _____

TOTAL BASE BID \$ _____

- END OF SECTION -

DIVISION 1 - GENERAL REQUIREMENTS1. SCHEDULE

- (A) This is a "Time is of the Essence" project. Bidders shall submit a time schedule with their bid proposals.
- (B) Due to the nature of the Owner's retail market this project must be completed in accordance with the agreed construction schedule. Sitework must be so scheduled as to have the pavement base course installed as early as possible in the job schedule.
- (C) General Contractor shall carefully schedule and coordinate work so as to provide the maximum cooperation and the minimum of interference with the work of others. Scheduling shall be approved by the Owner's Representative.
- (D) General Contractor shall submit prior to the start of the work a schedule showing the various phases and indicating the starting and completion dates of all phases of the contract work.
- (E) After the work is commenced, the General Contractor shall conduct weekly jobsite meetings with all major Contractors and shall advise the Owner as to the then current status of the schedule, and indicating whether or not the General Contractor contemplates, as of that time, any future deviation from the schedule. Such reports and meetings minutes shall include a statement indicating that the report is based on the then current information furnished by all Contractors and material suppliers and shall be issued promptly after the weekly meeting.
- (F) No extension of time beyond date stipulated in proposal will be allowed on account of inclement weather, material delivery delays, or other causes which could have been avoided by exercise of reasonable foresight on General Contractor's part.
- (G) Any problems that occur during the course of the job that would affect the schedule shall be brought to the Owner's Representative attention immediately.

2. WORK OF THE GENERAL CONTRACTOR

- (A) General Contractor shall furnish all labor and material required to perform and complete all work as shown and described in the Contract Documents. Include all work indicated or specified in addenda, change bulletins, clarifications accepted alternates or amendments.
- (B) The scope of work shall include all work noted in the plans or these specifications with the following clarifications:
 - (1) Verification of the site conditions is the responsibility of the General Contractor and no extra (time or money) shall be approved due to this General Contractor's failure to review conditions under which the work will be performed unless identified specifically by written exception as a part of his proposal.

- (2) The Contract Documents are intended to describe a total and completed facility. The specifications describe the various items of work, character of materials and quality of workmanship. Any appurtenances, parts, finish work, etc., essential to the entire completion of the work, though not specifically shown or specified shall be covered by the contract sum.
- (3) The General Contractor will be required to furnish and install all temporary water, electric power and lighting, etc., that is necessary to perform his work and shall remove same upon completion of the work. Point of connection, route and method of extension must meet the approval of the Owner's Representative, the utility and local governing authorities.
- (C) The General Contractor shall not assign any monies due or to become due to him under the Contract Documents without prior consent of the Owner, nor shall either party to the contract assign the contract or sublet it as a whole without the written consent of the other.
- (D) The base bid shall be a complete and total package but to avoid price duplications shall exclude those items for which alternates are requested. Each alternate price shall be a total including all charges associated with adding the said item to the scope of work. Reference Section 00011, Paragraph 6(F).

3. PAYMENTS

- (A) The General Contractor shall furnish a cost on the most current version of A.I.A. Forms G702 and G703 with the complete breakdown of the contract price so arranged and itemized as to meet the approval of the Owner's Representative.
- (B) All applications for payment will be submitted on A.I.A. Form G702 or a reasonable facsimile thereto and shall be accompanied by Certificate A.I.A. Form G703.
 - (1) Column B, Description of Work, on Form G703 shall be listed by Sub-contract and specification division and shall include material supplier items.
 - (2) Column C, Schedule Value, on Form G703 shall be the actual sub-contract value and not the estimated value for the corresponding line item of work.
- (C) Submit three (3) embossed, notarized copies of applications with original signatures on each, accompanied by current jobsite photographs and a current critical path project schedule.
- (D) General Contractor shall submit all appropriate lien releases, including with the application for payment
- (E) Payment applications shall be accompanied by Contractor and material supplier partial lien waivers for the preceding month's application. These partial lien waivers shall equal the total dollar amount for each line item listed under "Description of Work, Column B, Form G703", for which the General Contractor received payment for the preceding month's application.

- (F) **Payment applications will not be processed until all such partial and/or final lien waivers have been submitted to the Owner's Office. Partial and final lien waivers shall be accompanied by an itemized index of waivers, which covers the previous month's draw.**
- (G) The Owner shall pay the General Contractor between the first and fifteenth of each month for work performed the preceding month, in accordance with Plans and Specifications, plus any approved Change Orders, if pay requests and lien waivers are in compliance with contract and submitted as stipulated.
- (H) Payments to be made as follows:
- (1) The General Contractor shall prepare a statement each month of all work performed the preceding month including all acceptable materials suitably stored on the site at that time.
 - (2) When the statement is approved by the Owner, the Owner will pay ninety percent (90%) of the amount due.
 - (3) Release of retained funds shall be contingent upon completion of all punchlist work, the receipt of the General Contractor's execution of Exhibit "A" and all warranties, As-Built Drawings, and service/operating manuals. Release of retained funds will also not be approved until all contractor and requested material supplier final lien waivers have been submitted.
 - (4) Miscellaneous Provisions: General Contractors and material suppliers shall not be entitled to service charges or interest on any monies due and not paid and on any monies due as a result of any claim, dispute or other matter in question.
 - (5) All Change Order cost breakdowns shall be notarized and shall be included on the Application for Payment Form G702 and G703.

4. SUBSTITUTIONS

- (A) All material, equipment and processes to be substituted for those specified or shown in Contract Documents shall be approved by Design Professional and the Owner's Representative in writing prior to item or work being installed or performed. Substitutions shown on shop drawings approved by the Design Professional do not constitute approval of substituted item.
- (B) Request for Substitution shall be in accordance with "SUBSTITUTION PROCEDURES" below.

5. SUBSTITUTION PROCEDURES

- (A) Instructions to Bidders specify time restrictions for submitting request for substitutions during the bidding period. Comply with requirements specified in this section.
- (1) Request for substitutions must be clearly identified.
 - (2) If the submittal is approved by the Design Professional, a Bid Addendum will be issued to all prospective bidders at least one week prior to bid date.

- (3) Unless request for changes are received and approvals are published by Bid Addendum in accordance with the above procedure, the successful bidder shall be held responsible for furnishing items and materials of the trade names or manufacturer's names called for in the specifications.
- (B) Substitutions may be considered when a product becomes unavailable through no fault of the General Contractor. Changes in products, materials, equipment, and methods of construction required by the Contract Documents proposed by the General Contractor after award of the Contract are considered to be requests for substitutions. The following are not considered requests for substitutions:
- (1) Substitutions requested during the bidding period and accepted by Bid Addendum prior to award of the Contract, are included in the Contract Documents and are not subject to requirements specified in this Section for substitutions.
 - (2) Revisions to Contract Documents requested by the Owner's Representative or the Design Professional.
 - (3) Specified options of products and construction methods included in the Contract Documents.
 - (4) The General Contractor's determination of the compliance with governing regulations and orders issued by the governing authorities.
- (C) A request for substitutions constitutes a representation that the contractor:
- (1) Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
 - (2) Will provide the same warranty for the substitution as the specified products.
 - (3) Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to the Owner.
 - (4) Waives claims for additional costs or time extension which may subsequently become apparent.
 - (5) Will credit the Owner cost savings (full amount).
- (D) Request for substitutions shall include the following data:
- (1) Date of request.
 - (2) Project name.
 - (3) Specification reference.
 - (4) Specified item.

- (5) Proposed substitution.
 - (6) Manufacturer.
 - (7) Cost impact.
 - (8) Deviations from the specified item with Cost Breakdown
 - (9) Schedule impact.
 - (10) Manufacturer's recommendations for use and installation. Submit drawings if required for clarity.
 - (11) A complete schedule of changes in the drawings and specifications, if any, which must be made in other work in order to permit the use and installation of the proposed substitute in accordance with the recommendations of the manufacturer of the product.
 - (12) Technical data to support request for approval. List reference standards met, submit testing laboratory reports and experience records.
 - (13) Other supporting data such as brochures, samples and drawings.
 - (14) Samples or product literature of specified product for comparison, if required by the Design Professional or the Owner's Representative.
- (E) Determination as to acceptability of proposed substitution shall be based only on data submitted. If necessary, the Design Professional will request additional information or documentation for evaluation within one week or upon receipt of a request for substitution.
- (1) The Design Professional will notify the General Contractor of acceptance or rejection of the proposed substitution within two weeks of receipt of request, or one week of receipt of additional information or documentation, whichever is later.
 - (2) Approval will be in the form of a signed change order by the Owner.
 - (3) Use the product specified if the Design Professional or Owner cannot make a decision on the use of the proposed substitute within in the time allocated.
- (F) All accepted substitutions require written change order approval by the Owner's Representative.**

6. SUBSTITUTIONS AFTER CONTRACT AWARD

- (A) In the event the General Contractor proposes substitutions to the Design Professional or to the Owner after the Contract has been awarded, the Design Professional will record all time used by him, his employees, and/or his consultants in the evaluation of each such proposed substitution.

- (B) Regardless of whether or not the Design Professional approves a proposed substitution, the Design Professional shall be reimbursed at the rate of two and one-half (2.5) times the direct cost for all time spent by the Design Professional and/or their consultants in evaluating each proposed substitution. A Change Order will be issued to reduce the Construction Contract by an amount equal to the fees charged by the Design Professional for reviewing one or more proposed substitutions. the Design Professional will be reimbursed by the Owner in accordance with the Change Order amounts.

7. SUBMITTAL PROCEDURES

- (A) Summary: The following includes administrative and procedural requirements for submittals required for performance of the Work:

- Definitions.
- Procedures (coordinating/processing/submittal preparation).
- Contractor's construction schedule.
- Submittal schedule.
- Daily construction reports.
- Shop Drawings and submittal data.
- Product Data.
- Samples.
- Quality assurance submittals.
- Required actions.

- (B) Definitions:

- (1) Coordination Drawings show the relationship and integration of different construction elements that require careful coordination during fabrication or installation to fit in the space provided or to function as intended.
- (2) Field Samples are full-size physical examples erected on-site to illustrate finishes, coatings or finish materials. Field samples are used to establish the standard by which the Work will be judged.
- (3) Mock-ups are full-size assemblies for review of construction, coordination, testing or operation. Mock-ups are used to establish the standard by which the work will be judged.

- (C) Procedures:

- (1) Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related activities to avoid delay.
 - (a) Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that required sequential activity.
 - (b) Coordinate transmittal of different types of submittals for related elements of the work so processing will not be delayed by the need to review

concurrently for coordination.

- (i) The Design Professional and Owner reserve the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received.
- (c) Processing: To avoid the need to delay installation as a result of the time required to process submittals, allow sufficient time for submittal review, including time for resubmittals.
 - 1. Allow 2 weeks for initial review. Allow additional time if the Design Professional must delay processing to permit coordination with subsequent submittals.
 - 2. If an intermediate submittal is necessary, process the same as the initial submittals.
 - 3. Allow 2 weeks for reprocessing each submittal.
 - 4. No extension of Contract Time will be authorized because of failure to transmit submittals sufficiently in advance of the Work to permit processing.
- (2) Submittal Preparation: Place a permanent title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.
 - (a) Provide a space approximately 4 by 5 inches on the title block on Shop Drawings to record the Contractor's review and approval markings on the action taken.
 - (b) Include the following information on the title block for processing and recording action taken.
 - 1. Project name.
 - 2. Date.
 - 3. Name and address of Architect.
 - 4. Name and address of Contractor.
 - 5. Name and address of subcontractor.
 - 6. Name and address of supplier.
 - 7. Name of manufacturer.
 - 8. Number and title of appropriate Specification Section.

9. Drawing number and detail references, as appropriate.
- (3) Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Transmit each submittal from the General Contractor to the Design Professional using the transmittal form. The Design Professional will not accept submittals received from sources other than the General Contractor.
 - (a) On the transmittal, record relevant information and requests for data. On the form, or separate sheet, record deviations from Contract Document requirements, including variations and limitations. Include Contractor's certification that information complies with Contract Document requirements.
 - (b) Transmittal Form: use AIA Document G810.
 - (4) Submittal Review: The Design Professional review and approval.
 - (a) The Design Professional shall review and approve submittals with reasonable promptness so as to cause not delay in Work. Allow two weeks for initial review.
 - (b) The Design Professional's approval is only for conformance with design concept of project with information in Contract Documents. The Design Professional's approval of a separate item shall not indicate approval of an assembly in which item functions.
 - (c) The Design Professional's approval of submittals shall not relieve General Contractor of responsibility for any deviation from requirements of Contract Documents unless General Contractor has informed the Design Professional in writing of such deviation at time of submission and the Design Professional and Owner have given written approval to the specific deviation. The Design Professional's approval shall not relieve the General Contractor for responsibility for errors or omissions in submittals.
 - (d) The Design Professional shall return reviewed shop drawings for printing and distribution by General Contractor.
 - (5) Resubmission: Make corrections and changes indicated for unapproved submission and resubmit in same manner as specified above, until the Design Professional's and/or Owner's approval is obtained.
 - (6) Distribution:
 - (a) General Contractor shall be responsible for obtaining and distributing copies of submittals to his sub-contractors and material suppliers after as well as before final approval. Prints of revised shop drawings shall carry the Design Professional's appropriate stamp.
 - (b) General Contractor shall maintain a file of approved submittals and record

- all deviations from submittal for the duration of the project.
- (c) The Owner will retain two copies of all submittals.
 - (d) When the following are specified in individual sections of the Specification Manual or as requested by the Owner, submit appropriate documentation at project closeout:
 - 1. Operation and maintenance data.
 - 2. Warranties.
 - (7) Any approved submittal that does not conform to the Contract Documents requires written change order approval by the Owner. The General Contractor is responsible for obtaining written Change Order approval.
- (D) General Contractor's Construction Schedule:
- (1) Bar-Chart Schedule: Prepare fully developed, horizontal bar-chart type, contractor's construction schedule. Submit to the Owner's Representative within 30 days after the date established for "Commencement of Work".
 - (a) Provide a separate time bar for each significant construction activity. Provide a continuous vertical line to identify the first working day of each week. Use the breakdown of units of Work as indicated in the "Schedule of Values".
 - (b) Within each time bar indicate estimated completion percentage in 10 percent increments. As Work progresses, place a contrasting mark in each bar to indicate Actual Completion.
 - (c) Prepare the schedule on a sheet or sheets, of stable transparency, or other reproducible media, of sufficient width to show data for entire construction period.
 - (d) Secure time commitments for performing critical elements of Work from parties involved. Coordinate each element on the schedule with other construction activities; include minor elements involved in the sequence of the Work. Show each activity in proper sequence. Indicate graphically the sequences necessary for complete of related portions of the Work.
 - (e) Coordinate the General Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittal Schedule, progress reports, payment requests, and other schedules.
 - (f) Indicate completion in advance of the date established for Substantial Completion. Indicate Substantial Completion on the Schedule.
 - (2) Phasing: On the schedule, show how requirements for phased completion to

- permit Work by separate Contractors and partial occupancy by the Owner affect the sequence of Work.
- (3) Work Stages: Indicate important stages of construction for each major portion of the Work, including submittal review, testing, and installation.
 - (4) Area Separations: Provide a separate time bar to identify each major construction area for each major portion of the Work. Indicate where each element in an area must be sequenced or integrated with other activities.
 - (5) Cost Correlation: At the head of the schedule, provide a cost correlation line, indicating planned and actual cost. On the line show dollar volume of Work performed as of the dates used for preparation of payment request.
 - (6) Distribution: Following response to the initial submittal, print and distribute copies to the Design Professional, Owner, subcontractors, and other parties required to comply with the scheduled dates. Post copies in the Project meeting room and on-site temporary field office.
 - (a) When revisions are made, distribute 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 construction activities.
 - (b) Schedule Updating: Revise the schedule after each meeting, event, or activity where revisions have been recognized or made. Issue the updated schedule concurrently with the report of each meeting.
- (E) Submittal Schedule:
- (1) After development and acceptance of the Contractor's Construction Schedule, prepare a complete schedule of submittals. Submit the schedule within 30 days after the date established for "commencement of work".
 - (a) Coordinate Submittal Schedule with the list of subcontracts, Schedule of Values, and the list of products as well as the Contractor's Construction Schedule.
 - (b) Prepare the schedule in chronological order. Provide the following information:
 1. Scheduled data for the first submittal.
 2. Related Section number.
 3. Submittal category (Shop Drawings, Product Data, or Samples).
 4. Name of the subcontractor.

5. Description of the part of the Work covered.
 6. Scheduled date for resubmittal.
 7. Scheduled date the Design Professional's or the Owner representative's final release or approval.
- (2) Distribution: Following response to the initial submittal, print and distribute copies to the Design Professional, Owner, subcontractors, and other parties required to comply with the submittal dates indicated. Post copies in the Project meeting room and on-site field office.
- (a) When revisions are made, distribute 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 construction activities.
- (3) Schedule Updating: Revise the schedule after each meeting or activity where revisions have been recognized or made. Issue the updated schedule concurrently with the report of each meeting.
- (F) Daily Construction Reports:
- (1) Prepare a daily construction report recording the following information concerning events at the site, and submit duplicate copies to the Owner upon request:
 - (a) List of Contractors at the site.
 - (b) Approximate count of personnel at the site.
 - (c) High and low temperatures, general weather conditions.
 - (d) Accidents and unusual events.
 - (e) Meetings and significant decisions.
 - (f) Stoppages, delays, shortages and losses.
 - (g) Emergency procedures.
 - (h) Change Orders received, implemented.
 - (i) Services connected, disconnected.
 - (j) Equipment or system tests and start-ups.
 - (k) Partial Completions, occupancies.
 - (l) Substantial Completions authorized.

8. SHOP DRAWINGS AND SUBMITTAL DATA

(A) Shop Drawings and Submittal Preparation:

- (1) Submit newly prepared information drawing accurately to scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis the Shop Drawings. Standard information prepared without specific reference to the Project is not a Shop Drawings.
- (2) Shop Drawings include fabrication and installation Drawings, setting diagrams, schedules, patterns, templates and similar Drawings. Include the following information:
 - (a) Dimensions.
 - (b) Identification of products and materials included by sheet and detail number.
 - (c) Compliance with specified standards.
 - (d) Notation of coordination requirements.
 - (e) Notation of dimensions established by field measurement.
- (3) Sheet Size: Except for templates, patterns and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2 x 11 inches but no larger than 36 by 48 inches.
- (4) The instructions below will guide you on how to submit a shop drawing through CASCO's Shop Drawing Dropbox. Utilizing the Shop Drawing Dropbox ensures that the shop drawing submittal gets processed and distributed correctly. Please let us know if you have any questions. **All Shop Drawings get logged into an internal system before being reviewed.** Shop drawings sent directly to the reviewer will still be forwarded to be logged into the internal system. Utilizing the Shop Drawings Dropbox eliminates that extra step making the sure the turnaround is as short as possible. When submitting Shop Drawing Submittals electronically, the General Contractor is required to follow the procedures set forth below:
 - a. General Contractor shall submit shop drawings thru Dropbox: <http://shopdrawings.cascocorp.com>
 - b. Do not submit directly to Project Leader, Project Administrative Coordinator or rtg@cascocorp.com.
 - c. General Contractor's shall complete the CASCO Shop Drawing Submittal Form in its entirety. Under the section: "Notify Others by Email" include the email address shopdrawings@cascocorp.com; (also included CASCO's PM; CPWM APM and CPM). The shopdrawings@cascocorp.com has

been established to easily identify Shop Drawing Submittals.

- d. Submittals shall be provided in complete and not emailed in "piecemeal" fashion. Partial submittals shall be rejected.
- e. For shop drawings that are required to be signed and sealed, scanned copies of the signature and seal will be acceptable provided that wet signed and sealed prints are sent to CASCO for record purposes.
- f. All submitted documents shall be in .pdf format. Any submittal not in pdf format shall be immediately rejected.
- g. All shop drawings shall have the review stamp of the General Contractor indicating that he has reviewed the submittal prior to receipt by CASCO. Shop Drawings that do not have the General Contractor's review stamp shall be immediately rejected.

Note: Submittals that cannot be reviewed via email including Samples that need color or texture approval must be provided hard copy. Submittal received by CASCO after 12 noon Central Time will begin to be processed for review the next business day. CASCO shall return electronic submittals via email in .pdf format. Hard copies will not be returned.

- (5) Do not use Shop Drawings without an appropriate final stamp indicating action taken.
- (B) After award of the Contract, the General Contractor shall promptly prepare and submit to the Design Professional all product data, shop drawings and certifications as required by the specifications within the designated timeframe provided in Section 01021.B.I.1 and 01021.B.I.2. All Product Data, Shop Drawings and Certifications required by the specifications shall be submitted to the design professional no later than 120 days after award of the contract.
- (C) Except for those shop drawings and/or submittals specifically requested by the Design Professional and the Owner, the Design Professional will not review shop drawings, submittals, or product data.
 - (1) Request for clarifications and/or interpretations of the Contract Documents shall be made in writing on an individual and specific basis. All such requests shall first be reviewed by the General Contractor.
 - (2) In the event specific approvals are required by the manufacturer of a product, material, or fabrication, the General Contractor and his Contractors shall provide said "approval" of the shop drawings or submittals as required to release for fabrication and/or shipment on a timely basis. The General Contractor and his Contractors shall advise suppliers, vendors, distributors, and manufacturers of the terms stated in this paragraph regarding release or "approval" for manufacturing, fabrication, and/or shipment to insure timely delivery of respective products, materials, equipment, and fabrications.

- (3) Submittals received by the Design Professional outside the scope of the above guidelines will be returned to the General Contractor without review or comment.
- (D) The above stated procedures and policies regarding shop drawings and submittals are intended to simplify and expedite the construction process and emphasize the General Contractor's role and responsibility for coordinating the work of all trades in a proper and timely manner consistent with the Contract Documents. In keeping with this intent and concept, review comments received by the General Contractor and his Contractors from the Design Professional on selected and requested shop drawings and/or submittals shall not be interpreted or construed as relieving the Contractor or his Contractors from complying with the requirements set forth in the Contract Documents.
- (E) For all shop drawings, or product data, including those requested by the Design Professional and the Owner, the General Contractor shall review same thoroughly and carefully, clearly marking and/or noting all discrepancies and deviations from the Contract Documents, and affixing an appropriate review stamp, signed and dated. General Contractor's review (and submittal if requested) shall constitute a representation by the General Contractor that he has verified compliance with the Contract Documents; and that he has determined and/or verified field measurements, coordination, materials, and requirements relating to the work and information contained therein are consistent with the project criteria and Contract Documents. The General Contractor shall be responsible to distribute all shop drawings and product data to the appropriate Contractor, as applicable, on a timely basis after his review.
- (F) At the completion of the project and prior to or in conjunction with the General Contractor's request for final payment, two (2) copies of requested shop drawings and similar data shall be furnished to the Owner as part of the "As-Built" project records, including applicable revisions and notations to truly reflect as-built conditions.
- (G) Requested shop drawings and submittal data shall be mailed with a transmittal letter or form prepared by the General Contractor which shall include the number of copies and identification of each item submitted. The transmittal shall not be used as the only source for identifying deviations, if any, from the Contract Documents.
- (1) Shop drawings and submittal data which the General Contractor requests to be returned by overnight carrier will be sent via General Contractor's overnight carrier's account.
- (H) Requested shop drawings for inter-related equipment must be submitted at one time, since the performance of one piece of equipment must be matched in performance by all other equipment of the overall system.
- (I) Submittals required of the specifications:
- (1) Submit direct to the project Civil Engineer with copy of Transmittal to the Design Professional:
- 02711 – Storm drainage pipe, structures, and grates 60 days.

- 02668 – Water, sewer and fire line pipe, fittings, valves, etc. 60 days.
 - 02511 – Asphalt mix design 120 days
 - 02521 – Concrete pavement mix design 120 days
 - 02526 – Precast concrete wheel stops (Product Data and Shop Drawings to Owner) 120 days
- (2) Submit direct to the Design Professional within noted timeframe after award of the contract:
- Section 02280, Soil Treatment (Product Data, Guarantee); 60 days.
 - Section 02910, Exterior Sun Control Devices; 60 days.
 - Section 03301, Concrete (Reinforcing Steel Shop Drawings, Concrete Mix Designs, Concrete Mix Strength Data); 60 days.
 - Section 03456, Glass Fiber Reinforced Gypsum (Shop Drawings); 90 days.
 - Section 04201, Unit Masonry Work (Concrete Block Strength Certification; Concrete Masonry Unit, Natural Stone Veneer, and Brick Veneer Product Data, Accessory Product Data, Glass Block Product and Accessory Data, Grout Mix Design, Product Samples to Owner); 60 days.
 - Section 05120, Structural Steel (Shop Drawings, Connection Design Certification, Connection Design Calculations); 30 days.
 - Section 05210, Steel Joists (Shop Drawings, Manufacturer's Certification); 30 days.
 - Section 05211, Steel Joist Girders (Shop Drawings, Manufacturer's Certification); 30 days.
 - Section 05311, Metal Roof Deck (Shop Drawings, Manufacturer's Certification); 30 days.
 - Section 05400, Cold Rolled Structural Metals (Shop Drawings, Manufacturer's Data and Certification); 30 days.
 - Section 05500, Miscellaneous Metals (Shop Drawings); 60 days.
 - Section 06100, Carpentry (Product Data, Shop Drawings); 120 days.
 - Section 06650, Solid Polymer Fabrications (Shop Drawings); 120 days.
 - Section 07115, Bituminous Dampproofing (Product Data); 60 days.
 - Section 07210, Building Insulation (Product Data); 60 days.

- Section 07241, Exterior Insulation and Finish System (Product Data, Sample to Owner, Contractor's Qualifications); 90 days
- Section 07273, Roofing Underlayment (No Substitutions) 90 days
- Section 07540 Single Ply TPO Membrane Roofing (Shop Drawings, Product Data, Warranties); 90 days.
- Section 07600, Flashing and Sheet Metal (Product Data, Color Samples to Owner); 90 days.
- Section 07701, Roof Accessories (No Substitutions) 90 days
- Section 07901, Joint Sealants (Color Samples to Owner, Product Data); 90 days.
- Section 08101, Hollow Metal Work (Shop Drawings, Product Data) 90 days
- Section 08422, Impact Resistant Curtainwall System (Shop Drawings, Product Data, Design Certification); 60 days.
- Section 08711, Finish Hardware (Hardware Schedule, Product Data); 120 days.
- Section 09261, Gypsum Drywall (Product Data, Texture Samples to Owner); 90 days.
- Section 09650, Resilient Flooring (Product Data); 120 days
- Section 09680, Carpeting (Product Data) 120 days
- Section 09900, Painting (Color Samples to Owner, Product Data, Paint Schedule); 120 days.
- Section 10165, Plastic Laminate Toilet Compartments (Shop Drawings, Product Data); 120 days.
- Section 10522, Fire Extinguishers and Accessories (Product Data); 120 days.
- Section 10811, Toilet Room Accessories (Product Data); 120 days.
- Section 10900, Interior Space Frame (Shop Drawings, Product Data); 120 days.
- Section 10999, Decorative Metals (Shop Drawings, Product Samples to Owner); 120 days.
- Section 15301, Fire Protection Systems (Shop Drawings, Product Data, Test Certifications); 60 days.

- Section 15401, Plumbing Systems (Product Data); 60 days.
- Section 15501, HVAC Systems and Equipment (Product Data); 60 days.
- Section 15881, Air Distribution Systems and Accessories (Product Data); 60 days.
- Section 16051, Basic Materials, Methods and Requirements (Product Data, Ground System Test Report); 60 days.
- Section 16052, Low Voltage Electric Work (Fire Alarm Shop Drawings, Product Data); 90 days
- Section 16401, Power Distribution Systems (Product Data); 60 days.
- Section 16501, Lighting Systems (Product Data); 60 days.

(J) Roof Maintenance Notice

(1) Roof Maintenance Information for the Owner.

- (a) The General Contractor (GC) shall be responsible to put the following **ROOF DRAINAGE NOTICE** in the building Owner's Operating and Maintenance Manuals at the time the facility is turned over to the Owner. The **notice** in Paragraph (c) below shall apply to projects having interior roof drains and/or scuppers.
- (b) In addition, the GC shall have the following notice typed, framed under glass, and mounted in the office.
- (c) **NOTICE TO BUILDING OWNERS AND TENANTS REGARDING ROOF DRAINAGE**
 - 1. Excessive ponding due to clogged roof drains can cause rapid roof collapse. While the roof and structure have been designed to Code standards at the time of building permit issue, ponding water, especially in excess of 4.5 inches depth, should be avoided.
 - 2. A secondary (overflow) roof drainage system is provided to relieve ponding when water depth exceeds 3 inches. However, it is imperative that the roof be periodically inspected to ensure that both the primary and secondary roof drainage systems are functioning properly and are unobstructed by leaves or debris. An inspection should be performed prior to any predicted major storms or hurricanes that are expected to cause local flash flooding and unusual debris.
- (d) Periodic monitoring/follow-up:
 - 1. Facility Managers should be made aware of the roof collapse risk

associated with ponding. The flow of storm water through secondary or overflow outlets should be monitored. Noticeable wash-out in landscaping or wet areas should be reported to the Maintenance Manager. Any unusual building sounds or movements of the roof structure might indicate excessive ponding during a significant storm event. Evacuate the building if there is any evidence of excessive ponding that might result in roof collapse.

9. PRODUCT DATA

- (A) Collect Product Data into a single submittal for each element of construction or system. Product Data includes printed information, such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams, and performance curves.
- (1) Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products that are not required, mark copies to indicate the applicable information. Include the following information:
 - (a) Manufacturer's printed recommendations.
 - (b) Compliance with trade association standards.
 - (c) Compliance with recognized testing agency standards.
 - (d) Application of testing agency labels and seals.
 - (e) Notation of dimension verified by field measurement.
 - (f) Notation of coordination requirements.
 - (2) Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.
 - (3) Preliminary Submittal: Submit a preliminary single copy of Product Data where selection of options is required.
 - (4) Submittals: Submit 4 copies of each required submittal; submit 6 copies where required for maintenance manuals. the Design Professional will retain one and will return the other marked with action taken and corrections or modifications required. The Owner will retain 2 copies of all submittals.
 - (a) Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.
 - (5) Distribution: Furnish copies of final submittal to installers, subcontractors, suppliers, manufacturers, fabricators, and others required for performance of construction activities. Show distribution on transmittal forms.

- (a) Do not proceed with installation until a copy of Product Data is in the Installer's possession.
- (b) Do not permit use of unmarked copies of Product Data in connection with construction.

10. SAMPLES

- (A) Submit full-size full fabricated Samples cured and finished as specified and physically identical with the material or product proposed. Samples include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches showing color, texture, and pattern.
 - (1) Mount, display, or package Samples in the manner to facilitate review of qualities indicated. Include the following:
 - (a) Specification Section number and reference.
 - (b) Generic description of the Sample.
 - (c) Sample Source.
 - (d) Product name or name of the manufacturer.
 - (e) Compliance with recognized standards.
 - (f) Availability and delivery time.
 - (2) Submit Samples for review of size, kind, color, pattern, and texture. Submit Samples for a final check of these characteristics with other elements and a comparison of these characteristics between the final submittal and the actual component as delivered and installed.
 - (a) Where variation in color, pattern, texture or other characteristic is inherent in the material or product represented, submit at least 3 multiple units that show approximate limits of the variations.
 - (b) Refer to other Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.
 - (c) Refer to other Sections for Samples to be returned to the Contractor for incorporation in the Work. Such Samples must be undamaged at time of use. On the transmittal, indicate special request regarding disposition of Sample submittals.
 - (3) Preliminary Submittals: Submit a full set of choices where Samples are submitted for selection of color, pattern, texture, or similar characteristics form a range of standard choices.

- (a) The Design Professional or Owner will review and return preliminary submittals with the Design Professional's or Owner's notation, indicating selection and other action.
- (4) Submittals: Except for Samples illustrating assembly details, workmanship, fabrication techniques, connections, operation and similar characteristic, submit Adobe PDF files. The Design Professional or Owner will return the PDF files marked with the action taken.
- (5) Maintain sets of Samples, as returned, at the Project Site, for quality comparisons throughout the course of construction.
 - (a) Unless noncompliance with Contract Documents provisions is observed, the submittal may serve as the final submittal.
 - (b) Sample sets may be used to obtain final acceptance of the construction associated with each set.
- (B) Distribution of Samples: Prepare and distribute additional sets of subcontractors, manufacturers, fabricators, suppliers, installers, and others as required for performance of the Work. Show distribution on transmittal forms.
 - (1) Field samples are full-size examples erected on-site to illustrate finishes, coatings, or finish materials and to establish the Project standard.
 - (a) Comply with submittal requirements to the fullest extent possible. Process transmittal forms to provide a record of activity.

11. QUALITY ASSURANCE SUBMITTAL

- (A) Submit quality control submittals, including design data, certifications, manufacturer's instruction, manufacturer's field reports, and other quality control submittals as required under other Sections of the Specifications.
- (B) Certifications: Where other Sections of the Specifications require certification that a product, material, or installation complies with specified requirements, submit a notarized certification from the manufacturer certifying compliance with specified requirements.
 - (1) Signature: Certification shall be signed by an officer of the manufacturer or other individual authorized to sign documents on behalf of the company.
- (C) Inspection and Test Reports: Requirements for submittal of inspection and test reports from independent testing agencies are specified in Section 01400 "Quality Assurance Testing and Inspection".

12. REQUIRED ACTION

- (A) Except for submittals for the record or information, where action and return is required, the Design Professional will review each submittal, mark to indicate action taken, and return

promptly.

- (1) Compliance with specified characteristics is the Contractor's responsibility.
- (B) Action Stamp: The Design Professional will stamp each submittal with a uniform action stamp. The Design Professional will mark the stamp appropriately to indicate action taken, as follows:
- (1) Final Unrestricted Release: When the Design Professional marks a submittal "Approved", the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents.
 - (2) Final-But-Restricted Release: When the Design Professional marks a submittal "Approved as Noted", the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents. Final payment depends on that compliance.
 - (3) Returned for Resubmittal: When the Design Professional marks a submittal "Not Approved, Revise and Resubmit", do not proceed with Work covered by the submittal, include purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal according to the notations; resubmit without delay. Repeat, if necessary, to obtain different action mark.
 - (a) Do not use, or allow others to use, submittals marked "Not Approved, Revise and Resubmit" at the Project Site or elsewhere where Work is in progress.
 - (4) Other Action: Where submittal is for information or record purposes or special processing or other activity, the Design Professional will return the submittal marked "Action Not Required".
- (C) Other Action:
- (1) Any approved submittal that does not conform to the Contract Documents requires written change order approval by the Owner's representative.

13. EXPEDITING PRODUCT DELIVERIES

- (A) General Contractor shall be responsible for ordering and purchasing products equipment, and materials on a prompt and timely basis to avoid delays in construction due to deliveries.

14. AS-BUILT DRAWINGS

- (A) Each contractor shall maintain current and accurate marked-up prints indicating the as-built conditions associated with his contracted work. Upon completion of his work, he shall submit the required marked prints to the General Contractor for review and approval.
- (B) The as-built conditions shown on these prints shall be transferred to a "master as-built set"

maintained by the General Contractor.

- (C) Each contractor shall sign this "master as-built set" certifying its accuracy.
- (D) Upon completion of the "Punchlist" the General Contractor shall forward the "master as-built set" to the Owner as a permanent record of the project.
- (E) As part of the close out documents, the General Contractor shall deliver to the Owner, two (2) complete hardcopy record sets and electronically scanned files of all submittals including deviations to the approved submittals.
- (F) The final retainage will not be released until receipt of this "master as-built set".
- (G) The General Contractor shall provide as-built survey drawings and/or information as required by the local permitting authority.

15. OWNER FURNISHED MATERIALS

- (A) Owner will furnish and install items as noted on the plans and in the Pre-Bid Conference Notes.
- (B) Each Contractor will receive, unload, store, insure and protect all Owner provided materials.
- (C) Refer to plans and Pre-Bid Conference Notes for other Owner furnished items.

16. SAFETY AND PROTECTION

- (A) Each Contractor shall be fully responsible for complete and absolute compliance with all provisions of the Occupational Safety and Health Act of 1970, including all amendments, pertaining to the work.
- (B) Each Contractor shall furnish and maintain for his portion of all the work all danger signals, signs, lights, guard barricades, etc., required by good practice and by law during the entire period of his contract. Each Contractor shall confine his equipment, storage of materials and the operations of his workmen to limits indicated by law. No Contractor shall load or permit the loading of any part of the structure with a weight that will endanger its safety.
- (C) Each Contractor shall be solely responsible for the proper protection of all materials and equipment delivered to the site from the time of such delivery until final approval and acceptance by the Owner. This protection and security provision shall include all Owner supplied items.
- (D) Each Contractor shall, at all times, protect the excavations, trenches and/or the portions of the building pertaining to his work from damage from rainwater, spring water, ground water, backing up of drains or sewers, and all other water. He shall provide all pumps and equipment and enclosures to provide this protection. He shall construct and maintain all necessary temporary drainage and do all pumping necessary to keep excavations free of water.

- (E) Each Contractor shall provide all shoring, bracing and sheathing as required for safety and for the proper execution of the work, and having it removed when the work is completed. Special attention shall be given to foundations for buildings and basements. Where cuts for utilities exceed 4', they shall be sloped or shored as required by a registered Engineer, in accord with both OSHA and local regulations.
- (F) Any work damaged by failure to provide protection as required above shall be removed and replaced with new work at the Contractor's expense. Special attention is drawn to this provision as it relates to Owner supplied items.

17. PERMITS, REGULATIONS, CODES AND STANDARDS

- (A) Each Contractor shall secure required permits necessary for the execution of his work. Specified permit fees to be paid by the Owner.
- (B) The Owner is responsible for filing the plans for the Building Permit. The General Contractor shall cooperate with the Owner in expediting acquisition of this Permit. The main Building Permit fee shall be paid by the Owner.
- (C) Each Contractor shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the work as drawn or specified.
- (D) All work installed by each Contractor shall be in compliance with governing Federal, State and Local Codes. All electrical work shall comply with the National Electrical Code (NEC - latest), except where more stringent local or other Codes must govern. Installations made without regard to Code requirements must be corrected by each Contractor without an increase in the contract amount.
- (E) The plans and specifications may exceed Code and Product Manufacturer requirements.
- (F) Any "Standard" (ASTM, ASA, etc.) referenced in these specifications shall be based on the edition and/or amendments of the Standard as specified herein. In cases where the edition or date of the "Standard" is not specified, the edition and/or amendments of the Standard which are current on the date the bids are submitted shall govern. Should a more current edition of a Standard become effective during construction, the General Contractor may, with the approval of the Design Professional apply the latest edition of the specified Standard.

18. SUPERVISION, COORDINATION AND LAYOUT

- (A) All work included in the respective contracts shall be under the constant supervision of qualified superintendents or foremen.
- (B) Considering the Time of Essence Contract the General Contractor shall conduct weekly job meetings with all major Contractors in attendance for the purpose of coordination and expediting.
- (C) In order to maintain proper coordination and continuation of all branches of work, job superintendents or foremen shall not be changed without prior notice to and approval of

the Owner's Representative.

- (D) Each Contractor shall carefully examine all drawings and specifications for the total project and coordinate his work with others to avoid delay and shall be responsible to ascertain that the work he installs does not interfere with work of other Contractors. If work is installed which does interfere, it shall be corrected at the Contractor's expense. Pre-occupation of space by any Contractor does not give him the right of priority to the space.
- (E) When piping, conduits, ducts or other items are to run in the same general direction, elevation or location, the Contractors involved shall request the General Contractor to arrange a conference to determine the proper allocation of the space or position.
- (F) When work is to be installed above ceilings, adequate clearance must be maintained to allow for access, repairs, and removal of all devices. Each Contractor shall be responsible for protecting his installation from being blocked off by others. Should this condition occur, he shall bring the matter to the attention of the other Contractor for correction.
- (G) Each Contractor shall be responsible for any layout associated with the performance of his work. Should a Contractor's work be subsequent to and contingent upon layout by another, he shall check said layout prior to proceeding with his work, reporting any discrepancies to the General Contractor. Proceeding with the layout shall be considered as acceptance of the layout.

19. TESTS AND INSPECTIONS

- (A) If the provisions of the contract, specifications, or any law, building ordinance or Code, rule, utility requirement, order or regulation prescribed by any legally constituted public authority having jurisdiction, require that any of the work performed by any Contractor, or any material thereof, whether complete or incomplete, be tested or inspected, then the General Contractor shall have said tests or inspections made by the Owner's testing laboratory in connection therewith. Additional testing or inspection shall be performed if the Contractor deems necessary.
- (B) The testing laboratory shall be selected by the Owner's Representative, scheduled and coordinated by the General Contractor and paid for by the Owner.
- (C) All tests shall be made by a well-established independent testing laboratory, having the facilities to make the tests required.
- (D) The testing laboratory shall report the results of all tests in writing to the General Contractor, the Design Professional, and the Owner's Representative.
- (E) The General Contractor shall be responsible for directly selecting, retaining, paying for, contracting with an Independent Testing Consultant (ITC) to provide total HVAC system testing and balancing services for this project. The General Contractor shall NOT subcontract this work to or under the HVAC Contractor's work to ensure that all TAB work is done independently of the mechanical installer/contractor. The General Contractor shall pay for complete HVAC Test System Test and Balance and re-test of noted deficiencies corrected by the contractor. The General Contractor shall be responsible to coordinate scheduling with the ITC. The ITC shall complete the "Systems Start-Up Checklist" (see

Section 15051, Exhibit B) and the General Contractor shall fax copies to the ITC and Owner before confirming the arrival date of the ITC on-site.

- (F) All costs for retesting or reinspection of materials, trip charges, excess standby time and overtime premiums incurred because of failure or inability of testing laboratory to execute the testing or reinspection initially shall be paid for by the General Contractor.

20. SURVEILLANCE BY A LOCAL PROFESSIONAL

- (A) Where required by Local or State code or authority, the Owner shall retain an Architect or Civil Engineer licensed in the State to provide construction surveillance and sign-off of the project.

21. CUTTING, PATCHING, AND CLEANING

- (A) No Contractor shall endanger and/or damage any work by cutting, drilling, digging or other actions. No Contractor shall cut or alter the work of other Contractor without prior approval by the General Contractor.
- (B) Any cost caused by defective and/or ill-timed work shall be borne by the Contractor responsible, therefore.
- (C) In no case shall any Contractor cut into any structural element, beam, or column without prior written approval from the Design Professional.
- (D) Each Contractor shall be responsible to follow the progress of the project to assure that his portion of the work is installed at the appropriate time to avoid unnecessary cutting, patching, or modifications to his work and/or the work of other Contractors. (Special effort shall be undertaken to ensure that all conduit and embedded items are properly installed in the masonry work.)
- (E) In case any Contractor is required to cut existing work in order to install the work required under his portion of the contract, the Contractor requiring the cutting shall bear the expense of the cutting and all subsequent repairing, patching, and/or replacement. All cutting, patching, repairing, and/or replacing shall meet with the approval of the Owner's Representative and the Design Professional.
- (F) Progress Cleaning: Each Contractor shall be responsible for cleaning up packing materials, trash, and any debris related to his portion of the work and/or generated by his workmen. In addition, each Contractor shall be responsible for cleaning walls, floors and other finished surfaces soiled as a result of his portion of the work or due to his workmen. All work by each Contractor shall be clean at the completion of the respective portion of the contract. (Again, special attention shall be given to cleaning dirt, stains, etc. from interior and exterior masonry.)
- (G) General Contractor is to maintain a clean access entry drive. Keep mud and debris onsite. Clean offsite roadway when needed.
- (H) The Contractor or material supplier shall promptly correct all work rejected by the Design

Professional or the Owner as defective or as failing to conform to the Contract Documents whether observed before or after substantial completion and whether or not fabricated, installed or completed. The Contractor or material supplier shall bear all costs of correcting such rejected work or materials, including the cost of the Design Professional's additional services thereby made necessary.

- (I) If the Owner prefers to accept defective or non-conforming work or materials, he may do so instead of requiring its removal and correction, in which case a Change Order will be issued to reflect an appropriate reduction in the contract sum, or, if the amount is determined after final payment, it shall be paid by the Contractor or material supplier.

22. OWNER OCCUPANCY

- (A) The Owner reserves the right to take initial occupancy of the building at the earliest possible date, particularly with regard to delivery and installation of fixtures, and merchandise. Depending on the progress of the General Contractor's work, this may or may not create some inconvenience. The General Contractor should anticipate this possibility. Claims for time delays and/or extra costs due to such inconveniences will not be allowed.
- (B) When the Owner takes beneficial occupancy and begins receipt of merchandise, the site shall no longer be considered as a construction site. Subsequent to beneficial occupancy the General Contractor and each Contractor will be subject to the rules of the store management regarding access, hours of work, security, smoking, food, noise, dust, etc.

23. FINAL CLEANING

- (A) General: Provide final cleaning. Conduct cleaning and waste removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- (B) Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
- (C) Comply with safety standards for cleaning. Do not pour volatile, harmful, or dangerous materials into drainage systems.
- (D) Complete the following cleaning operations prior to noon the Thursday preceding the Owner's fixture date. Incomplete work may be performed by the Owner.
 - (1) General
 - (a) Remove all debris and surface dust, soil and stains.
 - (b) Remove all non-permanent labels (e.g. stickers, etc.).
 - (c) Sweep and damp mop all hard surface flooring (e.g. exposed concrete, tile, VCT, wood, etc.).

- (d) Vacuum all carpet. Spot clean all soil and stains.
 - (e) Clean and sanitize all plumbing fixtures.
 - (f) Clean parking lot and site of rubbish, waste materials, litter and other debris.
- (2) Showroom
- (a) Wipe down and clean all surfaces including all walls, mirrors, doors, track lighting, overhead ductwork, glass block, wood trim, translucent panels, decorative metal and decorative items.
 - (b) Wipe down and clean the storefront framing, windows and laminate sills.
 - (c) Vacuum carpet removing debris and excess nap. Spot clean all soil and stains.
 - (d) Vacuum dust and debris from all enclosed areas and top of partition walls.
 - (e) Sweep and wet mop all floor tile.
- (3) Toilet Rooms
- (a) Wipe down and clean all surfaces including walls, mirrors, entry doors and countertops and partitions.
 - (b) Wipe down and clean light fixture lenses.
 - (c) Sweep and wet mop floors.
 - (d) Clean and sanitize all plumbing fixtures.
- (4) Office(s)
- (a) Wipe down and clean all surfaces including all walls, counters, shelving, entry door and light fixture lenses.
 - (b) Sweep and wet mop flooring.
- (5) Utility/Electrical Room
- (a) Wipe down and clean all surfaces including walls, electrical and mechanical equipment, conduits, lighting fixtures, ductwork and piping.
 - (b) Sweep and wet mop the concrete floor.
- (6) Janitors Closet

- (a) Wipe down and clean all surfaces including walls, piping, light fixtures, shelving and entry door.
 - (b) Clean and sanitize the mop sink.
 - (c) Sweep and wet mop the concrete floor.
- (7) Stock Room(s) (if applicable)
- (a) Wipe down and clean all surfaces including walls, light fixture(s) and entry door.
- (8) Breakroom (if applicable)
- (a) Wipe down and clean all surfaces including walls, light fixtures(s) and entry door.
 - (b) Sweep and wet mop hard surface flooring. Vacuum carpet (if applicable).
- (9) Equipment Access Platform (if applicable)
- (a) Wipe down and clean all surfaces including walls, rails, ladder and ductwork.
 - (b) Sweep or vacuum flooring.
- (10) Building Exterior
- (a) Wipe down and clean all window glass, storefront framing/trim and doors.
 - (b) Remove all soil, stains and discoloration from concrete masonry, brick, and natural stone walls and from precast concrete, cast stone, and stone sills.
 - (c) Remove all dust and dirt from underside of the canopy(s).
 - (d) Remove all debris from the roof.
- (11) Site
- (a) Remove all rubbish, waste materials, litter and other debris from the parking lot and site area.
 - (b) Sweep all paved areas. Wash paved areas to remove remaining soil. Clean spills, stains and other foreign deposits from paved areas.
 - (c) Remove all tools, construction equipment, machinery and surplus materials from the site. Tools, equipment, machinery and materials in use shall be stored in a single area designated by the Owner's Representative.

- (d) Remove all soil, stains, and foreign debris from sidewalks and curbs. Pressure wash if needed.
- (E) In the sole opinion of the Owner, the Owner will supplement the General Contractor's cleaning forces as needed to comply with these standards and the project schedule. The incurred cost will be the responsibility of the General Contractor and be deducted from the contract fee.

24. FINAL INSPECTION

- (A) As the work nears completion, the General Contractor shall review the requirements of the Contract Documents, inspect the work, and inform all parties involved of work to be corrected or completed before the project can be deemed substantially complete.
- (B) Upon Substantial Completion, the Owner's Representative will perform an inspection.
- (C) The Owner's Representative reserves the right to cancel and reschedule the inspection in the event considerably more work remains to be completed or corrected than indicated on the written request for inspection.
- (D) A representative of the General Contractor shall be present at the time of inspection.
- (E) Separate/individual punchlists will be performed by the following parties.
 - (1) The Owner's Construction Manager.
 - (2) The Architect and/or the MEP engineering consultants
 - (3) The independent testing and inspection company (ITC)
 - (4) The Owner's Facility Manager
 - (5) The independent HVAC test and balance company
 - (6) The Civil Engineer
 - (7) An independent fire protection inspection company
 - (8) Other specialty professionals as deemed necessary

The punchlist will be issued to the General Contractor upon performance of the specific inspection. Punchlist are partial or preliminary until all work has been completed. A final punch cannot be performed on portions of work that are incomplete. A consolidated final punchlist will be issued by the Owner to the General Contractor within 15 days following completion of all work.

25. GUARANTEE

- (A) General Guarantee - See Sample in Section 01700, WARRANTY MANUALS

- (1) The General Contractor and his Contractors shall guarantee their work in writing, including labor and materials, for a period of one (1) year or longer, if so specified elsewhere, from the date of final completion of the contract by the General Contractor or from full occupancy of the building by the Owner, whichever date is earlier.
 - (2) However, if at the time of full occupancy of the building by Owner, a portion of the work has not been completed or is found to be defective, the starting date of guarantee for the defective or incomplete portion shall be effective only after same has been completed or corrected by the General Contractor.
 - (3) If a portion of the building and/or the work is turned over to the Owner for occupancy and/or operation prior to the completion of the work under contract, the beginning of the guarantee period for the portion occupied will begin from the date of occupancy. In order to receive an adjustment in the guarantee period, the Contractors involved shall each submit a written certificate describing the portion of the work involved.
 - (4) Defective work and all damages resulting from same occurring within one year from the date of completion of work under contract shall be corrected by the General Contractor or responsible Contractor at his own expense.
 - (5) The General Contractor must perform a walkthrough with the Store Manager. The Contractor must obtain the Store Manager's signoff on the Owner's turnover checklist and include a copy in the Warranty Manual.
- (B) Specific Warranty
- (1) Manufacturer's equipment warranty shall be for at least a period of one (1) year as defined in the General Guarantee paragraph. When manufacturer's standard warranty is for a longer period, or if a longer period is called for in the specific equipment specifications, then the longer warranty period shall govern. In any case, the overall effective guarantee period shall not be shorter than the one (1) year period dating from the final completion date of the contract.
 - (2) General Contractor shall be required to turn over manufacturer's written guarantee to Owner's Representative prior to receiving final payment.

-END OF SECTION-

DIVISION 1 - GENERAL REQUIREMENTS

PART 1: GENERAL

1. SUMMARY

(A) This Section includes administrative and procedural requirements governing Alternates.

2. DEFINITIONS

(A) Definition: An alternate is an amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if the Owner decides to accept a corresponding change in either the amount of construction to be completed, or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

(1) The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate the Alternate into the Work. No other adjustments are made to the Contract Sum.

3. PROCEDURES

(A) Coordination: Modify or adjust affected adjacent Work as necessary to completely and fully integrate that Work into the Project.

(1) Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not mentioned as part of the Alternate.

(B) Notification: Immediately following the award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate whether alternates have been accepted, rejected or deferred for later consideration. Include a complete description of negotiated modifications to alternates.

(C) Execute accepted alternates under the same conditions as other Work of this Contract.

(D) Schedule: A "Schedule of Alternates" is included at the end of this Section. Specification Sections referenced in the Schedule contain requirements for materials necessary to achieve the Work described under each alternate.

PART 2: PRODUCTS (NOT APPLICABLE)

PART 3: EXECUTION

4. SCHEDULE OF ALTERNATES

(A) Other items as requested in the Pre-Bid Meeting.

END OF SECTION

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DIVISION 1 - GENERAL REQUIREMENTS1. GENERAL

- (A) All work under Divisions 15 and 16 of these specifications will be subject to and governed by the following:
- (1) GENERAL PROVISIONS AND BIDDING INFORMATION - Section 00011
- (B) The term "Mechanical" Contractors shall mean the Heating and Air Conditioning Contractor, Plumbing Contractor, and Fire Protection Contractor. The term "Electrical" Contractor shall mean the building Electrical Contractor. Electrical work performed by the automatic temperature control Contractor shall be included in the Heating and Air Conditioning Contractor's work. For ease of reference, the following abbreviations may be used in the specifications and drawings:
- GC General Contractor who shall be the prime Contractor for this project and who shall be responsible to the Owner.
- HAC Heating and Air Conditioning Contractor, a subcontractor to the GC.
- PBC Plumbing Contractor, a subcontractor to the GC.
- ELC Electrical Contractor, a subcontractor to the GC.
- FPC Fire Protection Contractor, a subcontractor to the GC.

2. MATERIALS, EQUIPMENT AND WORKMANSHIP

- (A) Unless otherwise specified, all materials and equipment incorporated in the work under the contract shall be new. All work shall be performed by persons qualified in the respective trades.
- (B) All material shall conform to the governing Codes or regulations.
- (C) All material and equipment shall bear the label of the Underwriters' Laboratories, Inc. (U.L.), if U.L. has an established certification for the particular type of material, device, or equipment.
- (D) Contractors shall not scale the drawings. Refer to architectural and structural drawings for the building construction and dimensions and refer to "Room Finish Schedule" on architectural drawings for material, finish, and construction method of walls, floors and ceilings so that proper roughing-in Contractor's work can be provided.
- (E) Where the word "provide" is used, this shall be taken to mean "furnish and install", unless otherwise noted or specified.
- (F) It is the intent of the drawings and specifications that all labor, materials, and equipment be provided as required to complete the installation of all mechanical and electrical systems and work described, shown, or indicated in the Contract Documents for proper functioning and finished appearance. The respective Contractors shall provide all necessary components, hardware, accessories, and devices as required to comply with the intent of the Contract Documents, whether or not such items are shown on the drawings or referenced in the specifications.
- (G) Unless otherwise noted on the drawings or specified, each Contractor shall provide structural members, brackets, bracing, hardware, and related accessories as required to securely install all equipment, devices, and materials under his portion of the work. This shall include flashing, gaskets, sealants, and caulking as required to prevent entrance of or damage from rain or wind.
- (H) In all cases, route utilities to cause the least interference with the fixture plan (e.g. mount sprinkler mains as high as possible). At the equipment access platform, route sprinkler drop along perimeter wall to avoid interference with platform use, etc.).

3. OWNER-FURNISHED EQUIPMENT AND/OR MATERIALS

- (A) Each Contractor shall receive, unload, secure, uncrate, erect, install, and place into proper operation all Owner-furnished equipment and accessories in accordance with the drawings and specifications and in accordance with the equipment manufacturer's detailed working drawings and installation recommendations. Contractor shall provide all materials, accessories, devices, and equipment as required to properly install and place into operation all Owner-furnished equipment, including assistance with and coordinating start-up services when provided by the equipment manufacturer.
 - (1) Stored materials are the General Contractor's responsibility upon receipt.
- (B) The equipment furnished by the Owner will carry the manufacturer's standard warranty. The Contractor shall notify the Owner's Representative should any defective components or features be discovered during receiving, uncrating, installation, or testing. The Owner will notify the manufacturer for replacement or repairs.
- (C) Any repairs and/or replacements required due to Contractor's negligence shall be the responsibility of the Contractor.
- (D) The Contractor shall provide all labor and work for repairs and/or replacements related to Owner-furnished equipment during the term of the manufacturer's warranty, including warranty extensions (if any), purchased with the equipment. All work, materials, and labor related to repairs and/or replacements excluded from the manufacturer's warranty shall be provided by the Contractor for all defects, malfunctions, or deficiencies occurring within the full warranty period.
- (E) The maintenance service requirements specified on the drawings and/or in the respective sections of the specifications shall apply to all Owner-furnished equipment, unless noted or specified otherwise.
- (F) Data relating to Owner-furnished equipment shall be included in the Operating and Maintenance Manuals provided by the Contractor in accordance with this section of the specifications unless noted or specified otherwise.
- (G) Each item of Owner-furnished Equipment and/or material is shown or identified on the drawings and/or in the appropriate Section of the specifications.
- (H) The Contractor shall make notifications and coordinate with the Owner's Representative and the manufacturer to assure a timely, properly functioning installation of Owner-furnished equipment.
- (I) Contractor is responsible for complete installation of equipment. If additional information is required, this must be made known at bidding time as an extra for this work will not be considered by the Owner.

4. CONCRETE WORK

- (A) Concrete Encasement and Cradles
 - (1) Concrete encasement, cradles, or trenches for underground pipes, conduits and ducts shall be provided by the respective Contractor, unless otherwise noted or specified.
 - (2) Composition and quality of concrete work shall comply with Division 3 of the specifications.

5. SLEEVES THROUGH MASONRY AND CONCRETE WALLS AND FLOORS

- (A) Exterior and Foundation Walls
 - (1) All piping or conduit through exterior walls and foundation walls shall pass through schedule 40 steel sleeves which shall be large enough to allow for caulking material. No sleeves are permitted through concrete structural members unless indicated on the structural drawings.

- (2) Space between pipe or conduit and sleeve shall first be packed with jute, hemp, or oakum and then be finally caulked flush with finished surfaces.
 - (B) Interior Walls and Partitions
 - (1) All piping or conduit through masonry interior walls and partitions shall pass through either schedule 40 black steel, plastic or galvanized steel sheet metal sleeves. Schedule 40 sleeves must be used with concrete or masonry construction. Sleeves will not be required for temperature control tubing.
 - (2) Space between pipe or conduit and sleeve, or between insulation and sleeve shall be caulked when passing through mechanical room walls or fire-rated walls.
 - (3) Ducts: Space between duct and opening shall be grouted with non-shrinking cement or plaster for fire rating and noise isolation. Openings in stud walls shall be sleeved with galvanized sheet metal collar and grouted as above. Fire dampers shall be provided in all ducts penetrating fire-rated walls.
 - (C) Floors
 - (1) All piping or conduit through concrete floors shall be provided with schedule 40 pipe sleeves, extending 1" above floor, except in finished areas. Sleeves in finished areas shall terminate flush with floor, and shall be schedule 40 pipe, plastic, or sheet metal.
 - (a) When opening is on the lowest floor - grout space between pipe or conduit and sleeve with non-shrinking cement.
 - (b) When opening is above lowest floor - space between pipe or conduit or insulation and sleeve shall be grouted with non-shrinking cement or shall be caulked from above and below to provide watertight construction and to maintain fire-rating of floor structure.
 - (2) All ducts through floors shall be provided with galvanized or painted steel angle frame for support of duct and closure of opening. Provide grouting in the same manner as for ducts through walls. Fire dampers are required in all ducts penetrating fire-rated floors.
6. LINTELS
- (A) All lintels required for supporting building construction above pipes, boxes, panels, ducts, etc., shall be furnished and installed by the GC.
 - (B) Contractor requiring the opening or recess shall be responsible for the size, location, and configuration of the opening.
7. ROOF OPENINGS AND CURBS
- (A) Roof Openings
 - (1) All roof openings for piping, vents, flues, stacks, ducts, conduits, etc., shall be sleeved by the respective Contractor.
 - (2) All framed openings on roof shall be provided by GC in accordance with details, dimensions, and locations shown on the structural and architectural drawings.
 - (B) Roof Curbs
 - (1) Unless prefabricated type curbs are specified, curbs shall be constructed by the GC in accordance with details and dimensions shown on the structural and architectural plans. Respective Contractor shall provide correct dimensions to the GC prior to fabrication of curbs.

- (2) Flashing for piping, vents, flues, stacks, ducts, conduits, etc., shall be made watertight by means of sleeves, flashing, and draw collars. Materials and methods shall be in accordance with Section 7E of these specifications. Sleeves, flashing, and flashing draw collars shall be furnished and installed by the Contractor requiring the opening. If piping is insulated, the insulation shall be sealed off by insulation cement or weatherproof mastic in a manner and with materials as required to prevent rain leakage. Contractors requiring openings shall coordinate all flashing, counter flashing, and related details with the roofing Contractor.
 - (3) Plumbing vent terminals shall be installed as shown on the drawings.
 - (4) Special flashing and counter flashing requirements, if required, shall be as shown on the drawings and/or as specified elsewhere in Division 15.
 - (5) Prefabricated roof curbs, if required, shall be of the type as specified in the appropriate Section of Division 15 of these specifications and/or noted on the drawings.
- (C) Flashing and Counter Flashing
- (1) Flashing around roof curbs shall be provided by the roofing Contractor under GC. Counter flashing shall be by the Contractor requiring such curbed openings, except where counter flashing is a component part of the equipment. All counter flashing materials and methods shall be in accordance with Section 07600 of these specifications.
8. CUTTING AND PATCHING
- (A) For New Construction
- (1) Roof Openings - Field-cut openings in roof deck shall be cut by other Contractor under GC. The size and location of such openings are the responsibility of the Contractor requiring the opening.
 - (2) Floors, Walls, and Partitions - Openings in stud walls shall be cut and/or framed by other Contractors under GC. Openings in concrete and masonry work shall be sleeved prior to or as the concrete and masonry work is being placed. The size and location of openings are the responsibility of the Contractor requiring the opening.
 - (3) Openings, lintels, frames, etc., as required for flush mounted panels and recessed equipment shall be provided by other Contractors under GC, unless otherwise noted on the drawings or specified herein.
 - (4) Each Contractor shall be responsible to follow the progress of the project to assure that all sleeves, openings, rough-in boxes, frames, etc., are placed at the proper time. Any and all subsequent cutting and patching and/or unnecessary modifications to the work of other Contractors shall be done at the expense of the Contractor requiring the opening. Under no circumstances shall any structural members, load bearing walls, footings, or foundations be cut without first obtaining written permission from CASCO.
- (B) Cutting shall be limited to the size necessary for working conditions. When cutting surfaces are difficult or costly to replace, such as marble, ceramic tile, wood paneling, etc., each Contractor shall consult with the General Contractor in advance and they shall jointly develop a method of cutting.
- (C) All patching shall be done with materials and by methods consistent with the construction and materials being patched. In general, cement grout shall be used with masonry, and filler compound shall be used with dry-wall or plastered surfaces. Quality and final appearance of all patching work shall be subject to the approval of the Owner's Representative and/or CASCO.

9. OPERATING AND SERVICE MANUALS

- (A) General- Near the completion of the project, and (in order to allow Owner time in which to become familiar with its contents) at least one (1) month prior to Contractor's request for final inspection, each Contractor shall be required to provide two (2) volumes of Operating and Service Manuals containing the following:
- (1) Start-up and Shut-down Procedures - Provide a step-by-step write-up of all major equipment. When manufacturer's printed start-up, trouble shooting and shut-down procedures are available, they may be incorporated into the operating manual for reference.
 - (2) Operating Instructions - Written operating instructions shall be included for the efficient and safe operation of all equipment.
 - (3) Equipment List - List of all major equipment as installed shall include model number, capacities, flow rates, and nameplate data. (The list shall include all equipment furnished by Owner.)
 - (4) Contractor will, before the store opens, familiarize store personnel with operating instructions on each piece of equipment (e.g. set temperature controls, timers for lights, etc.). Refer to Owner's turnover checklist.
 - (5) Service Instructions - Each Contractor shall be required to provide the following information for all pieces of equipment:
 - (a) Recommended spare parts including catalogue number, name of local suppliers, or factory representative.
 - (b) Lubrication and maintenance instructions for all equipment including all electric motors.
 - (c) Belt sizes, types and lengths (mechanical only).
 - (6) Manufacturer's Certificate of Warranty - Manufacturer's certificate of warranty shall be obtained for all major equipment furnished by each Contractor. Warranty shall be obtained for at least one (1) year as defined in the GUARANTEE paragraph. Where longer period is called for in the specific equipment specifications, the longer period shall govern.
 - (7) The Contractor shall include in the manuals parts catalogues for each item of equipment furnished by him on the project with the components identified by number for replacement ordering.
- (B) Submission
- (1) Manuals shall be in duplicate, and all materials shall be bound into volumes of standard 8-1/2" x 11" hard binders. Large drawings too bulky to be folded into 8-1/2" x 11" size shall be separately bound or folded into brown envelopes, cross referenced and indexed with the manuals.
 - (2) The manuals shall include the name of General Contractors, and other major Contractors.

10. ACCESS TO EQUIPMENT

- (A) Accessibility
- (1) All control devices, specialties, valves, and removable panels on equipment shall be so located as to provide easy access for inspection and maintenance including ease of removal of any interior components.
 - (2) Should any Contractor's work, such as piping, ducts, conduits, etc. be installed without due regard to the accessibility of devices installed by other Contractors, the installation shall be relocated, offset, or re-routed without cost to the Owner.

- (B) Access Panels
 - (1) Where devices are to be concealed in walls or above non-removable ceilings, each Contractor shall be required to furnish the required access panels to the GC for installation.
 - (2) Size of panels shall be larger than the devices for accessibility and shall be not less than 6 inches square for wall panels and not less than 12 inches square for ceiling panels. Where the opening must allow adequate room for a person to pass through, a 24" x 24" panel shall be provided.
 - (3) Construction of panel shall comply with the following:
 - (a) For masonry, tile, wood or gypsum board surfaces - extruded aluminum frames, 3/4" border, aluminum piano hinges, screwdriver-operated cam lock, brushed satin aluminum finish. Final painting to match decor by GC.
 - (b) For acoustical tile ceiling - flangeless construction of even tile module, recessed door panel for receiving acoustic tile by GC, piano hinges, flush screwdriver-operated cam latch, white prime coat finish. Access panels will not be required in accessible type ceilings.

11. OPERATION OF DEFECTIVE EQUIPMENT

- (A) If after installation, operation of the equipment proves to be unsatisfactory to Owner by reasons of defects, errors or omissions, Owner reserves the right to operate the equipment until it can be removed from service for correction by Contractor. Contractor shall be liable for any damage to equipment resulting from such continued operation.

12. ELECTRICAL WORK FOR MECHANICAL EQUIPMENT

- (A) Electrical Contractor - Shall wire all mechanical equipment furnished by various Contractors and the Owner, in accordance with the following general provisions:
 - (1) Power wiring from panel to motor controllers, relays, etc., and controllers to motor terminals per equipment manufacturer's wiring diagram.
 - (2) Furnish, install and wire local disconnect switches, manual push buttons and other control wiring specifically called for or noted in electrical specifications.
 - (3) Initial field oiling of all motors prior to the test running of same.
 - (4) Receive, unload, set and align all separately shipped motors. Adjust and align drive and adjust belt tension.
 - (5) Furnish and install motor starters specifically called for on plans.
 - (6) Install and wire all field-mounted devices, such as selector switches, push button stations, etc. specifically called for to be furnished by other Contractors when not a factory pre-wired component.
- (B) Mechanical and/or Plumbing Contractors - Shall include the following:
 - (1) All motor starters or control devices specifically called for to be factory pre-wired.
 - (2) Furnish individual motor starters or control devices specifically called for in accordance with the specifications, or as noted on the drawings.
 - (3) Automatic control and interlock wiring as called for under Division 15.
 - (4) Furnish complete and accurate wiring diagrams to ELC for all equipment requiring electrical power wiring and/or control wiring.
 - (5) All separately shipped motors shall be delivered to ELC for installation. Adjustment motor base and all bolts and nuts required for installation of base and motor shall be furnished by respective Contractor.

- (6) Furnish motor terminal connection diagram as prepared by motor manufacturers.
- (C) Motor Starters - Motor starters for mechanical equipment shall be furnished by the respective Contractors as called for on the drawings. In general, the following principles shall be followed:
- (1) All magnetic motor starters to be built-in in motor control panelboards will be furnished and installed by ELC.
 - (2) All magnetic motor starters to be factory pre-wired shall be furnished and installed at the factory and shall be included in the respective Mechanical Contract.
 - (3) All individual motor starters shall be furnished and installed by the ELC, unless noted to be furnished by others on plans. The ELC will install and wire all individual motor starters, including those furnished by others.
 - (4) Magnetic motor starters furnished by ELC will be provided with auxiliary contacts required for operation of starting device only. Additional auxiliary contacts required for electrical interlock and automatic controls shall be furnished and installed by the Contractor responsible for the interlock wiring.
 - (5) In order to be properly sized, all heater elements for overload relays on magnetic motor starters (except the starters factory prewired with equipment) shall be furnished and installed by the ELC in the field. Each Contractor furnishing the motorized equipment shall be required to furnish a list of motor characteristics to the ELC so that properly sized heater elements may be provided. The list shall include equipment identification by name and by number, full load current, locked rotor current, voltage rating, and suggested service factor to compensate for operating duty cycle and ambient temperature.

13. PAINTING

- (A) General
- (1) In general, all required field painting of piping, ductwork and other mechanical and electrical systems and components shall be done by Contractor under the GC. However, all painting or finishing, which is required for special results and/or wherever painting or finishing is specifically referenced within the context of Divisions 15 and 16, all such painting or finishing shall be provided by the respective Contractor, except as otherwise noted. Other painting to be provided under the mechanical and electrical work is described below.
 - (2) Contractors are referred to Section 09900 for further clarification and scope of painting work for this project.
- (B) Work Included - By Each Contractor
- (1) Equipment with factory standard finishes: Each Contractor shall touch-up paint all scratches or damages to finishes to match the factory finish. This shall include all Owner-furnished equipment.
 - (2) All miscellaneous structural members, brackets, braces, hardware, and accessories provided by each Contractor shall be painted with light grey rust inhibiting metal primer, except as otherwise specified herein or noted on the drawings. Items in this category which are galvanized, cadmium or copper plated, stainless steel, or finished with a factory finish shall not be painted.
 - (3) Nameplates and equipment identifications shall be masked-off or suitably protected from paint during touch-up or adjacent painting required by the respective mechanical or electrical Contractor. Protection of nameplates and similar identifications as may be required during paint operations performed by the painting Contractor under the GC shall be provided by that painting Contractor.

(C) Painting Specifications

- (1) All painting work shall be performed in a neat and workmanlike manner. All painting materials shall be of the best quality and suitable for the service intended. All finish paints shall present a glossy finish and/or shall match the color and texture of the adjacent areas and surfaces.
- (2) Surfaces to be painted by the respective mechanical or electrical Contractor shall be free of rust, scale, peeling, blistering, grease, oil, or deteriorating film prior to application of primer.
- (3) Applicable parts of Section 09900 of these specifications shall govern work under this Section.

END OF SECTION

DIVISION 1 - GENERAL REQUIREMENTS

The geotechnical report is made available for the convenience of the Contractor. Data on indicated subsurface conditions are not intended as representations or warranties of accuracy or continuity between soil borings. It is expressly understood that Owner will not be responsible for interpretations or conclusions drawn therefrom by Contractor. Additional test borings and other exploratory operations may be made by the Contractor for the purpose of preparing his bid, but these will be at no cost to the Owner. All work shall meet or exceed the requirements of the soils report unless clearly noted otherwise.

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ECS Florida, LLC

Subsurface Exploration and Geotechnical Engineering Report

Proposed Addition Rooms To Go – Cutler Ridge

18722 South Dixie Highway
Cutler Bay, Miami-Dade County, Florida 33157

ECS Project Number 25:3768

December 8, 2021





December 8, 2021

Mr. Will Martin
Rooms To Go
4004 Summit Boulevard NE Ste. 600
Atlanta, Georgia 30319

ECS Project No. 25:3768

Reference: Subsurface Exploration and Geotechnical Engineering Report
Proposed Addition Rooms To Go – Cutler Ridge
18722 South Dixie Highway
Cutler Ridge, Florida 33157

Dear Mr. Martin:

ECS Florida, LLC (ECS) has completed the subsurface exploration, laboratory testing, and geotechnical engineering analyses for the above-referenced project. Our services were performed in general accordance with our agreed to scope of work. This report presents our understanding of the geotechnical aspects of the project, the results of the field exploration conducted, and our geotechnical design and construction recommendations for the project.

It has been our pleasure to be of service to you during the design phase of this project. We would appreciate the opportunity to remain involved during the continuation of the design phase, and we would like to provide our services during construction phase operations as well to verify subsurface conditions assumed for this report. Should you have any questions concerning the information contained in this report, or if we can be of further assistance to you, please contact us.

Respectfully submitted,

ECS Florida, LLC

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APPENDICES

Appendix A – Diagrams

- Site Location Diagram
- Boring Location Diagram
- Subsurface Cross-Section A-A'
- Flood Map
- Soil Survey Map

Appendix B – Field Operations

- Reference Notes for Boring Logs
- Subsurface Exploration Procedure: Standard Penetration Testing (SPT)
- Boring Logs
- Exfiltration Test Results

EXECUTIVE SUMMARY

This executive summary is intended as a very brief overview of the primary geotechnical conditions that are expected to affect design and construction. Information gleaned from the executive summary should not be utilized in lieu of reading the entire geotechnical report.

- The purpose of this geotechnical exploration was to provide subsurface information for the design and construction of the proposed addition to the existing commercial use building. ECS understands that the proposed addition is expected to include one (1) single-story building (approximately 11,000 square feet in size) with associated pavements. Based on our field observations and aerial images, the site is currently an existing pavement parking area and grass covered lot.
- The geotechnical exploration performed for the planned development included nine (9) soil test borings drilled to depths on the order of 10 feet to 20 feet below the existing ground surface. Subsurface conditions within the borings generally consisted Silty Sandy LIMESTONE from existing grade to maximum termination depth of the borings (20 feet below existing grade).
- Based on assumed maximum loads of 100 kips column load and 2 kip per linear foot of wall load, the one (1) proposed building may be supported on conventional shallow foundations bearing at an assumed elevation of approximately EL +10.80 feet-datum on natural soils with an allowable net bearing capacity of 3,000 psf.
- Pavement recommendations are given for standard and heavy duty flexible (asphalt) and rigid (concrete) pavement. Details of pavement sections contained in Section 4.2 of this report.
- Based on the N-values measured in the borings, a Seismic Site Class D designation is appropriate for seismic design of the proposed building.
- Due to the developed nature of the site, there is a possibility that existing underground utilities may be present. Any existing utilities should be removed or abandoned in place.
- ECS should be retained to review the design documents for conformance with our recommendations.
- ECS should be retained for construction materials testing and special inspections to facilitate proper implementation of our recommendations.

1.0 INTRODUCTION

The purpose of this geotechnical exploration was to provide subsurface information for the design and construction of the proposed expansion to the existing facility. ECS understands that the proposed facility is expected to include one (1) building (approximately 11,000 square feet in size) with associated pavement areas. The recommendations developed for this report are based on project information provided by Rooms To Go, which consisted of:

- Concept Plan Sketch C prepared by CKE Group dated June 11, 2021

Our services were provided in accordance with our Proposal No. 25:7815 and Change Order, dated October 20, 2021, as authorized by Will Martin with Rooms To Go on October 22, 2021, which includes our Terms and Conditions of Service.

This report contains the procedures and results of our subsurface exploration and laboratory testing programs, review of existing site conditions, engineering analyses, and recommendations for the design and construction of the project.

The report includes the following items.

- A brief review and description of our field and laboratory test procedures and the results of testing conducted,
- A review of area and site geologic conditions,
- A review of subsurface soil stratigraphy with pertinent available physical properties,
- Final copies of our soil exploration/test boring logs,
- Recommendations for site preparation,
- Recommendations for structural fill placement,
- Recommended soil bearing pressures and foundation type,
- Recommended criteria for the design of earth retaining walls (loading docks),
- Recommended seismic site class in accordance with Florida Building Code,
- Recommendation for standard and heavy-duty pavement, and
- Evaluation and recommendations relative to groundwater control.

Our assessment was confined to the zone of soil likely to be stressed by the proposed construction. Our work did not address the potential for subsurface expression of deep geological conditions, such as sinkhole development related to karst activity. This evaluation requires a more extensive range of field services than performed in this study. We will be pleased to conduct an exploration to evaluate the probable effect of the regional geology upon the proposed construction if you desire.

2.2 PROPOSED CONSTRUCTION

Based on the information provided to us, we understand that the project is likely to consist of the construction of a proposed expansion to the existing facility, with associated pavements.

Structural loading information was not available at the time this report was prepared; however, we have made assumptions based on similar projects and our past experience. The structural loads for the proposed building are assumed not to be exceeding 100-kip column loads and wall loads not to be exceeding 3 kips per linear foot, respectively, bearing at an assumed elevation of EL.+10.80 feet-datum.

The following information included in Table 2.2.1 explain our understanding of the structures and their corresponding loads; please note that details of the construction of the proposed expansion was not available at the time this report was prepared and we have made some assumptions based on similar projects and our experience.

Table 2.2.1 Design Values

SUBJECT	DESIGN INFORMATION / EXPECTATIONS
# of Stories	One-story above grade
Usage	Commercial
Framing	We anticipate that the building will be principally cast-in-place concrete with minor reinforced masonry or steel frame.
Column Loads	100 kips (Full Dead and Factored Live)
Wall Loads	3 kips per linear foot (klf) maximum
Lowest Finish Floor Elevation	Assumed EL. +12.80 feet-datum
Column Spacing	Assumed approximately 20 x 20 feet (maximum)

- (1) If actual structural loads differ from these assumed loads ECS must be contacted immediately to revise building foundation recommendations and settlement calculations as needed.
- (2) The ground surface elevations were not surveyed by a licensed surveyor; therefore, the elevations shown are approximate and were inferred from Google-Earth© maps. The elevations described in this report should not be relied upon for site design.

3.0 FIELD EXPLORATION AND LABORATORY TESTING

Our exploration procedures are explained in greater detail in Appendix B including the insert titled Subsurface Exploration Procedures. Our scope of work included drilling nine (9) borings. Borings were performed for the proposed building (B-01 through B-05) and pavement areas (RD-01 through RD-04).

Boring locations were identified in the field by ECS personnel using GPS techniques prior to mobilization of our drilling equipment and their approximate locations are shown on the Boring Location Diagram in Appendix A. The approximate as-drilled boring locations are shown on the Boring Location Diagram in Appendix A. Ground surface elevations noted on our boring logs were interpolated from published topographic information and should be considered approximate. We recommend that boring location survey be performed by a professional surveyor to extend the usefulness of the subsurface information gathered. Standard penetration tests (SPTs) were conducted in the borings at regular intervals in general accordance with ASTM D 1586. Small representative samples were obtained during these tests and were used to classify the soils

encountered. The standard penetration resistances obtained to provide a general indication of soil density and correlate to shear strength parameters.

3.1 USUAL OPEN HOLE TESTING

Usual open hole testing was performed in accordance with procedures of South Florida Water Management District (SFWMD) Usual Condition Test procedure found in the SFWMD Environmental Resource Permit Information Manual Volume IV (September 2010 edition) at the locations denoted as exfiltration test EXF-01 and EXF-02 on the attached Exfiltration Logs found in Appendix B which includes the hydraulic conductivity (K_{IV} value). The K_{IV} -values are summarized below.

Tests	K_{IV} -Value (cfs/ft ² -ft head)
EXF-01	1.09×10^{-4}
EXF-02	1.23×10^{-4}

Note: Refer to the attached Usual Open Hole Test summary sheets for detailed information

3.2 SUBSURFACE CHARACTERIZATION

The subsurface conditions encountered were generally consistent with published geological mapping. The following sections provide generalized characterizations of the soil strata. Please refer to the boring logs in Appendix B.

The South Florida region is located on the southern flank of Florida Plateau, a stable, carbonate platform on which thick deposits of limestones, dolomites, and evaporates have accumulated. The general geology of the upper 200 feet of this platform within the area of South Florida where the proposed project is to be located is composed predominantly of limestone and quartz sand. The two geological formations that usually are encountered from west to east within Miami-Dade County are: Shelly Sediments of Plio-Pleistocene age and Miami Limestone.

Approximate Depth (ft)	Elevation ⁽¹⁾ (ft)	Stratum	Description	Ranges of SPT ⁽²⁾ N-values (bpf)
0.0 – 0.6	EL. +9.0 to EL.+8.4	N/A	Surficial Material – [B-01 through B-03 Asphalt [3.00”] and Gravel [4.00”]] [Topsoil [1.00’ to 3.00”] remaining locations]	N/A
0.6 – 20.0	EL. +8.4 to EL -11.6	I	SILTY SANDY LIMESTONE	8 – 28

Notes:

- (1) Please note that the ground surface elevations were interpolated from the grading plan provided; therefore, elevation ranges are approximate.
- (2) SPT refers to Standard Penetration Test.

A graphical presentation of the subsurface conditions is shown on the Generalized Subsurface Profile included in Appendix A.

3.3 GROUNDWATER OBSERVATIONS

Water levels were measured in our boring logs in Appendix B. Groundwater depths measured at the time of drilling ranged from 7.7 feet to 8.1 feet below the ground surface. Variations in the

long-term water table may occur because of changes in precipitation, evaporation, surface water runoff, construction activities, and other factors. Based upon our interpretation of the subsurface data, it appears that the seasonal high groundwater level is at depths ranging from approximately 6.7 feet to 7.1 feet.

Based on the Flood Insurance Rate Map (FIRM) Map Number 12086C0601L of Miami-Dade County, effective date September 11, 2009, indicates that most of the site is within Flood Zone X, which has a minimal flood hazard.

3.4 LABORATORY TESTING

Each sample was visually classified on the basis of texture and plasticity in accordance with ASTM D2488 Standard Practice for Description and Identification of Soils (Visual-Manual Procedures) including USCS classification symbols. After classification, the samples were grouped in the major zones noted on the boring logs in Appendix B. The group symbols for each soil type are indicated in parentheses along with the soil descriptions. The stratification lines between strata on the logs are approximate; in situ, the transitions may be gradual.

4.0 DESIGN RECOMMENDATIONS

4.1 BUILDING/STRUCTURE DESIGN

4.1.1 Foundations

Provided subgrades and Structural Fills are prepared as recommended in this report, the proposed structure can be supported by shallow foundations including column footings and continuous wall footings. We recommend the foundation design use the following parameters:

Summary of Shallow Foundation Design Parameters

Design Parameter	Column Footing	Wall Footing
Net Allowable Bearing Pressure ⁽¹⁾	3,000 psf	
Acceptable Bearing Soil Material	Medium Dense LIMESTONE - Stratum I	Medium Dense LIMESTONE- Stratum I
Minimum Width	24 inches	18 inches
Minimum Footing Embedment Depth (below slab or finished grade)	24 inches	24 inches
Estimated Total Settlement ⁽²⁾	Less than 1- inch	Less than 1- inch
Estimated Differential Settlement ⁽³⁾	Less than ¼ inches between columns	Less than ¼ inches

Notes:

- (1) Net allowable bearing pressure is the applied pressure in excess of the surrounding overburden soils above the base of the foundation.
- (2) Based on assumed structural loads. If final loads are different, ECS must be contacted to update foundation recommendations and settlement calculations.
- (3) Based on maximum column/wall loads and variability in borings. Differential settlement can be re-evaluated once the foundation plans are more complete.

Potential Undercuts: If soft or unsuitable soils are observed at the footing bearing elevations, the unsuitable soils should be undercut and replaced with approved structural fill or with lean concrete ($f'c \geq 1,000$ psi at 28 days) or No. 57 stone, as applicable, up to the original design bottom of footing elevation.

4.1.2 Floor Slabs

Provided subgrades and structural fills are prepared as discussed herein, the proposed floor slabs can be constructed as Ground Supported Slabs (or Slab-On-Grade). Based on a lowest finished floor elevation, it appears that the slabs will bear on compacted fill, Stratum I – LIMESTONE. However, there may be areas of loose or yielding soils that should be removed from below the structure foundation and the slab footprints, plus an extended horizontal distance of 5 feet and replaced with compacted structural fill in accordance with the recommendations included in this report.

The following graphic depicts our soil-supported slab recommendations:

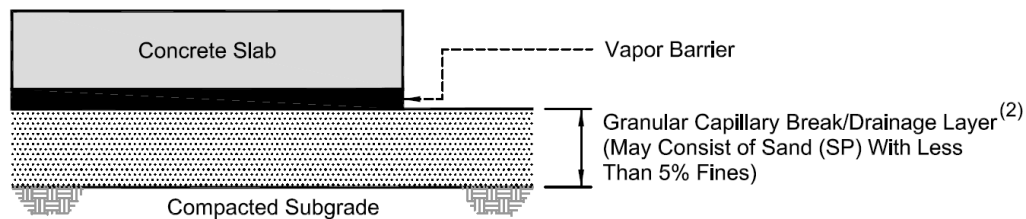


Figure 4.2.1

1. Drainage Layer Thickness: 4 inches
2. Drainage Layer Material: GRAVEL (GP, GW), SAND (SP, SW)

Soft or yielding soils may be encountered in some areas. Those soils should be removed and replaced with compacted Structural Fill in accordance with the recommendations included in this report.

Subgrade Modulus: Provided the Structural Fill and Granular Drainage Layer are constructed in accordance with our recommendations, the slab may be designed assuming a modulus of subgrade reaction, k_1 of 150 pci (lbs./cu. inch). The modulus of subgrade reaction value is based on a one foot by one foot plate load test basis.

Vapor Barrier: Before the placement of concrete, a vapor barrier may be placed on top of the granular drainage layer to provide additional protection against moisture penetration through the floor slab. When a vapor barrier is used, special attention should be given to surface curing of the slab to reduce the potential for uneven drying, curling and/or cracking of the slab. Depending on proposed flooring material types, the structural engineer and/or the architect may choose to eliminate the vapor barrier.

Slab Isolation: Soil-supported slabs should be isolated from the foundations and foundation-supported elements of the structure so that differential movement between the foundations and slab will not induce excessive shear and bending stresses in the floor slab. Where the structural configuration prevents the use of a free-floating slab such as in a drop-down footing/monolithic slab configuration, the slab should be designed with suitable reinforcement and load transfer devices to preclude overstressing of the slab.

4.1.3 Seismic Design Considerations

The 2018 Florida Building Code requires site classification for seismic design based on the upper 100 feet of a soil profile. Three methods are utilized in classifying sites, namely the shear wave velocity (v_s) method; the unconfined compressive strength (s_u) method; and the Standard Penetration Resistance (N-value) method. The N-value method was used for this project.

The seismic site class definitions for the weighted average of shear wave velocity or SPT N-value in the upper 100 feet of the soil profile are shown in the following table:

Site Class	Soil Profile Name	Shear Wave Velocity, V_s , (ft./s)	N value (bpf)
A	Hard Rock	$V_s > 5,000$ fps	N/A
B	Rock	$2,500 < V_s \leq 5,000$ fps	N/A
C	Very dense soil and soft rock	$1,200 < V_s \leq 2,500$ fps	>50
D	Stiff Soil Profile	$600 \leq V_s \leq 1,200$ fps	15 to 50
E	Soft Soil Profile	$V_s < 600$ fps	<15

The Site Class for the site was determined by calculating a weighted average SPT N-value for the top 100 feet of the subsurface profile. Based on the conditions encountered in the borings, we recommend that a Site Class “D” be used for design of the proposed building.

4.2 SITE DESIGN CONSIDERATIONS

4.2.1 Pavements

Subgrade Characteristics: Based on the results of our soil test borings, it appears that the soils that will be exposed as pavement subgrade will consist mainly of structural fill material and/or Limestone residuum. The pavement design assumes subgrades consist of suitable materials evaluated by ECS and placed and compacted to at least 98 percent of the maximum dry density as determined by the Standard Proctor test (ASTM D 1557).

Pavement Considerations: Pavement subgrades should be prepared in accordance with the recommendations in [Section 5.2 Structural Fill](#). We are providing recommendations for both standard duty and heavy duty flexible and rigid pavements sections. For the design and construction of exterior pavements, the subgrade should be prepared in strict accordance with the recommendations in the geotechnical report. An important consideration with the design and construction of pavements is surface and subsurface drainage. Where standing water develops, softening of the subgrade and other problems related to the premature deterioration of the pavement can be expected.

For flexible pavement, we recommend using a three-layer pavement section consisting of stabilized subgrade, base course, and surface course. For rigid pavement, we recommend using a two-layer pavement section of stabilized subgrade and surface course. The pavement layers may be placed on existing, prepared subgrade or compacted fill.

Pavement recommendations are based upon local experience with similar pavement conditions, Florida Department of Transportation (FDOT), and AASHTO Guide for Design of Pavement Structures.

A minimum separation of 18 inches should be maintained between the pavement aggregate base (limerock) or base course in asphalt pavement areas and the seasonal high groundwater levels. In most cases, this separation is available. No full depth asphalt sections are allowed. Recommended pavement sections are described below in Table 4.2.1.

Table 4.2.1: Pavement Structures Sections

Component	Asphalt		Concrete	
	Standard	Heavy	Standard	Heavy
Stabilized Subgrade	12"	12"	12"	12"
Base Course (Limerock)	6"	8"	-	-
Surface Course	2"	2.5"	5"	6"

Asphalt Surface Course (flexible): Prime and tack coats should be applied during the construction of the pavement sections in accordance with per Florida Department of Transportation (FDOT) Standard Specifications for Road and Bridge Construction (current edition). Before applying any bituminous material, all loose dust, dirt, and other foreign material which might prevent proper bond with the existing surface should be removed. Care should be taken in cleaning the outer edges, to ensure that the prime or tack coat will adhere. Prior to applying prime coat, the moisture content of the base should be checked to make sure that it does not exceed the optimum moisture.

The asphalt concrete pavement should consist of a Superpave mix Type SP as per FDOT Standard Specifications for Road and Bridge Construction (current edition), Section 334 Superpave Asphalt Concrete. Recycled Asphalt Pavement (RAP) and other recycled materials may be used as indicated in Section 334, previously mentioned. If this is to be a LEED certified project, credits may be awarded for using such materials.

During placement, the compaction efforts should be monitored by ECS, and asphalt should be compacted to a minimum 95 percent laboratory Marshall Density. After placement and field compaction, asphalt surface and base courses shall be randomly cored at minimum rate of three cores per day's placement per mix type, but not less than three cores in light duty areas and three cores in heavy-duty areas shall be obtained. Asphalt concrete pavement samples shall be tested for conformance with density and thickness requirements. Cores shall be cut from minimal loading areas representative of the project.

Concrete surface course (rigid): Our recommendations for heavy-duty portland cement concrete (pcc) pavement section is using unreinforced portland cement concrete surface course (Type 1) providing a minimum 28-day compressive strength of 4,000 pounds per square inch (psi). This section would be placed over the compacted limerock base course atop the stabilized subgrade. Appropriate steel reinforcing and jointing should also be incorporated into the design of all pcc. In addition, the concrete should provide a minimum 28-day flexural strength (modulus of rupture) of 600 psi, based on the third point loading of concrete beam samples.

Rigid pavement notes recommendations:

- The surface of the subgrade soils should be free of all soft, unstable, or unsatisfactory soil and smooth and uniform. Any disturbances or wheel rutting corrected prior to placement of concrete.
- The subgrade soils should be moistened not more than 24 hours prior to placement of concrete but there should be no standing water present during concrete placement.
- Concrete pavement thickness should be uniform throughout, with the exception to thickened edges (curbs or footings).
- The bottom of the pavement base course should be separated from the estimated typical wet season groundwater level by at least one and a half feet.
- Maximum Control Joint Spacing should be 12 feet by 12 feet
- Minimum Sawcut depth should be at least 1/4 of concrete thickness
- Isolation joints are recommended at the interface between concrete pavement and fixed objects such as drainage inlets, light poles, etc.
- Control joints should be sawed as soon as the concrete can withstand traffic and concrete surface and aggregate raveling can be prevented.

It is recommended that dowels be used for all construction joints for new pavements, the interface between new pavement and existing pavements, and interface at existing curb and gutter. It is recommended that 3/4-inch diameter smooth dowels 18 inches long spaced 12 inches on center be used. The full length of the dowels should be lightly oiled.

Base Course: Typically, the most prevalent flexible or rigid pavement base material in South Florida is limerock. Limerock is readily available from FDOT approved mines in South Florida. As an alternative base course, crushed concrete could be used. Limerock should have a minimum LBR of 100 and should be mined from an FDOT approved source. Limerock should be placed in maximum six-inch lifts and compacted to 98 percent of the Modified Proctor (ASTM D 1557) maximum dry density. Limerock pavement base shall be in accordance with Section 911 and 200 of the FDOT Specifications for Road and Bridge Construction (Current Edition).

Stabilized Subgrade: Stabilized subgrade soil material should be stabilized with rock to a minimum Limerock Bearing Ratio (LBR) of 40 percent, as specified by FDOT requirements for Type B or Type C Stabilized Subgrade. All stabilized subgrade materials should be compacted to 98 percent of the Modified Proctor (ASTM D1557) maximum dry density. Furthermore, the stabilized subgrade may be imported material or a blend of on-site soils and imported materials. If a blend is proposed, we recommend that the contractor perform a mix design to find the optimum mix proportions. It should be noted that a minimum of 97 percent of the stabilized material should pass a 3½ inch sieve.

Perform compliance testing for base course to a depth of one foot at a frequency of one test per 5,000 square feet, or at a minimum of two test locations, whichever is greater.

Pavement Subgrade Stabilization with Geogrid and/or Geotextile: In some of the parking and drive areas of the site, undercutting soft material may be considered inefficient. In such areas the use of a reinforcing geotextile or geogrid might be employed, under the advisement of ECS. Suitable stabilization materials may include medium duty woven geotextile fabrics or geogrids. The suitability and employment of reinforcing or stabilization products should be determined in the field by ECS personnel, in accordance with project specifications.

Perform compliance testing for base course to a depth of one foot at a frequency of one test per 5,000 square feet, or at a minimum of two test locations, whichever is greater.

4.2.2 Earth Retaining Walls Loading Docks

Based on our subsurface investigation we recommend using the parameters listed below for design.

Soil Parameters	0-20 feet (Limestone)
Coefficient of Earth Pressure at Rest (K _o):	0.42
Coefficient of Active Pressure at Rest (K _a):	0.74
Coefficient of Passive Earth Pressure (K _p):	3.70
Soil Moist Unit Weight (σ):	130 pcf
Cohesion (c):	0 psf
Angle of Internal Friction (φ):	35°
Sliding Friction Coefficient [Concrete on Soil] (μ):	0.35
Skin Friction [Concrete cast against Soil] (F _s):	250 psf

5.0 SITE CONSTRUCTION RECOMMENDATIONS

5.1 Subgrade Preparation

5.1.1 Previous Site Development

When reviewing our recommendations, please note that there are existing pavements on this site, and that previous grading activities have likely occurred on this site. Our experience with previously graded sites indicates that unexpected conditions can exist that were not encountered by the soil test borings. Unexpected conditions could include areas of soft or loose fill, debris-laden fill, and other obstructions or conditions. There is a possibility that existing underground utilities may be present and should be removed or abandoned in place. It should be noted that if existing or former underground utilities are abandoned and not removed or grouted full, soil may migrate into open voids (e.g., open pipes from utilities), causing subsidence of the overlying construction. These conditions should be addressed by on-site engineering evaluation by ECS during construction. In addition, existing utility lines, if located within proposed construction areas, may cause the new construction to behave unexpectedly due to the variable support conditions caused by old backfill. Furthermore, old backfill along utility lines also may provide inadequate support due to poor compaction. The poor support conditions may result in settlement or distress of the overlying new construction. Based on our experience, existing utility backfill rarely is suitable for support of new foundations. In slab areas, the load support characteristics of the backfill along utility lines typically

can be assessed with careful proofrolling and subgrade evaluation during construction. Some undercutting and/or bridging of these backfill areas should be anticipated if utilities are present.

5.1.2 Demolition

Site demolition should include the removal of existing asphalt, concrete curb and gutter, underground utilities and pipes from the proposed construction areas. Any underground utilities that may exist within the proposed building areas should be relocated, and any within proposed pavement areas should be evaluated by the design team and relocated or filled with grout, if necessary. The crushed stone on the ground surface in the existing pavement areas should be left in place in areas to be filled or can be excavated and re-used as compacted engineered fill. Excavations or cavities resulting from demolition should be backfilled with compacted structural backfill.

5.1.3 Stripping and Grubbing

The subgrade preparation should consist of stripping all vegetation, rootmat, topsoil, existing fill, existing pavements, and any soft or unsuitable materials. ECS should be retained to verify that topsoil and unsuitable surficial materials have been removed prior to the placement of structural fill or construction of structures.

5.1.4 Proofrolling

Prior to fill placement or other construction on subgrades, the subgrades should be evaluated by an ECS field technician. The exposed subgrade should be thoroughly proofrolled with construction equipment having a minimum axle load of 20 tons [e.g. fully loaded tandem-axle dump truck]. Proofrolling should be traversed in two perpendicular directions with overlapping passes of the vehicle under the observation of an ECS technician. This procedure is intended to assist in identifying any localized yielding materials.

Where proofrolling identifies areas that are unstable or “pumping” subgrade those areas should be repaired prior to the placement of any subsequent Structural Fill or other construction materials. Methods of stabilization include undercutting, moisture conditioning, or chemical stabilization. The situation should be discussed with ECS to determine the appropriate procedure. Test pits may be excavated to explore the shallow subsurface materials to help in determining the cause of the observed unstable materials, and to assist in the evaluation of appropriate remedial actions to stabilize the subgrade.

5.1.5 Site Temporary Dewatering

General Groundwater Conditions: The depth at which groundwater is present on the site varies with surface elevation and subject to local groundwater wells. Soils at contact with groundwater levels were very moist to wet. Based on the assumed finished floor and shallow foundation elevations we do not anticipate the need for dewatering. However, deeper utilities excavated more than 8 feet below the existing grade surface may require dewatering during installation.

Note that discharge of produced groundwater to surface waters of the state from dewatering operations or other site activities is regulated and would require temporary dewatering permits

from Miami-Dade County and the State of Florida Department of Environmental Protection (FDEP). This permit is termed a Generic Permit for the Discharge of Produced Groundwater from Any Non-Contaminated Site Activity. If discharge of produced groundwater is anticipated, we recommend sampling and testing of the groundwater early in the site design phase to prevent project delays during construction. ECS can provide the sampling, testing, and professional consulting required to evaluate compliance with the regulations.

5.1.6 Compaction

Subgrade Compaction: Upon completion of subgrade documentation, the exposed subgrade within the ten-foot expanded building limit should be moisture conditioned to within +/- two percent of the soil's optimum moisture content and be compacted with suitable equipment (minimum ten-ton roller) to a depth of ten inches. Subgrade compaction within the expanded building and pavement limits should be to a dry density of at least 98 percent of the Standard Proctor maximum dry density (ASTM D698). Beyond these areas, compaction of at least 95 percent should be achieved. ECS should be called on to document that proper subgrade compaction has been achieved.

Subgrade Compaction Control: The expanded limits of the proposed construction areas should be well defined, including the limits for buildings, fills, and slopes, etc. Field density testing of subgrades will be performed at frequencies in Table 5.1.6.1

Table 5.1.6.1 Frequency of Subgrade Compaction Testing

Location	Frequency of Tests
Expanded Building Limits	One test per 2,000 sq. ft.
Pavement Areas	One test per 5,000 sq. ft.
Utility Trenches	One test per 200 linear ft.
All Other Non-Critical Areas	One test per 5,000 sq. ft.

Subgrade Stabilization: In some areas, particularly low-lying, wet areas of the site, undercutting of excessively soft materials may be considered inefficient. In such areas the use of a reinforcing geotextile or geogrid might be employed, under the advisement of ECS. Suitable stabilization materials may include medium duty woven geotextile fabrics or geogrids. The suitability and employment of reinforcing or stabilization products should be determined in the field by ECS personnel, in accordance with project specifications.

5.2 STRUCTURAL FILL

Prior to placement of Structural Fill, representative bulk samples (about 50 pounds) of on-site and/or off-site borrow should be submitted to ECS for laboratory testing, which will typically include Atterberg limits, natural moisture content, grain-size distribution, and moisture-density relationships (i.e., Proctors) for compaction. Import materials should be tested prior to being hauled to the site to determine if they meet project specifications. Alternatively, Proctor data from other accredited laboratories can be submitted if the test results are within the last 90 days.

Satisfactory Structural Fill Materials: Materials satisfactory for use as Structural Fill should consist of inorganic soils with the following engineering properties and compaction requirements.

STRUCTURAL FILL INDEX PROPERTIES	
Subject	Property
Building and Pavement Areas	LL < 40, PI<6
Max. Particle Size	4 inches
Fines Content	Max. 25 % > #200 sieve
Max. organic content	5% by dry weight

STRUCTURAL FILL COMPACTION REQUIREMENTS	
Subject	Requirement
Compaction Standard	Standard Proctor, ASTM D1557
Required Compaction	95% of Max. Dry Density
Moisture Content	-2 to +3 % points of the soil's optimum value
Loose Thickness	8 inches prior to compaction

Fill Placement: Fill materials should not be placed on excessively wet soils. Excessively wet soils or aggregates should be scarified, aerated, and moisture conditioned.

At the end of each workday, all fill areas should be graded to facilitate drainage of any precipitation and the surface should be sealed by use of a smooth-drum roller to limit infiltration of surface water. During placement and compaction of new fill at the beginning of each workday, the Contractor may need to scarify existing subgrades to a depth on the order of four inches so that a weak plane will not be formed between the new fill and the existing subgrade soils.

Drying and compaction of wet soils is typically difficult during the rainy season. Accordingly, earthwork should be performed during the drier times of the year, if practical. Proper drainage should be maintained during the earthwork phases of construction to prevent ponding of water which tends to degrade subgrade soils. Alternatively, if these soils cannot be stabilized by conventional methods as previously discussed, additional modifications to the subgrade soils such as cement stabilization may be utilized to adjust the moisture content. If cement is utilized to control moisture contents and/or for stabilization, regular Type 1 cement can be used. The construction testing laboratory should evaluate proposed cement soil modification procedures, such as quantity of additive and mixing and curing procedures before implementation. The contractor should be required to minimize dusting or implement dust control measures, as required.

Fill material should be placed in horizontal lifts in confined areas such as utility trenches, portable compaction equipment and thin lifts of three inches to four inches may be required to achieve specified degrees of compaction.

We recommend that the grading contractor have equipment on site during earthwork for both drying and wetting fill soils. We do not anticipate significant problems in controlling moisture within the fill during dry weather, but moisture control may be difficult during extended periods of rain.

5.3 FOUNDATIONS AND FLOOR SLABS

Protection of Foundation Excavations: Exposure to the environment may weaken the soils at the footing bearing level if the foundation excavations remain open for too long a time. Therefore, foundation concrete should be placed the same day that excavations are made. If the bearing soils are softened by surface water intrusion or exposure, the softened soils must be removed from the foundation excavation bottom immediately prior to placement of concrete. If the excavation must remain open overnight, or if rainfall becomes imminent while the bearing soils are exposed, a one to three-inch thick “mud mat” of “lean” concrete should be placed on the bearing soils before the placement of reinforcing steel.

Footing Subgrade Observations: After over-excavation of the deleterious organic soils, most of the soils at the foundation bearing elevation are anticipated to be suitable for support of the proposed structure. It is important to have ECS observe the foundation subgrade prior to placing foundation concrete; to confirm the bearing soils are what was anticipated.

Slab Subgrade Verification: Prior to placement of a drainage layer, the subgrade should be prepared in accordance with the recommendations found in [Section 5.1.4 Proofrolling](#).

5.4 UTILITY INSTALLATIONS

Utility Subgrades: The soils encountered in our exploration are expected to be generally suitable for support of utility pipes. The pipe subgrades should be observed and probed for stability by ECS. Any loose or unsuitable materials encountered should be removed and replaced with suitable compacted structural fill, or pipe stone bedding material.

Utility Backfilling: The granular bedding material should be at least 4 inches thick, but not less than that specified by the civil engineer’s project drawings and specifications. We recommend that the bedding materials be placed up to the springline of the pipe. Fill placed for support of the utilities, as well as backfill over the utilities, should satisfy the requirements for [Section 5.1 Subgrade Preparation](#) and [Section 5.2 Structural Fill](#).

Excavation Safety: All excavations and slopes should be constructed and maintained in accordance with OSHA excavation safety standards. The contractor is solely responsible for designing, constructing, and maintaining stable temporary excavations and slopes. The contractor’s responsible person, as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the contractor’s safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations. ECS is providing this information solely as a service to our client. ECS is not assuming responsibility for construction site safety or the contractor’s activities; such responsibility is not being implied and should not be inferred.

6.0 CLOSING

ECS has prepared this report to guide the geotechnical-related design and construction aspects of the project. We performed these services in accordance with the standard of care expected of professionals in the industry performing similar services on projects of like size and complexity at this time in the region. No other representation expressed or implied, and no warranty or guarantee is included or intended in this report.

The description of the proposed project is based on information provided to ECS by Rooms To Go. If any of this information is inaccurate or changes, either because of our interpretation of the documents provided or site or design changes that may occur later, ECS should be contacted so we can review our recommendations and provide additional or alternate recommendations that reflect the proposed construction.

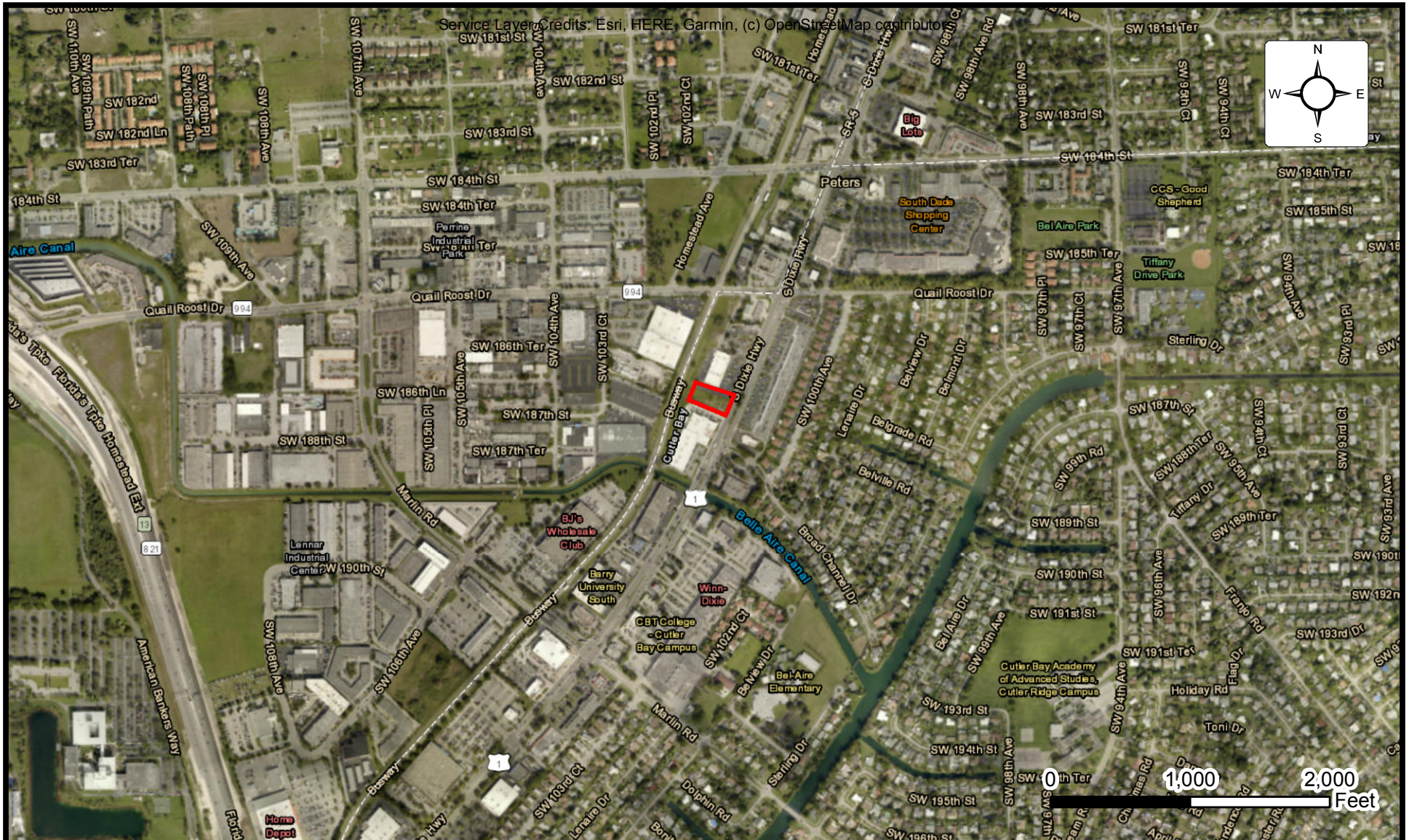
We recommend that ECS review the project plans and specifications so we can confirm that those plans/specifications are in accordance with the recommendations of this geotechnical report.

Field observations and quality assurance testing during earthwork and foundation installation are an extension of, and integral to, the geotechnical design. We recommend that ECS be retained to apply our expertise throughout the geotechnical phases of construction, and to provide consultation and recommendation should issues arise.

ECS is not responsible for the conclusions, opinions, or recommendations of others based on the data in this report.

APPENDIX A – Diagrams

Site Location Diagram
Boring Location Diagram
Subsurface Cross-Sections A-A'
Flood Map
Soil Survey Map



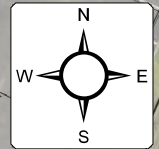
SITE LOCATION DIAGRAM PROPOSED ADDITION ROOMS TO GO - CUTLER RIDGE

18722 S DIXIE HIGHWAY, CUTLER BAY, FLORIDA
ROOMS TO GO









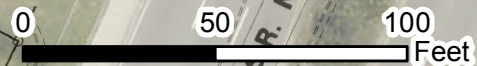
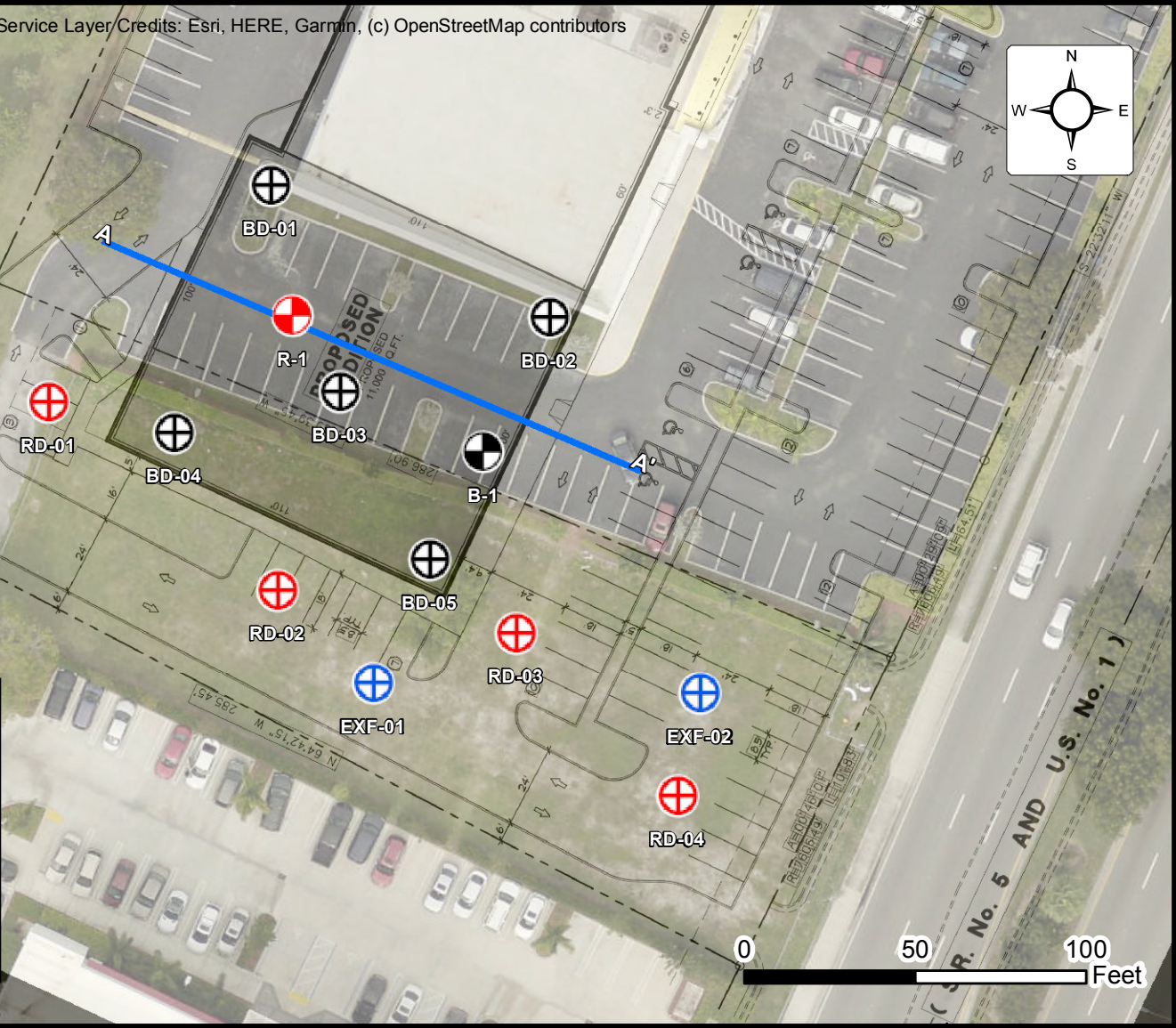
ENGINEER JM19
SCALE AS NOTED
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SHEET 1 OF 1
DATE 12/8/2021

Service Layer Credits: Esri, HERE, Garmin, (c) OpenStreetMap contributors



Legend

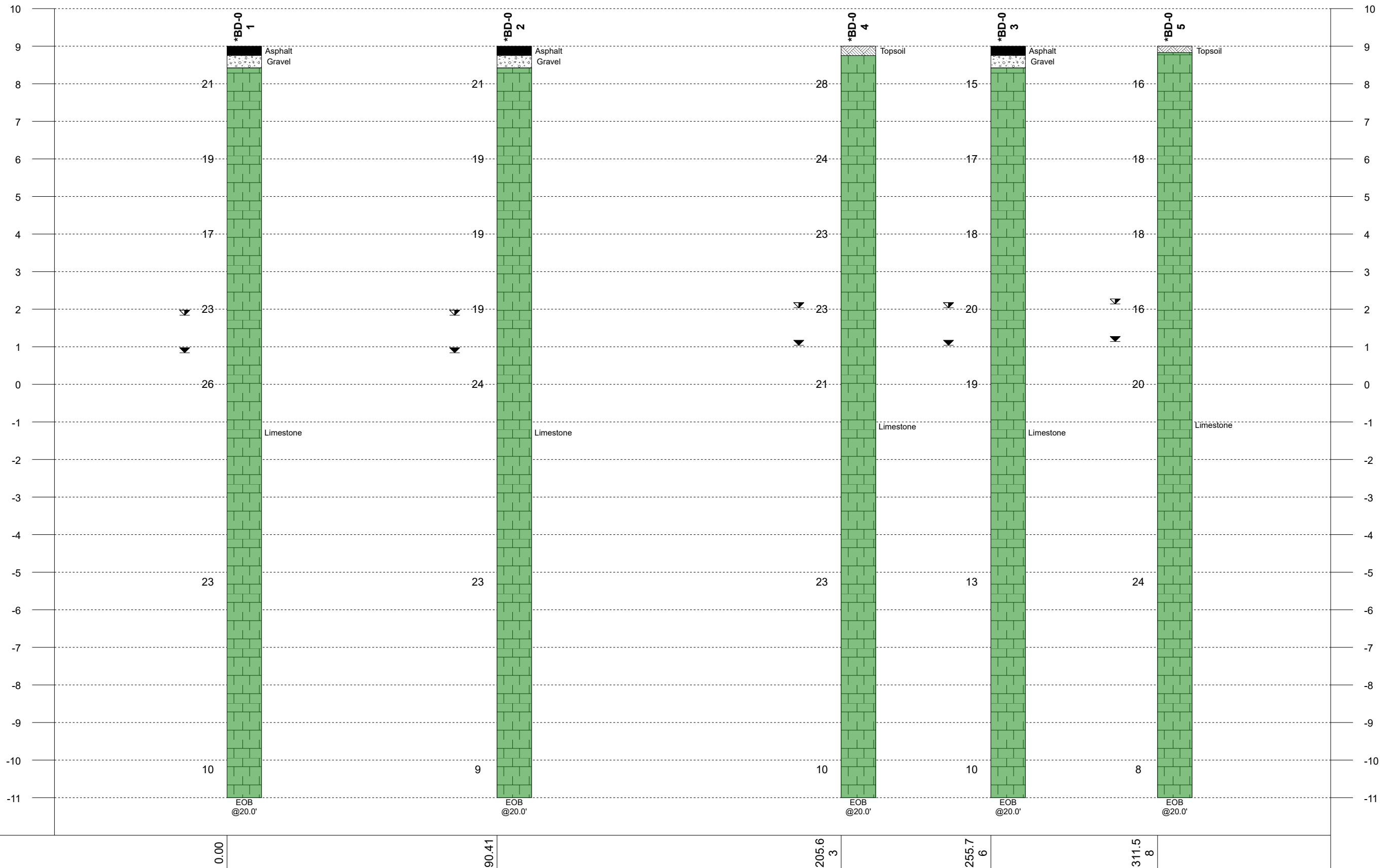
-  B Approximate Building Boring Location (June 2021)
-  BD Approximate Building Boring Locations
-  EXF Approximate Exfiltration Test Location
-  R Approximate Roadway Exfiltration Testing Location (June 2021)
-  RD Approximate Roadway Boring Locations
-  Approximate Profile Location




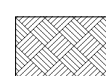
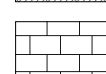
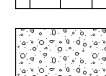
BORING LOCATION DIAGRAM PROPOSED ADDITION ROOMS TO GO - CUTLER RIDGE

18722 S DIXIE HIGHWAY, CUTLER BAY, FLORIDA
ROOMS TO GO

ENGINEER JM19
SCALE AS NOTED
PROJECT NO. 25:3768
SHEET 1 OF 1
DATE 12/8/2021



Legend Key

-  Asphalt
-  Topsoil
-  Limestone
-  Gravel or Conglo...

-12.00

Notes:
 1- EOB: END OF BORING AR: AUGER REFUSAL SR: SAMPLER REFUSAL.
 2- THE NUMBER BELOW THE STRIPS IS THE DISTANCE ALONG THE BASELINE.
 3- SEE INDIVIDUAL BORING LOG AND GEOTECHNICAL INFORMATION.
 4- STANDARD PENETRATION TEST RESISTANCE (LEFT OF BORING) IN BLOWS PER FOOT (ASTM D1586).

Plastic Limit	Water Content	Liquid Limit	▽	WL (First Encountered)		Fill
X	●	△	▼	WL (Completion)		Possible Fill
[FINES CONTENT%]			▽	WL (Seasonal High Water)		Probable Fill
	BOTTOM OF CASING		▽	WL (Stabilized)		Rock
	LOSS OF CIRCULATION					



GENERALIZED SUBSURFACE SOIL PROFILE A-A'

Proposed Rooms To Go - Cutler Ridge

Rooms To Go

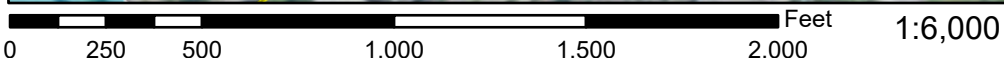
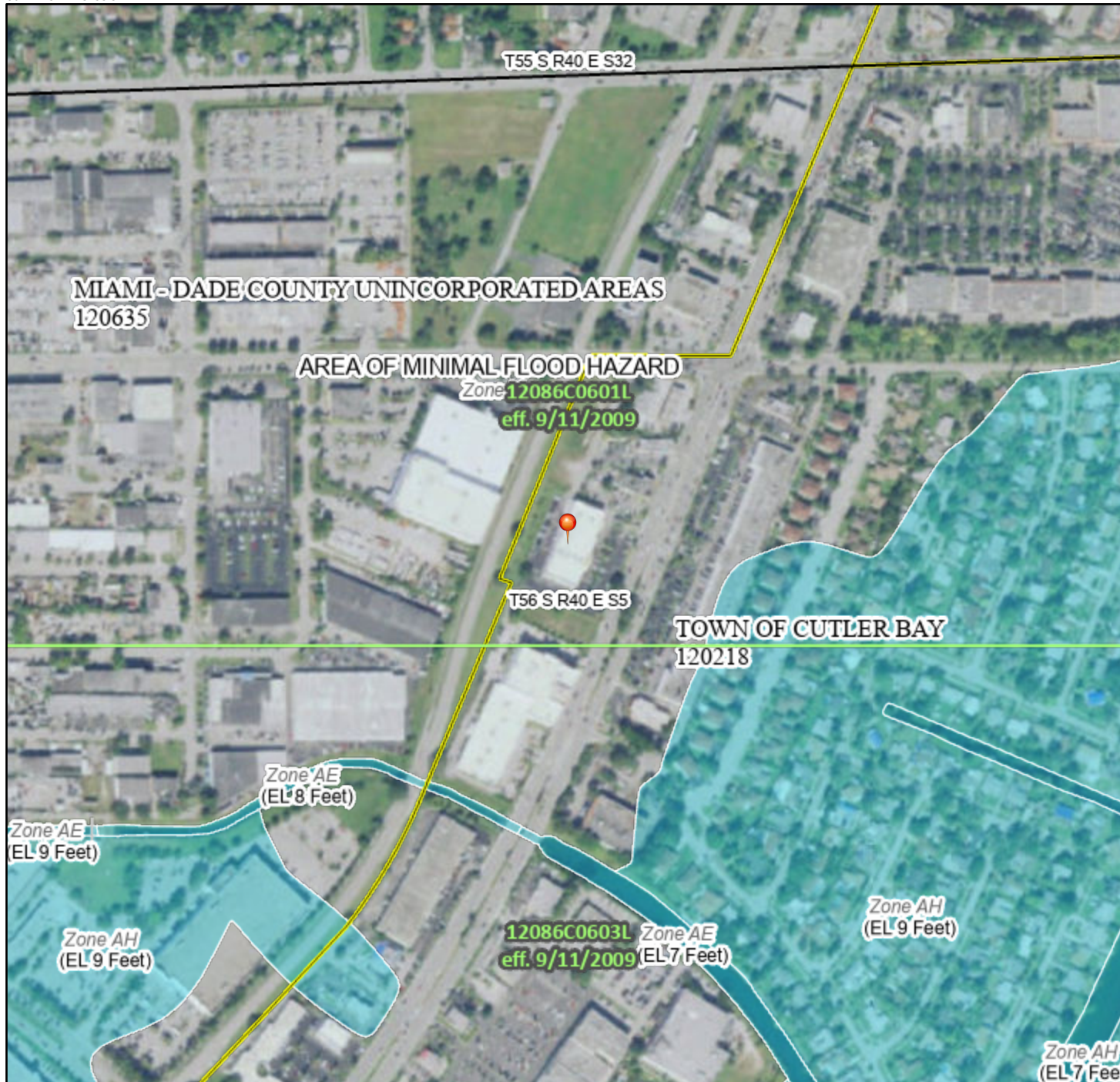
18722 S Dixie Highway, Cutler bay, Florida 33157

Project No: 25:3768 Date: 12/06/2021

National Flood Hazard Layer FIRMette



80°21'43"W 25°35'57"N



Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

- | | | |
|------------------------------------|--|--|
| SPECIAL FLOOD HAZARD AREAS | | Without Base Flood Elevation (BFE)
<i>Zone A, V, A99</i> |
| | | With BFE or Depth <i>Zone AE, AO, AH, VE, AR</i> |
| | | Regulatory Floodway |
| OTHER AREAS OF FLOOD HAZARD | | 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile <i>Zone X</i> |
| | | Future Conditions 1% Annual Chance Flood Hazard <i>Zone X</i> |
| | | Area with Reduced Flood Risk due to Levee. See Notes. <i>Zone X</i> |
| | | Area with Flood Risk due to Levee <i>Zone D</i> |
| OTHER AREAS | | NO SCREEN Area of Minimal Flood Hazard <i>Zone X</i> |
| | | Effective LOMRs |
| | | Area of Undetermined Flood Hazard <i>Zone D</i> |
| GENERAL STRUCTURES | | Channel, Culvert, or Storm Sewer |
| | | Levee, Dike, or Floodwall |
| OTHER FEATURES | | 20.2 Cross Sections with 1% Annual Chance |
| | | 17.5 Water Surface Elevation |
| | | Coastal Transect |
| | | Base Flood Elevation Line (BFE) |
| | | Limit of Study |
| | | Jurisdiction Boundary |
| | | Coastal Transect Baseline |
| | | Profile Baseline |
| | | Hydrographic Feature |
| MAP PANELS | | Digital Data Available |
| | | No Digital Data Available |
| | | Unmapped |



The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **12/6/2021 at 11:27 AM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Geologic Map of the State of Florida - Southern Peninsula

by Thomas M. Scott, P. G. #99, Kenneth M. Campbell, Frank R. Rupert, Jonathan D. Arthur,
Thomas M. Missimer, Jacqueline M. Lloyd, J. William Yon, and Joel G. Duncan

Quaternary

Holocene

Qh Holocene sediments

Pleistocene/Holocene

Qal Alluvium

Qbd Beach ridge and dune

Qu Undifferentiated sediments

Pleistocene

Qa Anastasia Formation

Qk Key Largo Limestone

Qm Miami Limestone

Qtr Trail Ridge sands

Tertiary/Quaternary

Pliocene/Pleistocene

TQsu Shelly sediments of Plio-Pleistocene age

TQu Undifferentiated sediments

TQd Dunes

TQuc Reworked Cypresshead sediments

Tertiary

Pliocene

Tc Cypresshead Formation

Tci Citronelle Formation

Tmc Miccosukee Formation

Tic Intracoastal Formation

Tt Tamiami Formation

Tjb Jackson Bluff Formation

Miocene/Pliocene

Thcc Hawthorn Group, Coosawatchie Formation, Charlton Member

Thp Hawthorn Group, Peace River Formation

Thpb Hawthorn Group, Peace River Formation, Bone Valley Member

Miocene

Trm Residuum on Miocene sediments

Tab Alum Bluff Group

Th Hawthorn Group

Thc Hawthorn Group, Coosawatchie Formation

Ths Hawthorn Group, Statenville Formation

Tht Hawthorn Group, Torreya Formation

Tch Chatahoocsee Formation

Tsmk St. Marks Formation

Oligocene/Miocene

Tha Hawthorn Group, Arcadia Formation

That Hawthorn Group, Arcadia Formation, Tampa Member

Oligocene

Tro Residuum on Oligocene sediments

Ts Suwannee Limestone

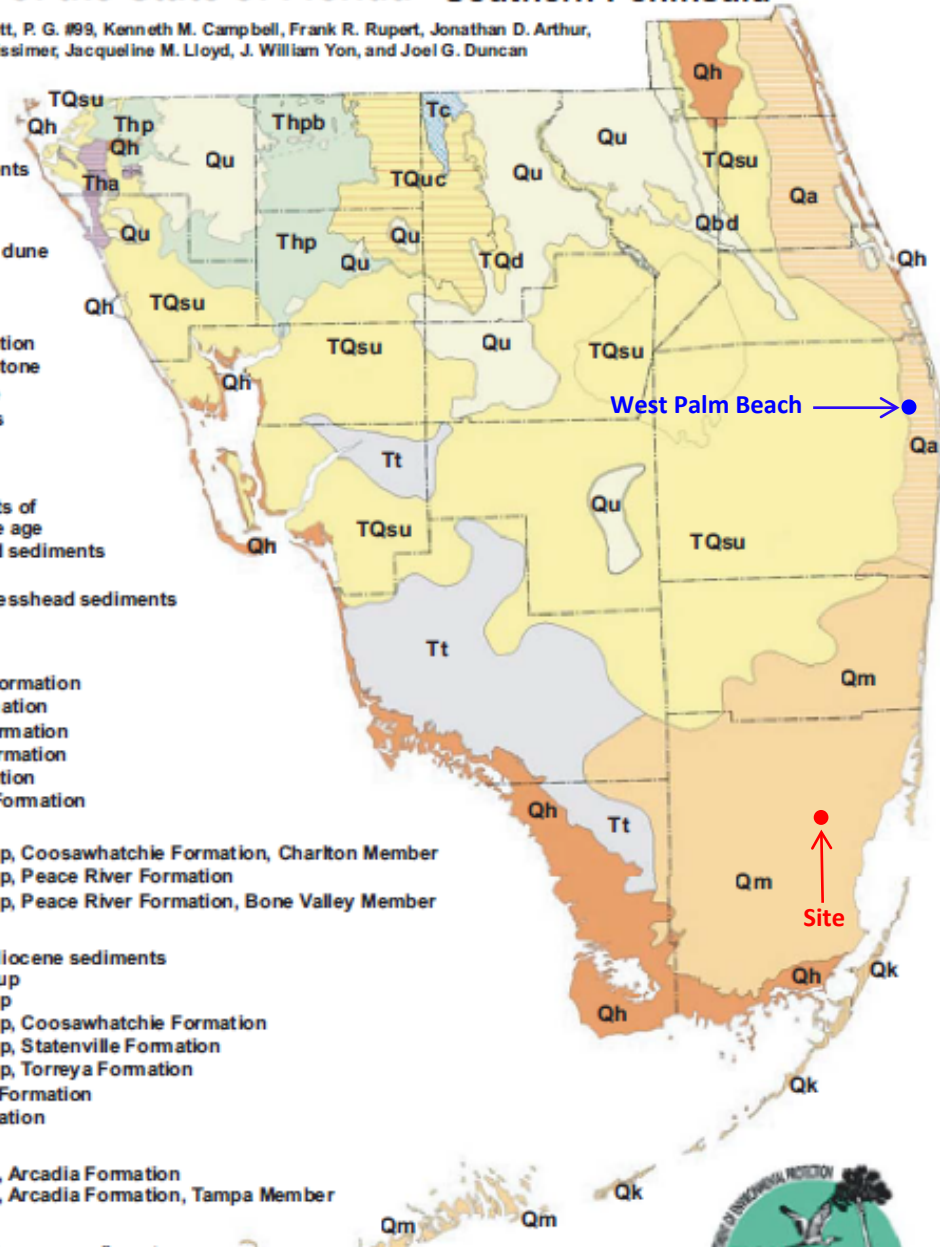
Tsm Suwannee Limestone - Marianna Limestone undifferentiated

Eocene

Tre Residuum on Eocene sediments

To Ocala Limestone

Tap Avon Park Formation



West Palm Beach → ●

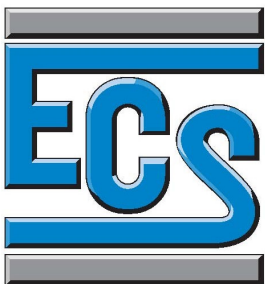
↑ ● Site



Scale 1:750,000
Albers Conic Equal-Area Projection



SOFIA - <http://sofia.usgs.gov>

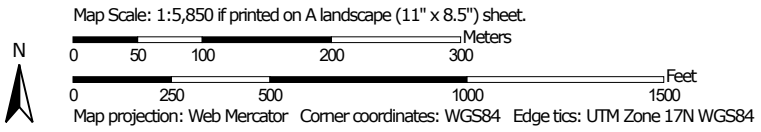


GEOLOGIC MAP FIGURE 3.2.1

OBTAINED FROM THE UNITED STATE GEOLOGICAL SURVEY PUBLICATIONS
WAREHOUSE WEBISTE

https://sofia.er.usgs.gov/publications/maps/florida_geology/#sections

Soil Map—Miami-Dade County Area, Florida
(Proposed Rooms To Go - Cutler Ridge)



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

Water Features



Streams and Canals

Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

Background



Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Miami-Dade County Area, Florida

Survey Area Data: Version 13, Aug 25, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jan 21, 2021—Apr 2, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
10	Udorthents, limestone substratum-Urban land complex, 0 to 2 percent slopes	3.2	2.5%
11	Udorthents, marl substratum-Urban land complex, 0 to 2 percent slopes	26.3	20.8%
15	Urban land, 0 to 2 percent slopes	95.8	75.7%
99	Water	1.2	1.0%
Totals for Area of Interest		126.6	100.0%

APPENDIX B – Field Operations

Reference Notes for Boring Logs

Subsurface Exploration Procedure: Standard Penetration Testing (SPT)

Boring Logs

Exfiltration Test Results



REFERENCE NOTES FOR BORING LOGS

MATERIAL ^{1,2}	
	ASPHALT
	CONCRETE
	GRAVEL
	TOPSOIL
	VOID
	BRICK
	AGGREGATE BASE COURSE
	GW WELL-GRADED GRAVEL gravel-sand mixtures, little or no fines
	GP POORLY-GRADED GRAVEL gravel-sand mixtures, little or no fines
	GM SILTY GRAVEL gravel-sand-silt mixtures
	GC CLAYEY GRAVEL gravel-sand-clay mixtures
	SW WELL-GRADED SAND gravelly sand, little or no fines
	SP POORLY-GRADED SAND gravelly sand, little or no fines
	SM SILTY SAND sand-silt mixtures
	SC CLAYEY SAND sand-clay mixtures
	ML SILT non-plastic to medium plasticity
	MH ELASTIC SILT high plasticity
	CL LEAN CLAY low to medium plasticity
	CH FAT CLAY high plasticity
	OL ORGANIC SILT or CLAY non-plastic to low plasticity
	OH ORGANIC SILT or CLAY high plasticity
	PT PEAT highly organic soils

DRILLING SAMPLING SYMBOLS & ABBREVIATIONS			
SS	Split Spoon Sampler	PM	Pressuremeter Test
ST	Shelby Tube Sampler	RD	Rock Bit Drilling
WS	Wash Sample	RC	Rock Core, NX, BX, AX
BS	Bulk Sample of Cuttings	REC	Rock Sample Recovery %
PA	Power Auger (no sample)	RQD	Rock Quality Designation %
HSA	Hollow Stem Auger		

PARTICLE SIZE IDENTIFICATION		
DESIGNATION	PARTICLE SIZES	
Boulders	12 inches (300 mm) or larger	
Cobbles	3 inches to 12 inches (75 mm to 300 mm)	
Gravel:	Coarse	¾ inch to 3 inches (19 mm to 75 mm)
	Fine	4.75 mm to 19 mm (No. 4 sieve to ¾ inch)
Sand:	Coarse	2.00 mm to 4.75 mm (No. 10 to No. 4 sieve)
	Medium	0.425 mm to 2.00 mm (No. 40 to No. 10 sieve)
	Fine	0.074 mm to 0.425 mm (No. 200 to No. 40 sieve)
Silt & Clay ("Fines")	<0.074 mm (smaller than a No. 200 sieve)	

COHESIVE SILTS & CLAYS		
UNCONFINED COMPRESSIVE STRENGTH, QP ⁴	SPT ⁵ (BPF)	CONSISTENCY ⁷ (COHESIVE)
<0.25	<2	Very Soft
0.25 - <0.50	3 - 4	Soft
0.50 - <1.00	5 - 8	Firm
1.00 - <2.00	9 - 15	Stiff
2.00 - <4.00	16 - 30	Very Stiff
4.00 - 8.00	31 - 50	Hard
>8.00	>50	Very Hard

RELATIVE AMOUNT ⁷	COARSE GRAINED (%) ⁸	FINE GRAINED (%) ⁸
Trace	≤5	≤5
With	10 - 20	10 - 25
Adjective (ex: "Silty")	25 - 45	30 - 45

GRAVELS, SANDS & NON-COHESIVE SILTS	
SPT ⁵	DENSITY
<5	Very Loose
5 - 10	Loose
11 - 30	Medium Dense
31 - 50	Dense
>50	Very Dense

WATER LEVELS ⁶	
	WL (First Encountered)
	WL (Completion)
	WL (Seasonal High Water)
	WL (Stabilized)

FILL AND ROCK			
FILL	POSSIBLE FILL	PROBABLE FILL	ROCK

¹Classifications and symbols per ASTM D 2488-17 (Visual-Manual Procedure) unless noted otherwise.

²To be consistent with general practice, "POORLY GRADED" has been removed from GP, GP-GM, GP-GC, SP, SP-SM, SP-SC soil types on the boring logs.

³Non-ASTM designations are included in soil descriptions and symbols along with ASTM symbol [Ex: (SM-FILL)].

⁴Typically estimated via pocket penetrometer or Torvane shear test and expressed in tons per square foot (tsf).

⁵Standard Penetration Test (SPT) refers to the number of hammer blows (blow count) of a 140 lb. hammer falling 30 inches on a 2 inch OD split spoon sampler required to drive the sampler 12 inches (ASTM D 1586). "N-value" is another term for "blow count" and is expressed in blows per foot (bpf). SPT correlations per 7.4.2 Method B and need to be corrected if using an auto hammer.

⁶The water levels are those levels actually measured in the borehole at the times indicated by the symbol. The measurements are relatively reliable when augering, without adding fluids, in granular soils. In clay and cohesive silts, the determination of water levels may require several days for the water level to stabilize. In such cases, additional methods of measurement are generally employed.

⁷Minor deviation from ASTM D 2488-17 Note 14.

⁸Percentages are estimated to the nearest 5% per ASTM D 2488-17.



SUBSURFACE EXPLORATION PROCEDURE: STANDARD PENETRATION TESTING (SPT) ASTM D 1586 Split-Barrel Sampling

Standard Penetration Testing, or **SPT**, is the most frequently used subsurface exploration test performed worldwide. This test provides samples for identification purposes, as well as a measure of penetration resistance, or N-value. The N-Value, or blow counts, when corrected and correlated, can approximate engineering properties of soils used for geotechnical design and engineering purposes.

SPT Procedure:

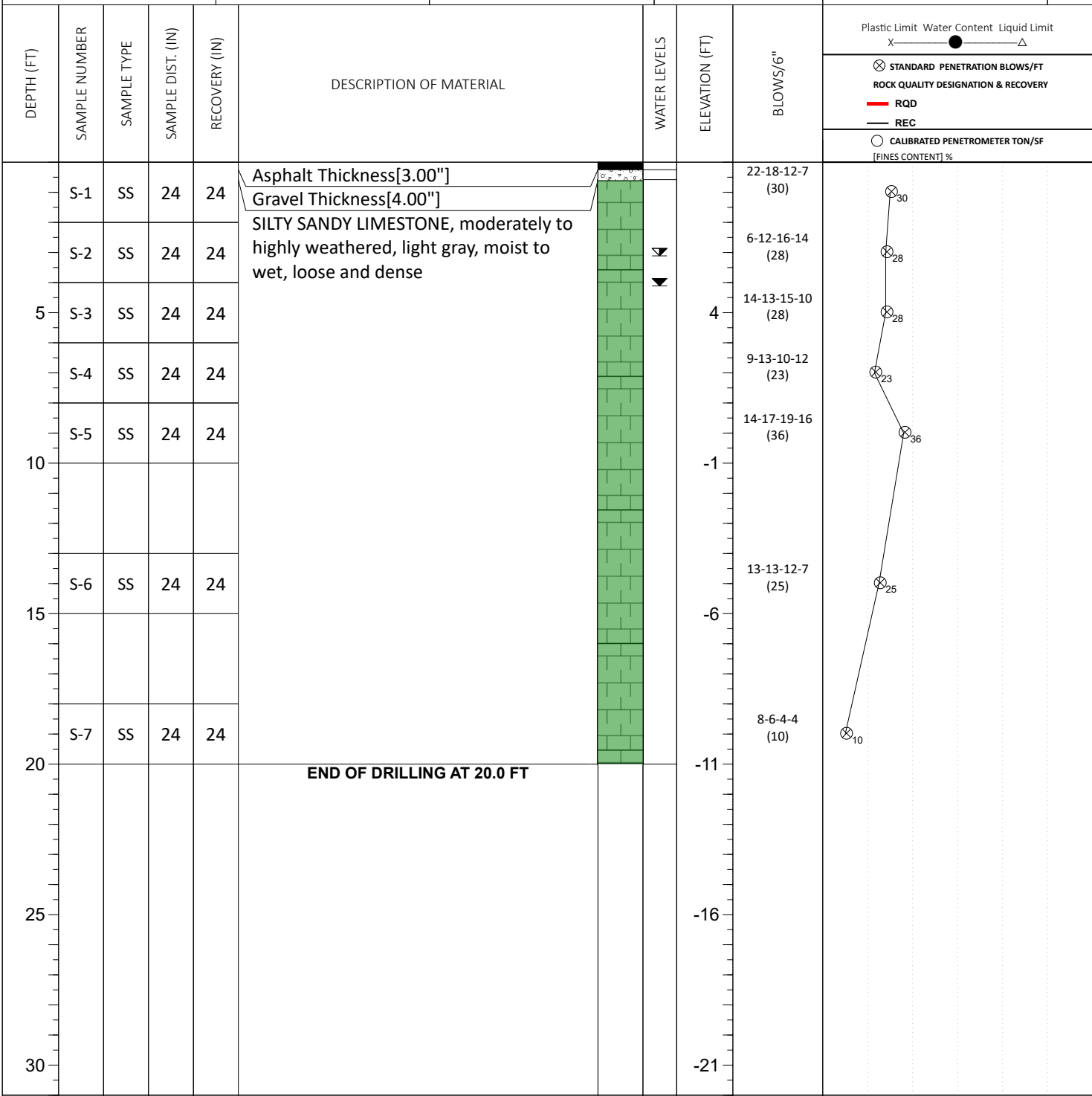
- Involves driving a hollow tube (split-spoon) into the ground by dropping a 140-lb hammer a height of 30-inches at desired depth
- Recording the number of hammer blows required to drive split-spoon a distance of 24 inches (in 3 or 4 Increments of 6 inches each)
- Auger is advanced* and an additional SPT is performed
- One SPT test is typically performed for every two to five feet
- Obtain two-inch diameter soil sample



**Drilling Methods May Vary*— The predominant drilling methods used for SPT are open hole fluid rotary drilling and hollow-stem auger drilling.

SITE LOCATION:
18722 S Dixie Highway, Cutler bay, Florida 33157

NORTHING: -1583619.1	EASTING: 3552692.5	STATION:	SURFACE ELEVATION: 9.0	LOSS OF CIRCULATION 
				BOTTOM OF CASING 



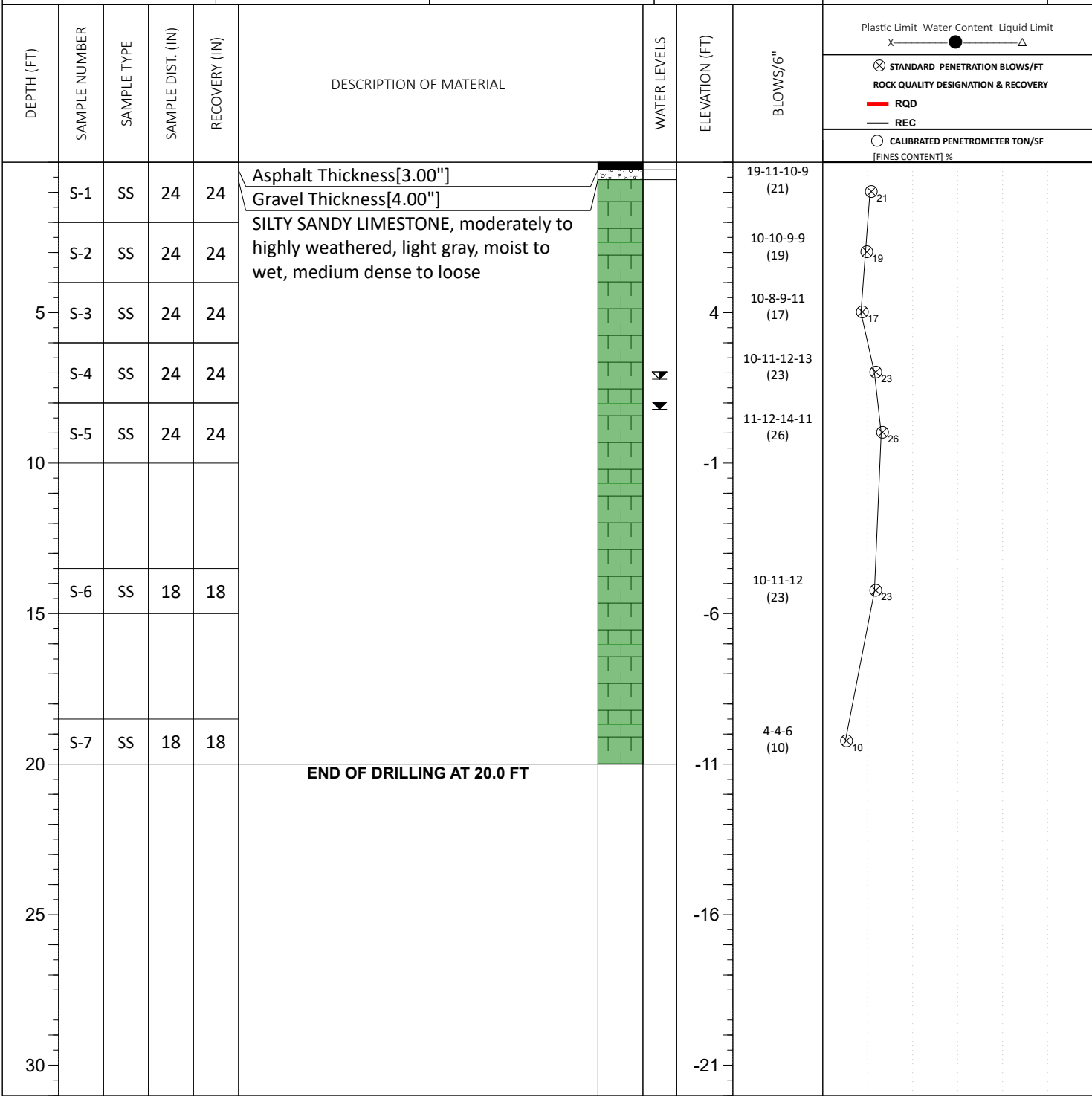
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

∇ WL (First Encountered) ▼ WL (Completion) 4.00 ∇ WL (Seasonal High Water) 3.00 ∇ WL (Stabilized)	BORING STARTED: Jun 30 2021 BORING COMPLETED: Jun 30 2021 EQUIPMENT: Truck	CAVE IN DEPTH: HAMMER TYPE: Auto DRILLING METHOD: CME 75	LOGGED BY: BAH1
--	---	--	------------------------

GEOTECHNICAL BOREHOLE LOG

SITE LOCATION:
18722 S Dixie Highway, Cutler bay, Florida 33157

NORTHING: -1583542.6	EASTING: 3552628.2	STATION:	SURFACE ELEVATION: 9.0	LOSS OF CIRCULATION
				BOTTOM OF CASING



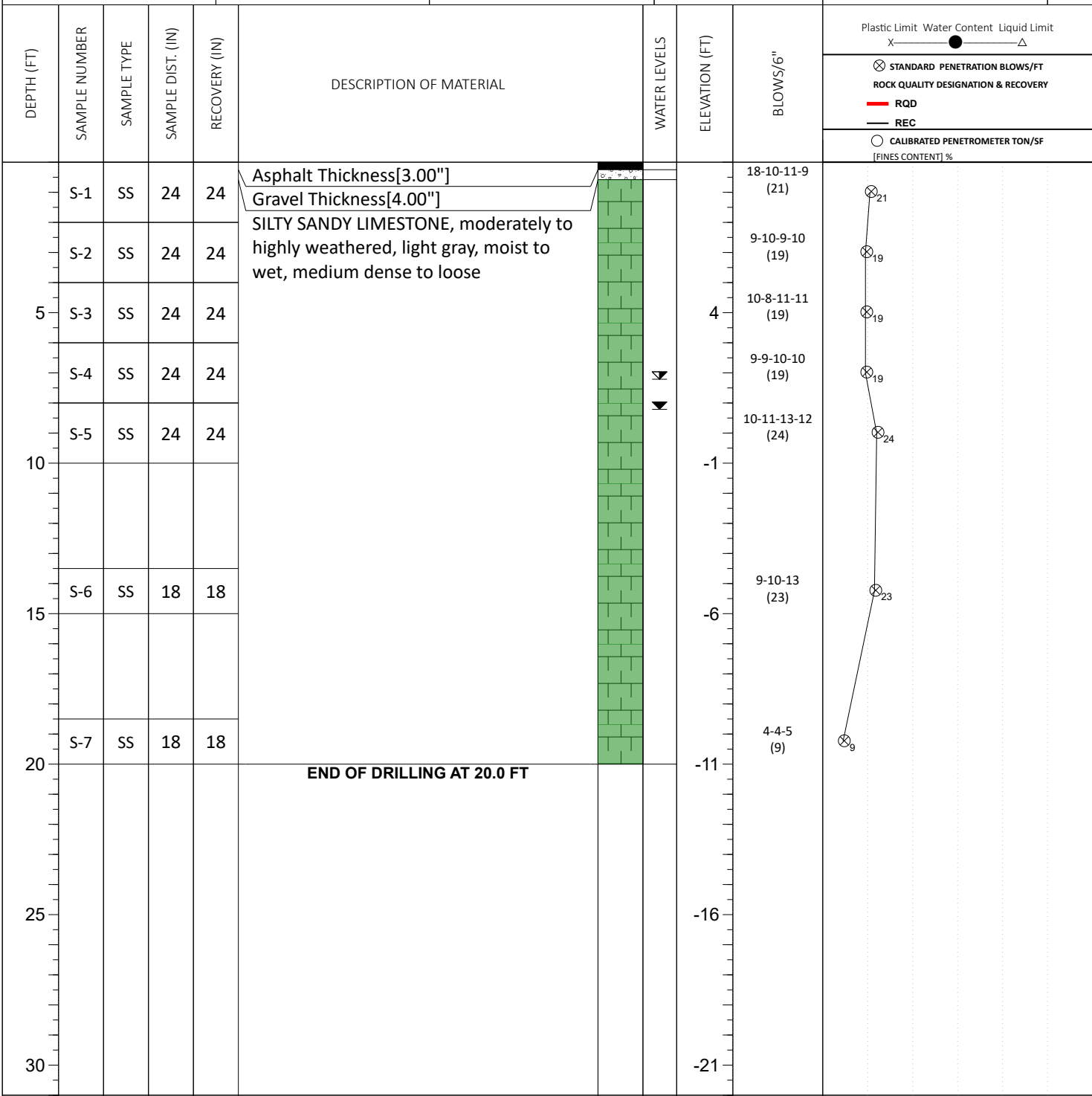
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

∇ WL (First Encountered) ▼ WL (Completion) 8.10 ∇ WL (Seasonal High Water) 7.10 ∇ WL (Stabilized)	BORING STARTED: Nov 23 2021 BORING COMPLETED: Nov 24 2021 EQUIPMENT: Truck	CAVE IN DEPTH: HAMMER TYPE: Auto DRILLING METHOD: D-90	LOGGED BY: BAH1
--	---	--	------------------------

GEOTECHNICAL BOREHOLE LOG

SITE LOCATION:
18722 S Dixie Highway, Cutler bay, Florida 33157

NORTHING: -1583579.4	EASTING: 3552710.8	STATION:	SURFACE ELEVATION: 9.0	LOSS OF CIRCULATION 
				BOTTOM OF CASING 

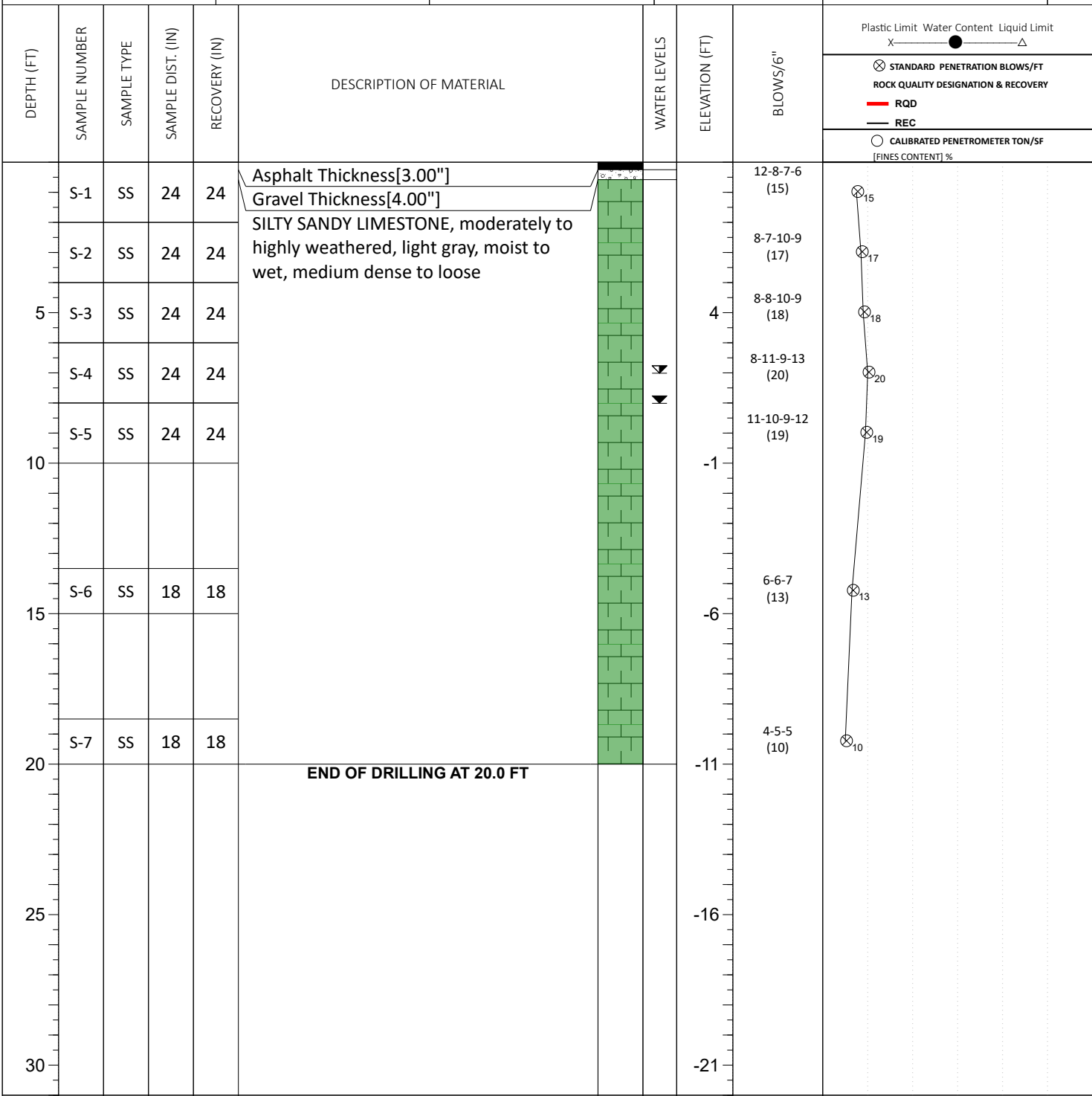


THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

∇ WL (First Encountered) ▼ WL (Completion) 8.10 ∇ WL (Seasonal High Water) 7.10 ∇ WL (Stabilized)	BORING STARTED: Nov 23 2021 BORING COMPLETED: Nov 24 2021 EQUIPMENT: Truck	CAVE IN DEPTH: HAMMER TYPE: Auto DRILLING METHOD: D-90	LOGGED BY: BAH1
--	---	--	------------------------

GEOTECHNICAL BOREHOLE LOG

SITE LOCATION: 18722 S Dixie Highway, Cutler bay, Florida 33157	LOSS OF CIRCULATION	
NORTHING: -1583602.7	EASTING: 3552649.9	STATION:
		SURFACE ELEVATION: 9.0
		BOTTOM OF CASING



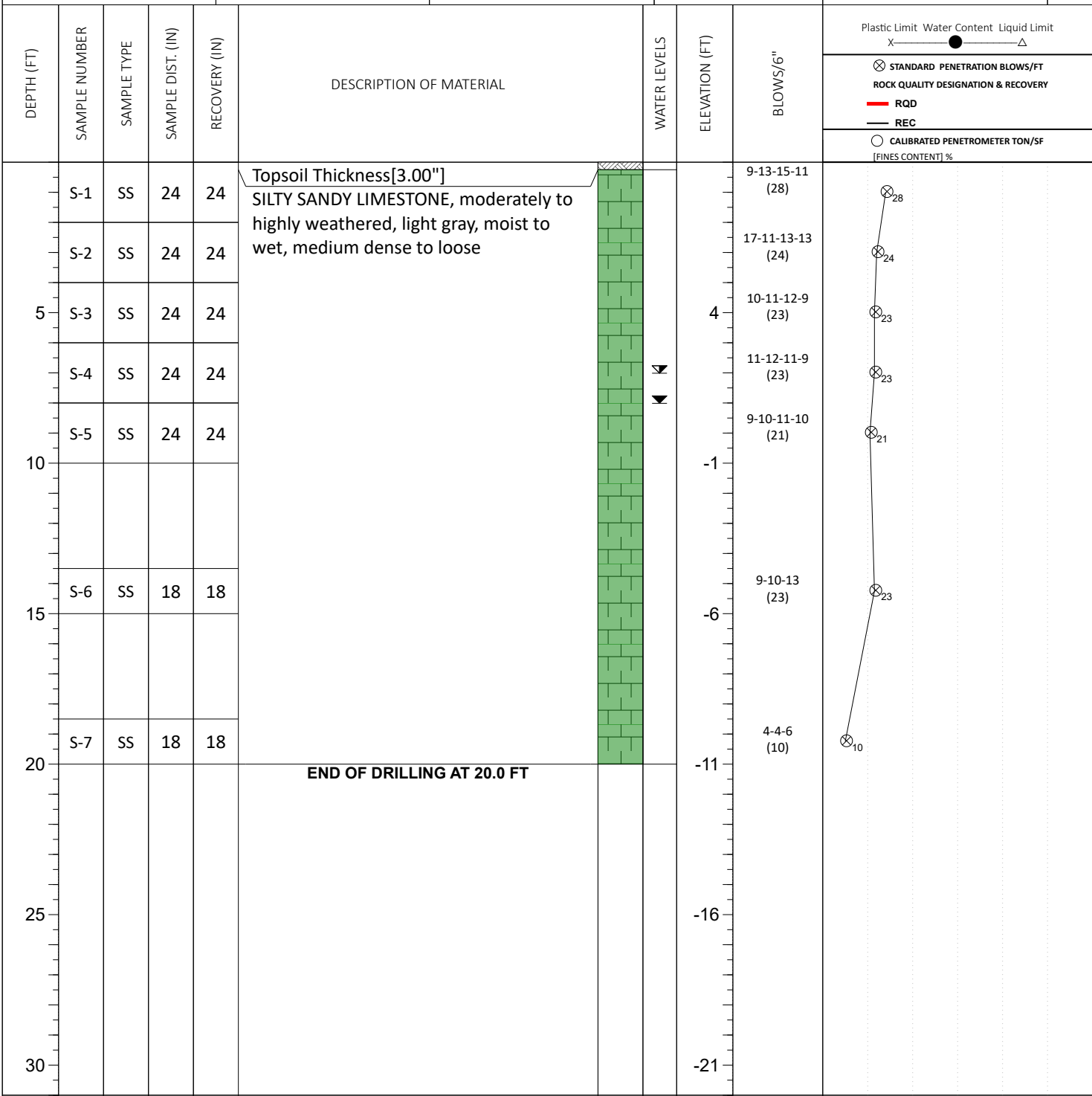
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

∇ WL (First Encountered) ▼ WL (Completion) 7.90 ∇ WL (Seasonal High Water) 6.90 ∇ WL (Stabilized)	BORING STARTED: Nov 23 2021 BORING COMPLETED: Nov 24 2021 EQUIPMENT: Truck	CAVE IN DEPTH: HAMMER TYPE: Auto DRILLING METHOD: D-90	LOGGED BY: BAH1
--	---	--	---------------------------

GEOTECHNICAL BOREHOLE LOG

SITE LOCATION:
18722 S Dixie Highway, Cutler bay, Florida 33157

NORTHING: -1583616.0	EASTING: 3552601.6	STATION:	SURFACE ELEVATION: 9.0	LOSS OF CIRCULATION
				BOTTOM OF CASING



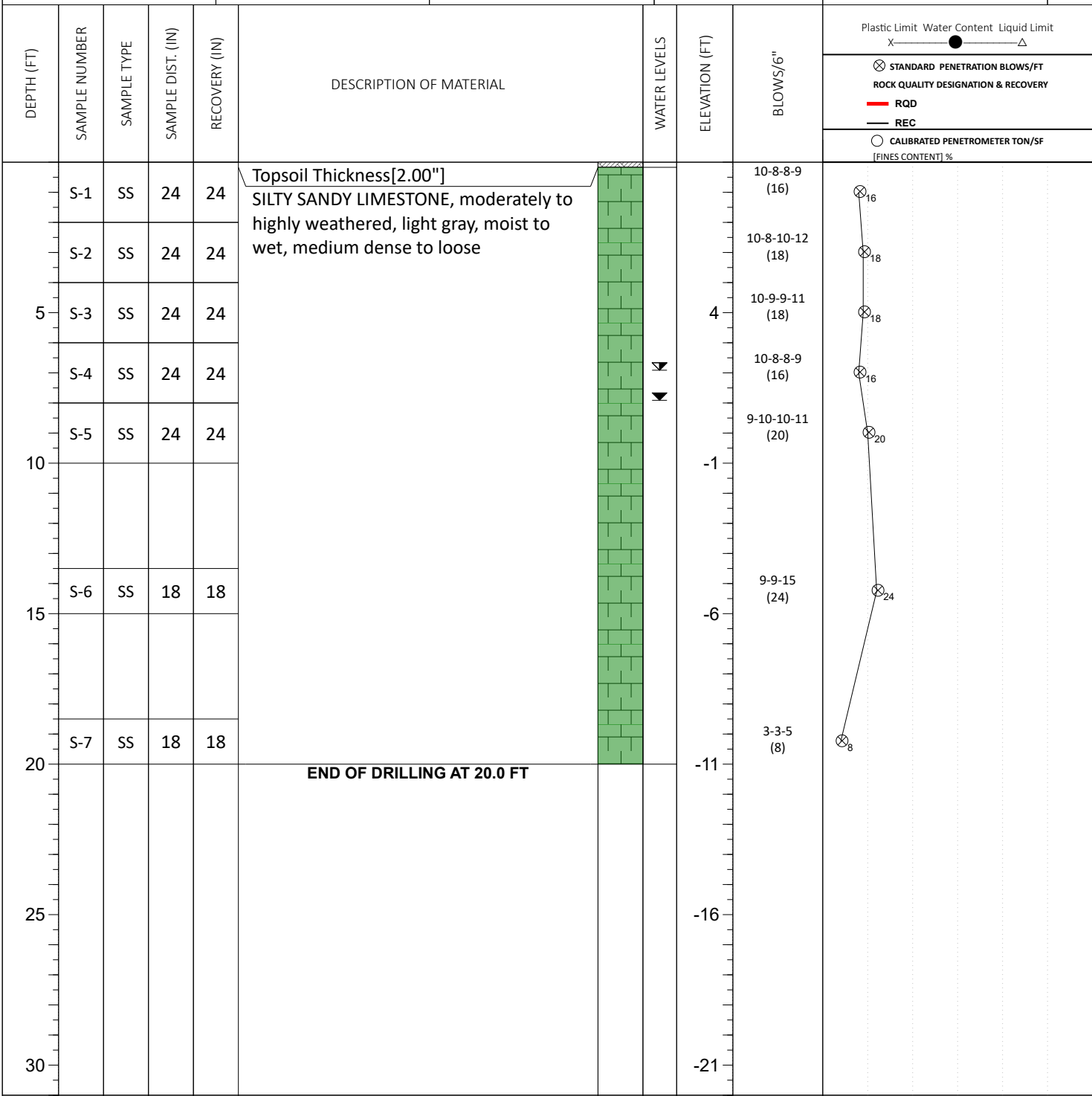
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

∇ WL (First Encountered) ▼ WL (Completion) 7.90 ∇ WL (Seasonal High Water) 6.90 ∇ WL (Stabilized)	BORING STARTED: Nov 23 2021 BORING COMPLETED: Nov 24 2021 EQUIPMENT: Truck	CAVE IN DEPTH: HAMMER TYPE: Auto DRILLING METHOD: D-90	LOGGED BY: BAH1
--	---	--	------------------------

GEOTECHNICAL BOREHOLE LOG

SITE LOCATION:
18722 S Dixie Highway, Cutler bay, Florida 33157

NORTHING: -1583651.3	EASTING: 3552677.4	STATION:	SURFACE ELEVATION: 9.0	LOSS OF CIRCULATION 
				BOTTOM OF CASING 

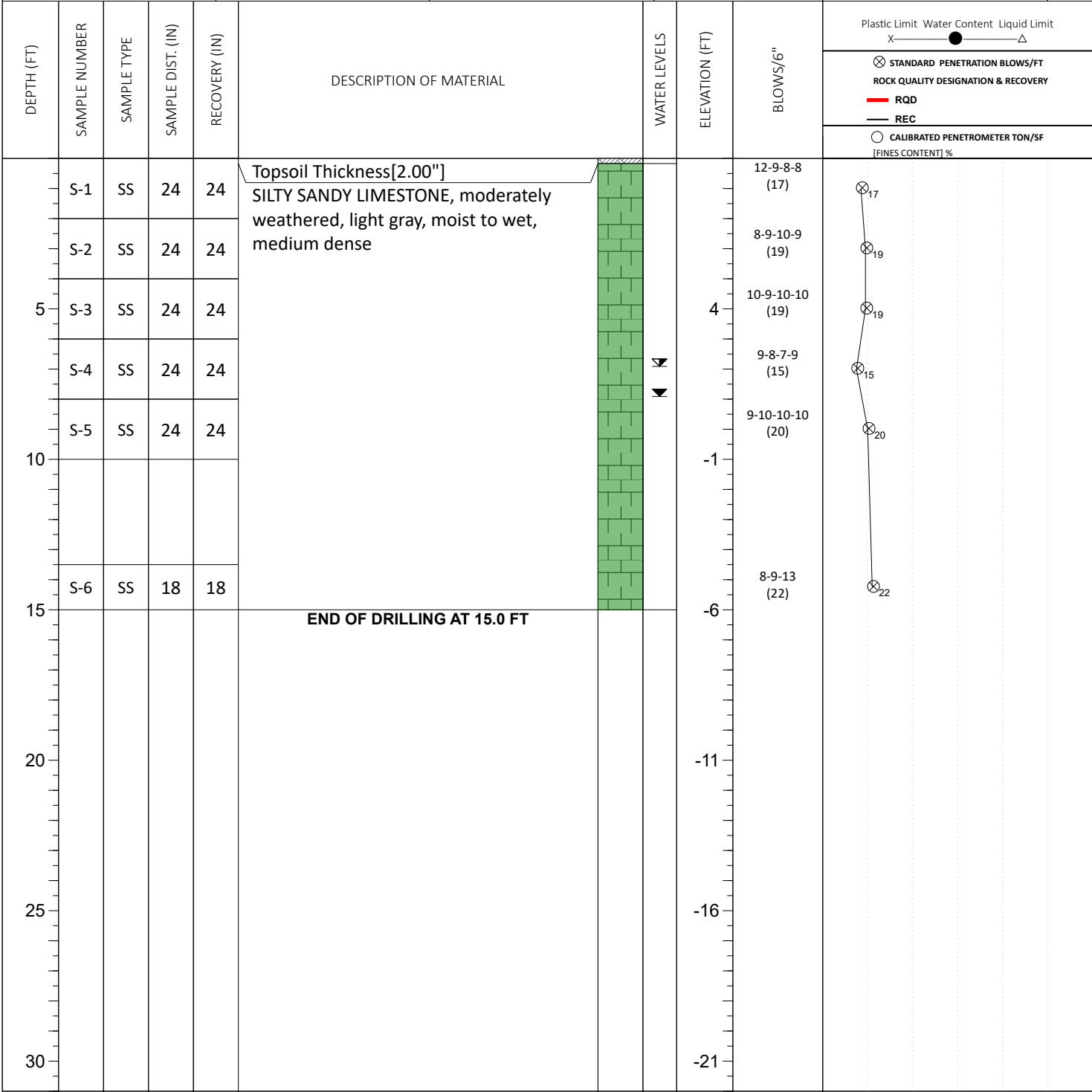


THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

∇ WL (First Encountered) ▼ WL (Completion) 7.80 ∇ WL (Seasonal High Water) 6.80 ∇ WL (Stabilized)	BORING STARTED: Nov 23 2021 BORING COMPLETED: Nov 24 2021 EQUIPMENT: Truck	CAVE IN DEPTH: HAMMER TYPE: Auto DRILLING METHOD: D-90	LOGGED BY: BAH1
--	---	--	------------------------

GEOTECHNICAL BOREHOLE LOG

SITE LOCATION: 18722 S Dixie Highway, Cutler bay, Florida 33157	LOSS OF CIRCULATION	
NORTHING: -1583687.9	EASTING: 3552661.6	STATION:
		SURFACE ELEVATION: 9.0
		BOTTOM OF CASING



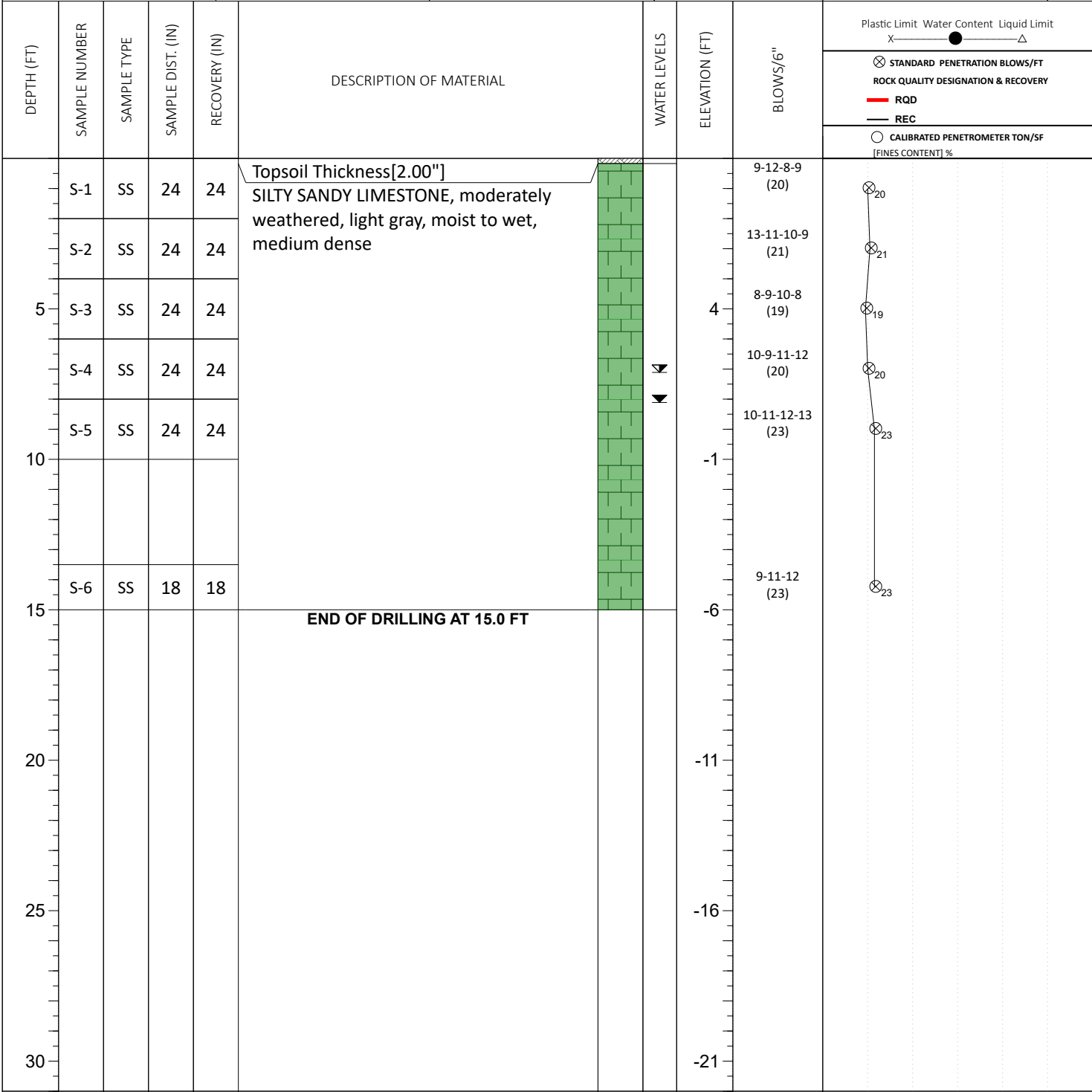
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

∇ WL (First Encountered)	BORING STARTED: Nov 23 2021	CAVE IN DEPTH:
▼ WL (Completion) 7.80	BORING COMPLETED: Nov 24 2021	HAMMER TYPE: Auto
∇ WL (Seasonal High Water) 6.80	EQUIPMENT: Truck	LOGGED BY: BAH1
∇ WL (Stabilized)		DRILLING METHOD: D-90

GEOTECHNICAL BOREHOLE LOG

SITE LOCATION:
18722 S Dixie Highway, Cutler bay, Florida 33157

NORTHING: -1583688.6	EASTING: 3552757.3	STATION:	SURFACE ELEVATION: 9.0	LOSS OF CIRCULATION
				BOTTOM OF CASING

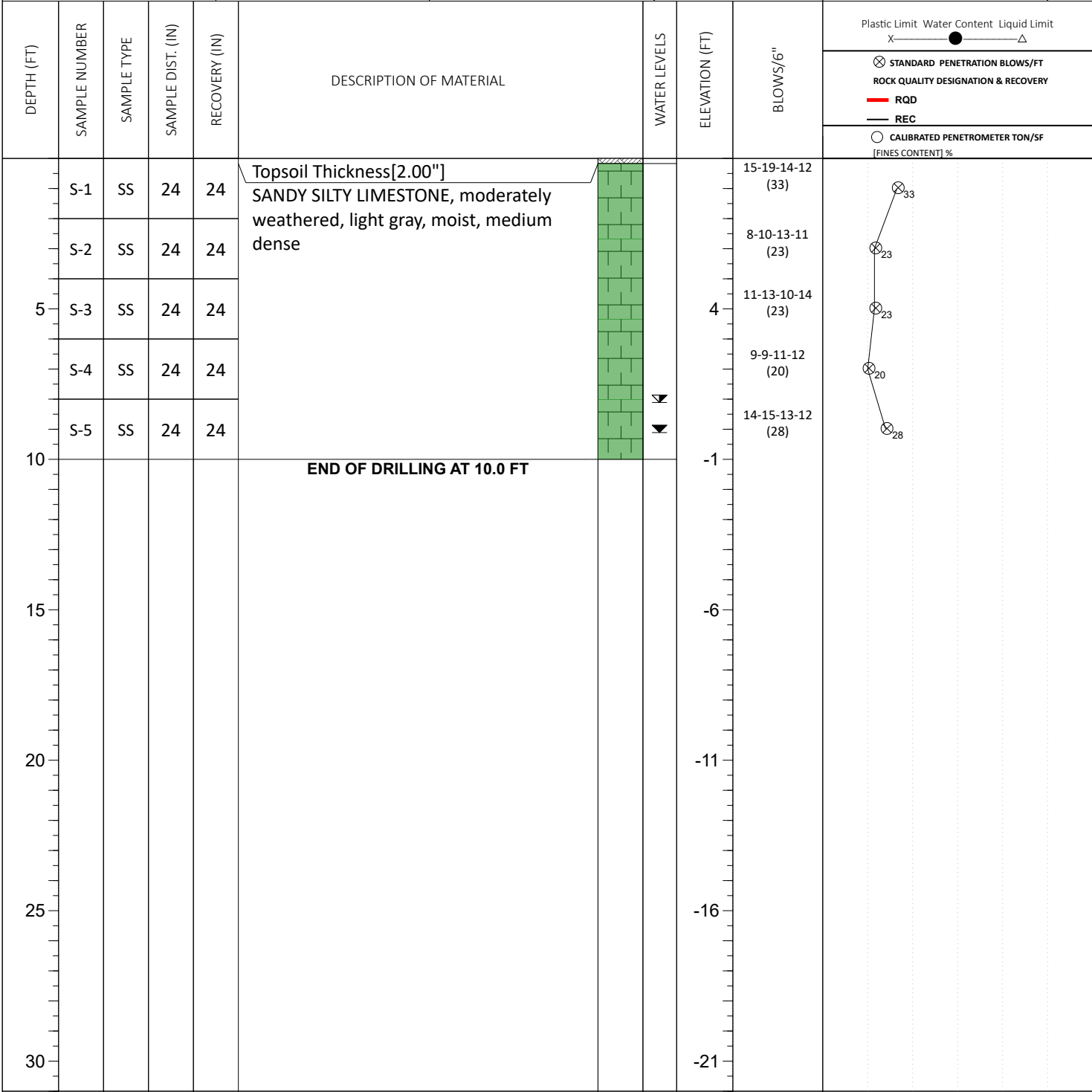


THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

∇ WL (First Encountered) ▼ WL (Completion) 8.00 ∇ WL (Seasonal High Water) 7.00 ∇ WL (Stabilized)	BORING STARTED: Nov 23 2021 BORING COMPLETED: Nov 24 2021 EQUIPMENT: Truck	CAVE IN DEPTH: HAMMER TYPE: Auto DRILLING METHOD: D-90	LOGGED BY: BAH1
--	---	--	------------------------

GEOTECHNICAL BOREHOLE LOG

SITE LOCATION: 18722 S Dixie Highway, Cutler bay, Florida 33157	LOSS OF CIRCULATION
NORTHING: -1583607.8	EASTING: 3552564.6
STATION:	SURFACE ELEVATION: 9.0
BOTTOM OF CASING 	

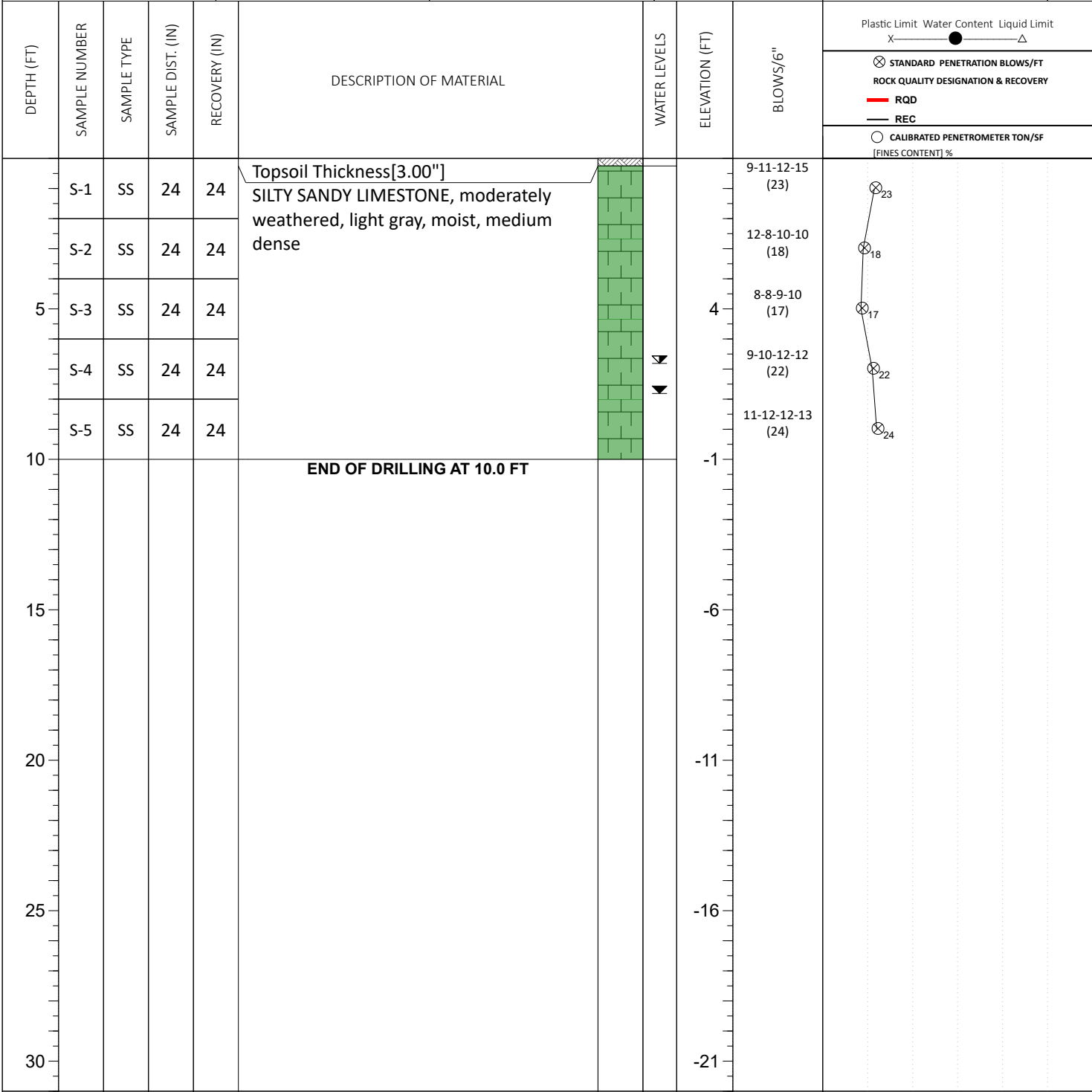


THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

∇ WL (First Encountered)	BORING STARTED: Nov 23 2021	CAVE IN DEPTH:
▼ WL (Completion) 9.00	BORING COMPLETED: Jun 30 2021	HAMMER TYPE: Auto
∇ WL (Seasonal High Water) 8.00	EQUIPMENT: Truck	LOGGED BY: BAH1
∇ WL (Stabilized)		DRILLING METHOD: D-90

GEOTECHNICAL BOREHOLE LOG

SITE LOCATION: 18722 S Dixie Highway, Cutler bay, Florida 33157	LOSS OF CIRCULATION	
NORTHING: -1583661.4	EASTING: 3552633.0	STATION:
SURFACE ELEVATION: 9.0		BOTTOM OF CASING



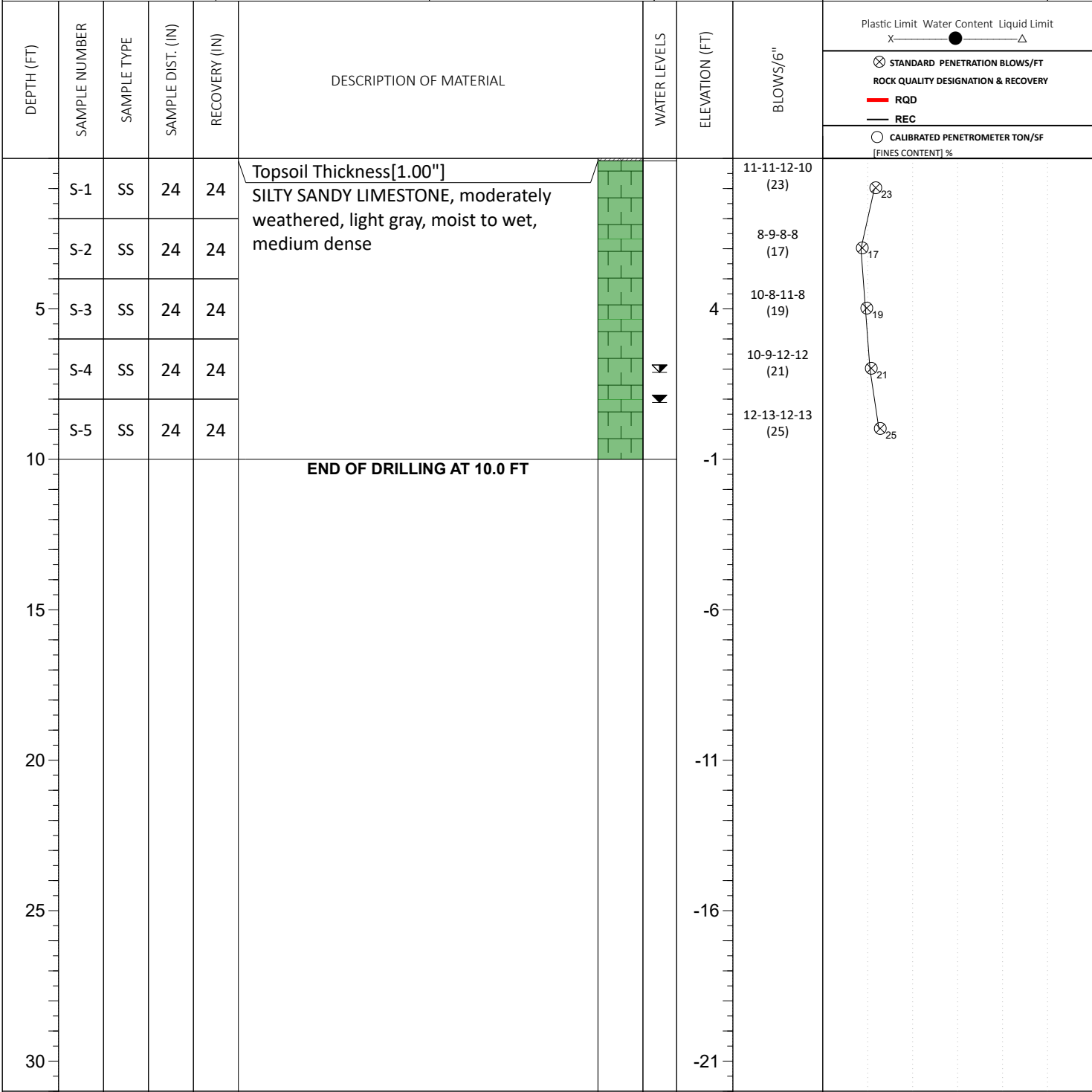
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

∇ WL (First Encountered) ▼ WL (Completion) 7.70 ∇ WL (Seasonal High Water) 6.70 ∇ WL (Stabilized)	BORING STARTED: Nov 23 2021 BORING COMPLETED: Nov 24 2021 EQUIPMENT: Track	CAVE IN DEPTH: HAMMER TYPE: Auto LOGGED BY: BAH1	DRILLING METHOD: D-90
--	---	--	------------------------------

GEOTECHNICAL BOREHOLE LOG

SITE LOCATION:
18722 S Dixie Highway, Cutler bay, Florida 33157

NORTHING: -1583672.1	EASTING: 3552703.3	STATION:	SURFACE ELEVATION: 9.0	LOSS OF CIRCULATION 
				BOTTOM OF CASING 



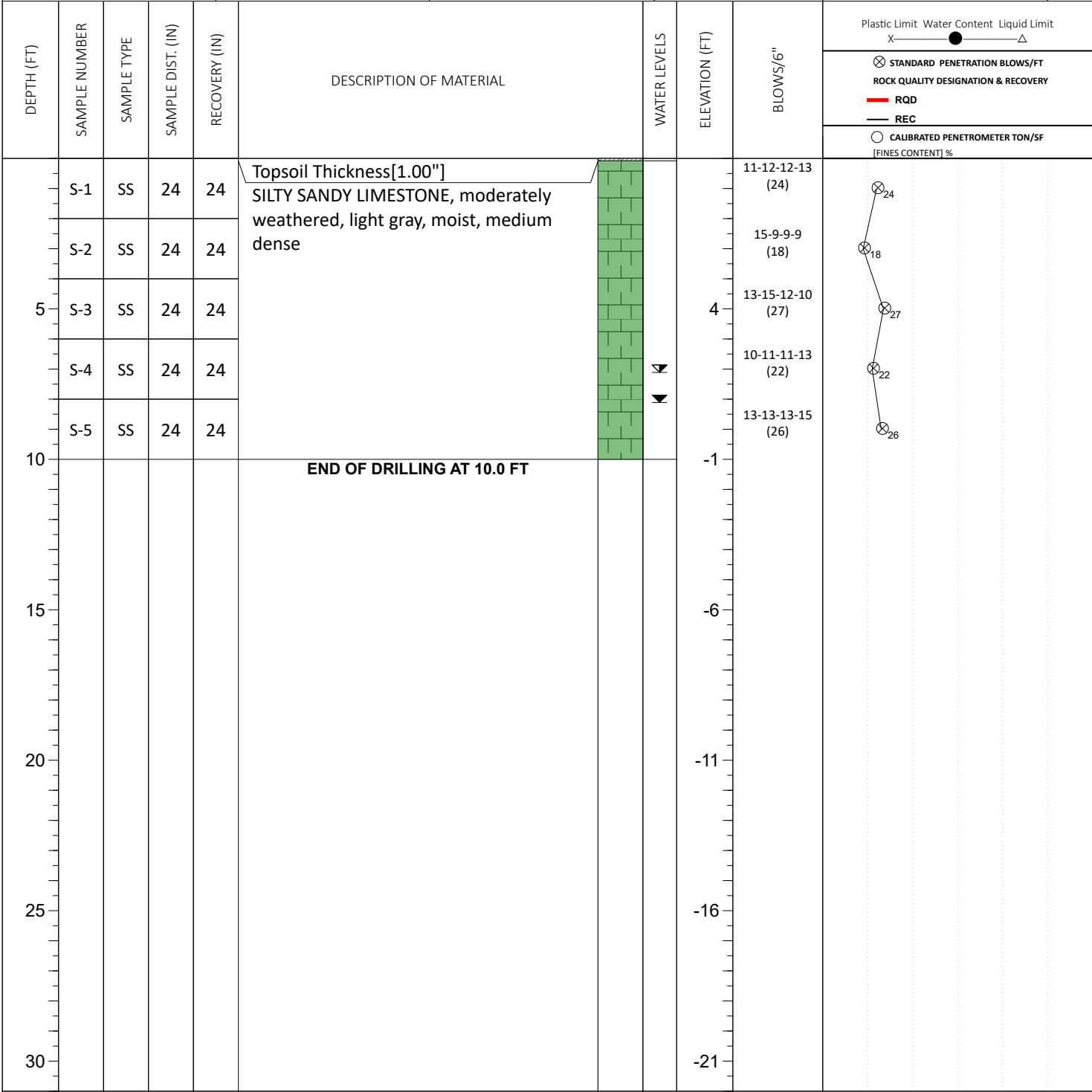
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

∇ WL (First Encountered) ▼ WL (Completion) 8.00 ∇ WL (Seasonal High Water) 7.00 ∇ WL (Stabilized)	BORING STARTED: Nov 23 2021 BORING COMPLETED: Nov 24 2021 EQUIPMENT: Truck	CAVE IN DEPTH: HAMMER TYPE: Auto DRILLING METHOD: D-90	LOGGED BY: BAH1
--	---	--	------------------------

GEOTECHNICAL BOREHOLE LOG

SITE LOCATION:
18722 S Dixie Highway, Cutler bay, Florida 33157

NORTHING: -1583718.8	EASTING: 3552751.6	STATION:	SURFACE ELEVATION: 9.0	LOSS OF CIRCULATION
				BOTTOM OF CASING

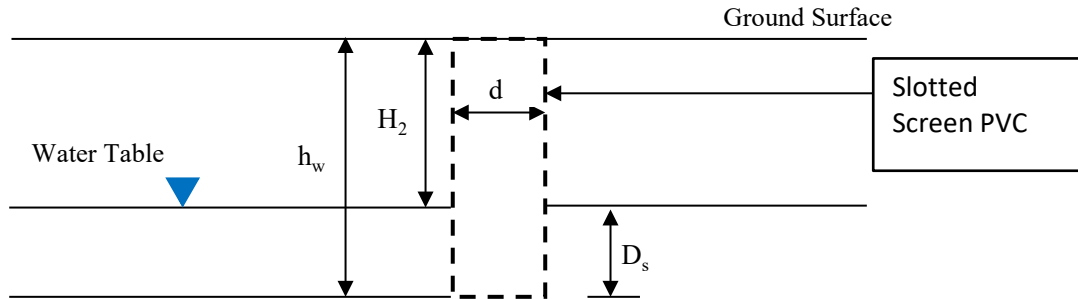


THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

∇ WL (First Encountered) ▼ WL (Completion) 8.00 ∇ WL (Seasonal High Water) 7.00 ∇ WL (Stabilized)	BORING STARTED: Nov 23 2021 BORING COMPLETED: Nov 24 2021 EQUIPMENT: Truck	CAVE IN DEPTH: HAMMER TYPE: Auto DRILLING METHOD: D-90	
--	---	--	--

GEOTECHNICAL BOREHOLE LOG

**SOUTH FLORIDA WATER MANAGEMENT DISTRICT
" USUAL OPEN - HOLE TEST "**



$$K_{IV} = 4Q / [\pi d (2H_2^2 + 4H_2 D_s + H_2 d)]$$


1.09E-04 CFS/FT²-FT HEAD

Q = Average Flow Rate = 0.014995 CFS
 d = Diameter of Test Hole = 0.50 feet
 H₂ = Head on Water Table = 7.8 feet
 h_w = Total Hole Depth = 15.0 feet
 D_s = Saturated Hole Depth = 7.2 feet

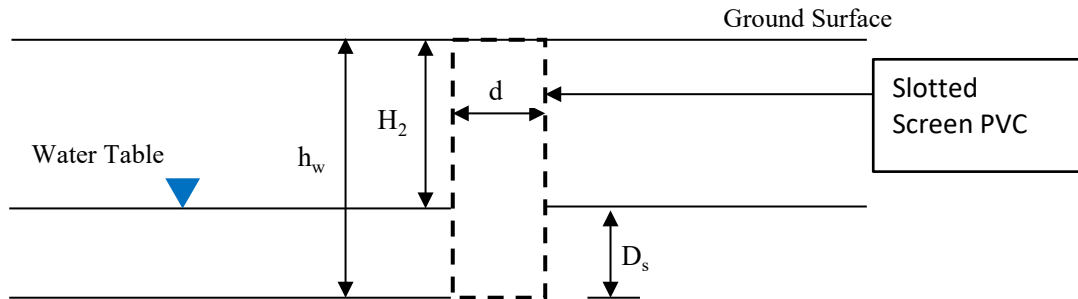
TEST LOCATION : EXF-01
 DEPTH TO WATER TABLE : 7.8 ft Below Existing Grade
 DEPTH OF TEST HOLE : 15 ft Below Existing Grade
 AVERAGE FLOW RATE: 6.7 GPM

SOIL PROFILE :
 0.0' - 15.0' LIMESTONE

NOTES: The soil profile is determined by drilled cuttings & should not be relied upon as an accurate record of soil type or for transition zones.

USUAL OPEN HOLE TEST SUMMARY	Test Date	Project No.	Test No.	Tested By	Checked by:
	11/23/21	3768	EXF-01	SC	JM
			Job No.: 25:3768		
			Proposed Addition Rooms To Go - Culter Ridge 18722 South Dixie Highway Culter Ridge, Florida 33157		

**SOUTH FLORIDA WATER MANAGEMENT DISTRICT
" USUAL OPEN - HOLE TEST "**



$$K_{IV} = 4Q / [\pi d (2H_2^2 + 4H_2 D_s + H_2 d)]$$

1.23E-04 CFS/FT²-FT HEAD


Q = Average Flow Rate = 0.017156 CFS
 d = Diameter of Test Hole = 0.50 feet
 H₂ = Head on Water Table = 8.0 feet
 h_w = Total Hole Depth = 15.0 feet
 D_s = Saturated Hole Depth = 7.0 feet

TEST LOCATION : EXF-02
 DEPTH TO WATER TABLE : 8 ft Below Existing Grade
 DEPTH OF TEST HOLE : 15 ft Below Existing Grade
 AVERAGE FLOW RATE: 7.7 GPM

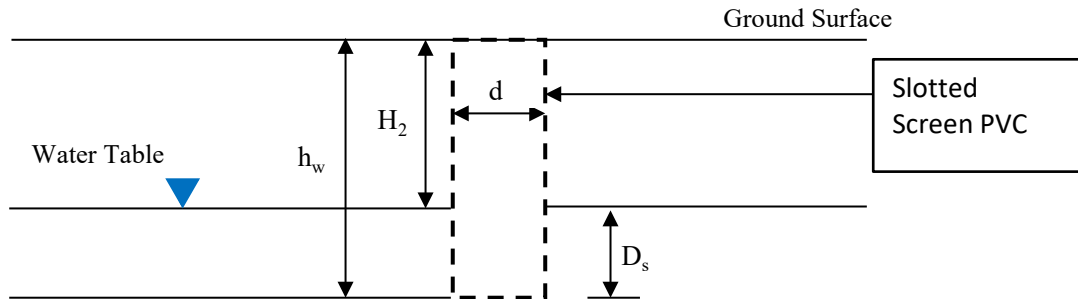
SOIL PROFILE :
 0.0' - 15' LIMESTONE

NOTES: The soil profile is determined by drilled cuttings & should not be relied upon as an accurate record of soil type or for transition zones.

USUAL OPEN HOLE TEST SUMMARY	Test Date 11/23/21	Project No. 3768	Test No. EXF-02	Tested By SC	Checked by: JM
-------------------------------------	-----------------------	---------------------	--------------------	-----------------	-------------------

	Job No.: 25:3768 Proposed Addition Rooms To Go - Culter Ridge 18722 South Dixie Highway Culter Ridge, Florida 33157
--	--

**SOUTH FLORIDA WATER MANAGEMENT DISTRICT
" USUAL OPEN - HOLE TEST "**



$$K_{IV} = 4Q / [\pi d (2H_2^2 + 4H_2 D_s + H_2 d)]$$


2.19E-04 CFS/FT²-FT HEAD

Q = Average Flow Rate = 0.027182 CFS
 d = Diameter of Test Hole = 0.42 feet
 H₂ = Head on Water Table = 8.8 feet
 h_w = Total Hole Depth = 15.0 feet
 D_s = Saturated Hole Depth = 6.2 feet

TEST LOCATION : R-1
 DEPTH TO WATER TABLE : 8.75 ft Below Existing Grade
 DEPTH OF TEST HOLE : 15 ft Below Existing Grade
 AVERAGE FLOW RATE: 12.2 GPM

SOIL PROFILE :
 0.0' - 15' LIMESTONE

NOTES: The soil profile is determined by drilled cuttings & should not be relied upon as an accurate record of soil type or for transition zones.

USUAL OPEN HOLE TEST SUMMARY	Test Date	Project No.	Test No.	Tested By	Checked by:
	06/30/21	3768	R-1	SC	JM
				Job No.: 25:3768	
				Proposed Addition Rooms To Go - Culter Ridge 18722 South Dixie Highway Culter Ridge, Florida 33157	

SECTION 01052HAZARDOUS MATERIAL INFORMATION1. HAZARDOUS MATERIAL INVESTIGATION:

- (A) A hazardous material investigation has been performed for the project. A copy of the report is attached herein. Appendices to the report will be provided to the successful General Contractor.
- (B) Hazardous materials, if any, are identified in the report. The General Contractor shall be responsible to remove all hazardous materials under this Contract. Removal of any hazardous materials shall be done in accordance with the hazardous material report, and all local, state, and federal guidelines.

2. INTERPRETATION:

- (A) Hazardous material investigation data contained in the hazardous material report is provided solely for information and convenience of the bidders. The Owner and CASCO disclaim any responsibility or warranty of any kind whatsoever for the accuracy, true location, quantities, and extent of the hazardous material investigation that has been prepared by others. They further disclaim responsibility for interpretation of the data by bidders, as in projecting presence, type of material, location and quantity. The bidder assumes the risk that conditions may be other than appearing in the aforesaid documents, but nothing herein shall affect the provisions of the General Conditions of the Contract.

3. UNANTICIPATED SUBSURFACE CONDITIONS:

- (A) If during demolition or construction operations the Contractor encounters hazardous materials, he shall immediately bring this to the Owner's attention with written confirmation within 24 hours. The General Contractor shall then arrange for proper removal of the unanticipated hazardous material. The General Contractor shall not proceed with any removal operations unless directed otherwise, in writing, by the Owner.

4. EXTRA PAYMENT:

- (A) No consideration for extra payment will be given for conditions occurring which could have been anticipated from the information contained in the hazardous material report.
- (B) If conditions occur resulting in extra work which could not have been anticipated or reasonably inferred from the hazardous material report information, the Contract General Conditions shall apply.

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September 9, 2021

Will Martin
Rooms To Go
400 Perimeter Center Terrace NE
Suite 800
Atlanta, Georgia 30346

ECS Project No. 55: 3939

Reference: Phase I Environmental Site Assessment Report, Cutler Bay Properties, 18670/18690/18722
S Dixie Highway, Cutler Bay, Miami-Dade County, Florida 33157

Dear Mr. Martin:

ECS Florida, LLC (ECS) is pleased to provide you with the results of our Phase I Environmental Site Assessment (ESA) for the referenced site. ECS services were provided in general accordance with ECS Proposal No. 55:5072/5073 authorized on June 16, 2021 and generally meet the requirements of ASTM E1527-13, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process and EPA Standards and Practices for All Appropriate Inquiries contained in 40 CFR Part 312.

If there are questions regarding this report, or a need for further information, please contact the undersigned.

ECS Florida, LLC

Stephanie Lister
Environmental Scientist
slister@ecslimited.com
561-250-0662

Cliff Hendrickson, P.G.
Principal Geologist
CHendrickson@ecslimited.com
407-859-8378

Project Summary

Cutler Bay Properties
18670/18690/18722 S Dixie Highway
Cutler Bay, Florida 33157

Report Section		No Further Action	REC	CREC	HREC	BER	Comment
4.0	User Provided Information	✓					
5.1	Federal ASTM Databases	✓					
5.2	State ASTM Databases		✓				The absence of a delineated contamination plume at the northern access roadway is considered a REC. The presence of arsenic in groundwater and benzo(a) pyrene and arsenic and soil near the western property boundary likely to be impacting the subject property represents a REC to the subject property.
5.3	Additional Environmental Record Sources	✓					
6.0	Historical Use Information	✓					
7.0	Site and Area Reconnaissance	✓					
8.0	Additional Services	✓					
9.0	Interviews	✓					

ENVIRONMENTAL PROFESSIONAL STATEMENT

We declare that, to the best of our professional knowledge and belief, we meet the definition of Environmental Professional as defined in § 312.10 of 40 CFR 312. We have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. We have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

A handwritten signature in black ink, appearing to read "Cliff Hendrickson". The signature is fluid and cursive, with a prominent initial "C" and "H".

Cliff Hendrickson, P.G.
Principal Geologist
September 9, 2021

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1.0 EXECUTIVE SUMMARY

ECS Florida, LLC (ECS) was contracted by Rooms To Go to perform an ASTM E1527-13, Phase I Environmental Site Assessment (ESA) of the Cutler Bay Properties located at 18670/18690/18722 S Dixie Highway in Cutler Bay, Miami-Dade County, Florida (i.e. subject property). This Executive Summary is an integral part of the Phase I ESA report. ECS recommends that the report be read in its entirety.

The subject property is located in a commercial area of Cutler Bay, Florida. The subject property is bound on the north by Miami Grill Restaurant, followed by a Shell Gas Station, on the east by Shell Gas Station (adjacent to northern access roadway) South Dixie Highway followed by commercial properties, on the south by City Furniture, followed by Ashley Home Store and on the west by vacant parcel of land and beyond by the South Miami-Dade Busway. ECS identified environmental issues at adjoining or nearby properties that are believed to present a recognized environmental condition (REC) at the subject property.

Based on the records search, site reconnaissance and interviews, it appears that the subject property was developed with commercial buildings from at least 1944 until 1952. From 1963 through 1979, the subject property was vacant land. In 1984, a restaurant was constructed on the southern portion of the subject property. In 1994, the present-day commercial retail store was constructed. Historical records prior to 1919 were not reasonably ascertainable for the subject property.

Our review of historical information for adjoining or nearby properties identified the area as originally rural that transitioned to commercial.

A regulatory database search report was provided by Envirosite Corporation. The database search involves researching a series of Federal, State, Local, and other databases for facilities and properties that are located within specified minimum search distances from the subject property. The report did identify the subject property on the databases researched.

The subject property is listed as a GTO_MIAMI-DADE COUNTY - FL facility. The GTO_MIAMI-DADE COUNTY - FL listing is used to establish permitting of a facility that utilizes on-site grease traps. Due to the nature of this listing, ECS does not believe this listing results in a REC for the subject property.

The subject property is listed as a BROWNFIELD_AREAS-FL facility. The **subject property** is located within the **Perrine** Brownfield Area which consists of ~15,196 acres. Brownfields are abandoned, idled, or underused industrial and commercial facilities where expansion or redevelopment is complicated by real or perceived environmental contamination. Florida's Brownfields Redevelopment Act's primary goals are to reduce health and environmental hazards on existing commercial and industrial sites that are abandoned or underused due to these hazards and create financial and regulatory incentives to encourage voluntary cleanup and redevelopment of sites. The **Perrine** Area is not considered a REC at this time.

The Envirosite Corporation report identified several off-site properties within the minimum ASTM search distances. ECS does not consider the listings to be potential sources of soil, groundwater or vapor impact to the subject property, except for the following:

Cutler Bay Town Centre, 10100 SW 186th Street - This BROWNFIELDS-FL site is located adjacent to the west of the subject property. Based on a review of available files from Miami-Dade County Department of Environmental Resources (DERM's), the Cutler Bay Town Centre is currently undergoing assessment activities. Based on a review of February 17, 2021 Response to Review Comments prepared by SCS Engineers, arsenic and benzo(a)pyrene was detected in site soil and only arsenic was identified in groundwater, likely associated with prior railroad line which historically operated adjacent west of the subject property. Wells adjoining the western subject property boundary suggest that arsenic may have impacted the subject property. The presence of arsenic in groundwater and benzo(a) pyrene and arsenic and soil near the western property boundary likely to be impacting the subject property represents a REC to the subject property. As we understand the subject property will include an expansion of the existing building, we expect that the level of approvals through DERM would include approval of stormwater discharge locations to determine if locations are free of contaminant impacts, approval of any planned dewatering activities, and soil management.

SUNSHINE #234|SHELL OIL STATION, 18600 S DIXIE HWY - This facility is located on the adjoining property to the northeast of the subject property. On January 28 & 29, 2019, a representative of the Department of Regulatory & Economic Resources, Division of Environmental Resources Management (DERM) conducted a routine discharge inspection for the above referenced site and observed free floating product in a groundwater monitoring well. Analytical results from the groundwater grab samples obtained from the monitoring well confirmed the presence of hydrocarbon contamination in the ground and/or groundwater of the facility. A Discharge Reporting Form (DRF) was submitted by a facility representative on January 28, 2019. On December 8, 2020, DERM mailed a "final notice before court action" letter to this facility for failure to supply a site assessment report regarding the above referenced discharge. A previous site assessment report (SAR) of the facility and subsequent Site Rehabilitation Completion Order (SRCO) was completed in 2018 in regard to a discharge that took place in 2009. This previous site assessment report, completed by Water Restoration Inc. (WRI), reported groundwater flow to be northwesterly, towards the northern accessway of the subject property. Based on the distance from the subject property, the regulatory information reviewed, and the absence of a delineated contamination plume, ECS considers this listing to result in a REC for the northern access road of the subject property.

ASTM E1527-13 defines a "data gap" as: "a lack of or inability to obtain information required by this practice despite good faith efforts by the environmental professional to gather such information." Data gaps which would be expected to impact our ability to render a professional opinion concerning the subject property were not identified.

We have performed a Phase I Environmental Site Assessment in general conformance with the scope and limitations of ASTM E1527-13 of the Cutler Bay Properties located at 18670/18690/18722 S Dixie Highway, in Cutler Bay, Miami-Dade County, Florida. Exceptions to, or deletions from, this practice are described in Section 2.6 of this report. This assessment has revealed no evidence of recognized environmental conditions in connection with the property except for the following:

- The absence of a delineated contamination plume at the northeast adjoining Shell Oil Station is considered a REC to the northern access roadway of the subject property.

- The presence of arsenic in groundwater and benzo(a) pyrene and arsenic and soil near the western property boundary likely impacting the subject property represents a REC to the subject property.

As we understand the subject property will include an expansion of the existing building, we expect that the level of approvals through DERM would include approval of stormwater discharge locations to determine if locations are free of contaminant impacts, approval of any planned dewatering activities, and soil management related impact at the Cutler Bay Town Centre property.

Should dewatering be needed as part of future construction activities, DERM may require a Dewater Plan due to proximity to the Shell gas station and Cutler Bay Town Centre.



October 12, 2021

Mr. Nicholas Roth
Rooms to Go
400 Perimeter Center Terrace NE
Suite 800
Atlanta, Georgia 30346
NRoth@RoomsToGo.com

ECS Proposal No. 55-5937

Reference: Proposal for Phase II Environmental Site Assessment
Cutler Bay Rooms to Go Property Expansion
18722 S. Dixie Highway
Cutler Bay, Florida

Dear Mr. Roth:

ECS Florida, LLC (ECS) presents our following Scope of Services and Cost Estimate for providing a Phase II Environmental Site Assessment (ESA) for the above-referenced subject property.

Background

ECS identified the neighboring adjoining Cutler Bay Town Centre property with documented arsenic and benzo(a)pyrene equivalents in soil and groundwater as a Recognized Environmental Condition (REC) likely to impact the Rooms to Go property.

We understand that the intent is to enter into a ground lease with the current property owner. The plan is to expand the existing Rooms to Go property to the south.

Our proposal is structured to complete a subsurface investigation relative to the planned construction improvements associated with construction. The investigation will focus along the property boundary where the planned expansion is located and in planned stormwater exfiltration locations.

Scope of Services

A Public Utility Clearance will be called in to mark public utilities within adjoining rights-of-way, prior to field work. As the public utility clearance will not mark private utilities, ECS will also contact a private utility contractor to locate the private utilities in the vicinity of the proposed boring locations.

ECS will oversee a Florida-licensed drilling subcontractor to conduct soil borings and install groundwater wells utilizing a hollow-stem auger mounted drill rig.

- A total of three (3) soil borings will be installed along the western property boundary in the vicinity of the planned expansion to understand if impacts reached the property and be able to develop plan to manage soil during construction. Soil samples will be collected from 0-6",

6"-2', and 2-4' from each soil boring location and submitted for analysis of total arsenic using EPA method 6020 and Polycyclic Aromatic Hydrocarbons (PAHs) by EPA Method 8270.

- A total of two (2) soil borings will be installed in two of the planned stormwater exfiltration trench locations closest to the western property boundary. Soil samples will be collected from 0-6", 6"-2', and 2-4' from each soil boring location and submitted for analysis of total arsenic using EPA method 6020 and PAHs by EPA Method 8270.
- Two shallow-water monitoring wells will be advanced to an approximate depth of 15 feet below land surface (bls) dependent upon water table. Well construction will consist of a ten (10) foot interval of pre-packed 1-inch diameter 0.006-inch slotted PVC well screen and finished with PVC stick-up riser. Each monitoring well will be sufficiently developed following installation. After monitoring wells have stabilized, ECS will return to the property to collect groundwater samples from the wells. ECS will use a peristaltic pump to collect each groundwater sample, following adequate purging.

Two (2) groundwater samples will be collected in clean laboratory-supplied pre-preserved containers with teflon-lined lids, labeled appropriately, and placed immediately on ice, and submitted for laboratory analysis of arsenic by EPA Method 6020 and PAHs by EPA Method 8270, and nitrate.

- At the conclusion of the sampling event, the drilling subcontractor will properly abandon the three monitoring wells.

Reporting

ECS will prepare a report summarizing the findings of the Phase II ESA activities. The report will provide a description of our work and our findings. In addition, we will provide tables, figures and data reports. The report will also include specific recommendations regarding the findings, including recommendations for additional work, if appropriate.

The intent is to prepare a DERM-document deliverable for their review.

Cost Estimate and Schedule

The cost for the Phase II Environmental Site Assessment is a lump sum of **\$11,700**.

ECS can complete the proposed scope of work in approximately four weeks, assuming a standard laboratory turnaround of 5 to 7 business days.

Schedules are estimated from the date of receipt of a signed authorization to proceed and assume the site is adequately accessible.

It should be noted that our cost estimate is a lump sum and is considered a not-to-exceed amount. The budget will not be exceeded unless unusual conditions are encountered at the time of the investigation. In the event that unusual conditions are encountered, we will contact you for authorization prior to initiating any additional service and/or exceeding the total budget estimate. ECS is not responsible for repair cost for striking any unmarked utility.

Assumptions:

- 1) Laboratory analytical include standard (5 to 7 day) turnaround time.
- 2) Based on Phase II ESA results, additional soil and groundwater assessment may be necessary.
- 3) DERM review fees are not included

We will contact you for authorization prior to initiating any additional service and/or exceeding the total budget estimate.

Acceptance

Attached to this letter, and an integral part of our proposal, are our "Terms and Conditions of Service". These conditions represent the current recommendations of the Association of Soil and Foundation Engineers, the Consulting Engineers' Council, and the Geotechnical Division of the American Society of Civil Engineers.

Our insurance carrier requires that we receive written authorization prior to initiation of work, and a signed contract prior to the release of any work product. This letter is the agreement for our services. Your acceptance of this proposal may be indicated by signing and returning the enclosed copy to us.

We are pleased to have this opportunity to offer our services and look forward to working with you on the project.

Respectfully,

ECS Florida, LLC



Alex J. Chatham, P.E.
Senior Environmental Engineer



J. Cliff Hendrickson, P.G.
Principal Geologist

Enclosures: Proposal Acceptance

ECS Florida, LLC

PROPOSAL ACCEPTANCE

Proposal No.: 55-5937
Date: October 12, 2021
Scope of Work: Phase II ESA
Location: Rooms to Go Property
Cutler Bay, Miami-Dade County, Florida 33032

Client Signature: _____ Date: _____

Please complete this page and return one copy of this proposal to ECS Florida, LLC to indicate acceptance of this proposal and to initiate work on the above-referenced project. The Client's signature indicates agreement of our Terms and Conditions of Service attached.

BILLING INFORMATION

(Please Print or Type)

Name of Client: _____

Name of Contact Person: _____

Telephone No. Of Contact Person: _____

Party Responsible for Payment: _____

Company Name: _____

Person/Title _____

Department: _____

Billing Address: _____

Telephone Number: _____

Fax Number: _____

Client Project/Account Number _____

Special Conditions for Invoice _____

Submittal and Approval _____



ECS FLORIDA, LLC

TERMS AND CONDITIONS OF SERVICE

The professional services ("Services") to be provided by ECS Florida, LLC ("ECS") pursuant to the Proposal shall be provided in accordance with these Terms and Conditions of Service ("Terms"), including any addenda as may be incorporated or referenced in writing and shall form the Agreement between ECS and CLIENT.

1.0 INDEPENDENT CONSULTANT STATUS - ECS shall serve as an independent professional consultant to CLIENT for Services on the Project and shall have control over, and responsibility for, the means and methods for providing the Services identified in the Proposal, including the retention of Subcontractors and Subconsultants

2.0 SCOPE OF SERVICES - It is understood that the fees, reimbursable expenses and time schedule defined in the Proposal are based on information provided by CLIENT and/or CLIENT'S agents, contractors and consultants ("Contractors"). CLIENT acknowledges that if this information is not current, is incomplete or inaccurate, if conditions are discovered that could not be reasonably foreseen, or if CLIENT orders additional services, the scope of services will change, even while the Services are in progress.

3.0 STANDARD OF CARE

3.1 In fulfilling its obligations and responsibilities enumerated in the Proposal, ECS shall be expected to comply with and its performance evaluated in light of the standard of care expected of professionals in the industry performing similar services on projects of like size and complexity at that time in the region (the "Standard of Care"). Nothing contained in the Proposal, the agreed-upon scope of Services, these Terms or any ECS report, opinion, plan or other document prepared by ECS shall constitute a warranty or guarantee of any nature whatsoever.

3.2 CLIENT understands and agrees that ECS will rely on the facts learned from data gathered during performance of Services as well as those facts provided by the CLIENT and/or CLIENT'S contractors and consultants. CLIENT acknowledges that such data collection is limited to specific areas that are sampled, bored, tested, observed and/or evaluated. Consequently, CLIENT waives any and all claims based upon erroneous facts provided by the CLIENT, facts subsequently learned or regarding conditions in areas not specifically sampled, bored, tested, observed or evaluated by ECS.

3.3 If a situation arises that causes ECS to believe compliance with CLIENT'S directives would be contrary to sound engineering practices, would violate applicable laws, regulations or codes, or will expose ECS to legal claims or charges, ECS shall so advise CLIENT. If ECS' professional judgment is rejected, ECS shall have the right to terminate its Services in accordance with the provisions of Section 25.0, below.

3.4 If CLIENT decides to disregard ECS' recommendations with respect to complying with applicable laws or regulations, ECS shall determine if applicable law requires ECS to notify the appropriate public officials. CLIENT agrees that such determinations are ECS' sole right to make.

4.0 CLIENT DISCLOSURES

4.1 Where the Services requires ECS to penetrate a surface, CLIENT shall furnish and/or shall direct CLIENT'S or CLIENT'S Contractors to furnish ECS information identifying the type and location of utility lines and other man-made objects known, suspected, or assumed to be located beneath or behind the Site's surface. ECS shall be entitled to rely on such information for completeness and accuracy without further investigation, analysis, or evaluation.

4.2 "Hazardous Materials" shall include but not be limited to any substance that poses or may pose a present or potential hazard to human health or the environment whether contained in a product, material, by-product, waste, or sample, and whether it exists in a solid, liquid, semi-solid or gaseous form. CLIENT shall notify ECS of any known, assumed, or suspected regulated, contaminated, or other similar Hazardous Materials that may exist at the Site prior to ECS mobilizing to the Site.

4.3 If any Hazardous Materials are discovered, or are reasonably suspected by ECS after its Services begin, ECS shall be entitled to amend the scope of Services and adjust its fees or fee schedule to reflect any additional work or personal protective equipment and/or safety precautions required by the existence of such Hazardous Materials.

5.0 INFORMATION PROVIDED BY OTHERS - CLIENT waives, releases and discharges ECS from and against any claim for damage, injury or loss allegedly arising out of or in connection with errors, omissions, or inaccuracies in documents and other information in any form provided to ECS by CLIENT or CLIENT'S Contractors, including such information that becomes incorporated into ECS documents.

6.0 CONCEALED RISKS - CLIENT acknowledges that special risks are inherent in sampling, testing and/or evaluating concealed conditions that are hidden from view and/or neither readily apparent nor easily accessible, e.g., subsurface conditions, conditions behind a wall, beneath a floor, or above a ceiling. Such circumstances require that certain assumptions be made regarding existing conditions, which may not be verifiable without expending additional sums of money or destroying otherwise adequate or serviceable portions of a building or component thereof. Accordingly, ECS shall not be responsible for the verification of such conditions unless verification can be made by simple visual observation. CLIENT agrees to bear any and all costs, losses, damages and expenses (including, but not limited to, the cost of ECS' additional services) in any way arising from or in connection with the existence or discovery of such concealed or unknown conditions.

7.0 RIGHT OF ENTRY/DAMAGE RESULTING FROM SERVICES

7.1 CLIENT warrants that it possesses the authority to grant ECS right of entry to the site for the performance of Services. CLIENT hereby grants ECS and its agents, subcontractors and/or subconsultants ("Subconsultants"), the right to enter from time to time onto the property in order for ECS to perform its Services. CLIENT agrees to indemnify and hold ECS and its Subconsultants harmless from any claims arising from allegations that ECS trespassed or lacked authority to access the Site.

7.2 CLIENT warrants that it possesses all necessary permits, licenses and/or utility clearances for the Services to be provided by ECS except where ECS' Proposal explicitly states that ECS will obtain such permits, licenses, and/or utility clearances.

7.3 ECS will take reasonable precautions to limit damage to the Site and its improvements during the performance of its Services. CLIENT understands that the use of exploration, boring, sampling, or testing equipment may cause damage to the Site. The correction and restoration of such common damage is CLIENT'S responsibility unless specifically included in ECS' Proposal.

7.4 CLIENT agrees that it will not bring any claims for liability or for injury or loss against ECS arising from (i) procedures associated with the exploration, sampling or testing activities at the Site, (ii) discovery of Hazardous Materials or suspected Hazardous Materials, or (iii) ECS' findings, conclusions, opinions, recommendations, plans, and/or specifications related to discovery of contamination.

8.0 UNDERGROUND UTILITIES

8.1 ECS shall exercise the Standard of Care in evaluating client-furnished information as well as information readily and customarily available from public utility locating services (the "Underground Utility Information") in its effort to identify underground utilities. The extent of such evaluations shall be at ECS' sole discretion.

8.2 CLIENT recognizes that the Underground Utility Information provided to or obtained by ECS may contain errors or be incomplete. CLIENT understands that ECS may be unable to identify the locations of all subsurface utility lines and man-made features.

8.3 CLIENT waives, releases, and discharges ECS from and against any claim for damage, injury or loss allegedly arising from or related to subterranean structures (pipes, tanks, cables, or other utilities, etc.) which are not called to ECS' attention in writing by CLIENT, not correctly shown on the Underground Utility Information and/or not properly marked or located by the utility owners, governmental or quasi-governmental locators, or private utility locating services as a result of ECS' or ECS' Subconsultant's request for utility marking services made in accordance with local industry standards.

9.0 SAMPLES

9.1 Soil, rock, water, building materials and/or other samples and sampling by-products obtained from the Site are and remain the property of CLIENT. Unless other arrangements are requested by CLIENT and mutually agreed upon by ECS in writing, ECS will retain samples not consumed in laboratory testing for up to sixty (60) calendar days after the first issuance of any document containing data obtained from such samples. Samples consumed by laboratory testing procedures will not be stored.

9.2 Unless CLIENT directs otherwise, and excluding those issues covered in Section 10.0, CLIENT authorizes ECS to dispose of CLIENT'S non-hazardous samples and sampling or testing by-products in accordance with applicable laws and regulations.

10.0 ENVIRONMENTAL RISKS

10.1 When Hazardous Materials are known, assumed, suspected to exist, or discovered at the Site, ECS will endeavor to protect its employees and address public health, safety, and environmental issues in accordance with the Standard of Care. CLIENT agrees to compensate ECS for such efforts.

10.2 When Hazardous Materials are known, assumed, or suspected to exist, or discovered at the Site, ECS and/or ECS' subcontractors will exercise the Standard of Care in containerizing and labeling such Hazardous Materials in accordance with applicable laws and regulations, and will leave the containers on Site. CLIENT is responsible for the retrieval, removal, transport and disposal of such contaminated samples, and sampling process byproducts in accordance with applicable law and regulation.

10.3 Unless explicitly stated in the Scope of Services, ECS will neither subcontract for nor arrange for the transport, disposal, or treatment of Hazardous Materials. At CLIENT'S written request, ECS may assist CLIENT in identifying appropriate alternatives for transport, off-site treatment, storage, or disposal of such substances, but CLIENT shall be solely responsible for the final selection of methods and firms to provide such services. CLIENT shall sign all manifests for the disposal of substances affected by contaminants and shall otherwise exercise prudence in arranging for lawful disposal.

10.4 In those instances where ECS is expressly retained by CLIENT to assist CLIENT in the disposal of Hazardous Materials, samples, or wastes as part of the Proposal, ECS shall do so only as CLIENT'S agent (notwithstanding any other provision of this Agreement to the contrary). ECS will not assume the role of, nor be considered a generator, storer, transporter, or disposer of Hazardous Materials.

10.5 Subsurface sampling may result in unavoidable cross-contamination of certain subsurface areas, as when a probe or excavation/boring device moves through a contaminated zone and links it to an aquifer, underground stream, pervious soil stratum, or other hydrous body not previously contaminated, or connects an uncontaminated zone with a contaminated zone. Because sampling is an essential element of the Services indicated herein, CLIENT agrees this risk cannot be eliminated. Provided such services were performed in accordance with the Standard of Care, CLIENT waives, releases and discharges ECS from and against any claim for damage, injury, or loss allegedly arising from or related to such cross-contamination.

10.6 CLIENT understands that a Phase I Environmental Site Assessment (ESA) is conducted solely to permit ECS to render a professional opinion about the likelihood of the site having a Recognized Environmental Condition on, in, beneath, or near the Site at the time the Services are conducted. No matter how thorough a Phase I ESA study may be, findings derived from its conduct are highly limited and ECS cannot know or state for an absolute fact that the Site is unaffected or adversely affected by one or more Recognized Environmental Conditions. CLIENT represents and warrants that it understands the limitations associated with Phase I ESAs.

11.0 OWNERSHIP OF DOCUMENTS

- 11.1 ECS shall be deemed the author and owner (or licensee) of all documents, technical reports, letters, photos, boring logs, field data, field notes, laboratory test data, calculations, designs, plans, specifications, reports, or similar documents and estimates of any kind furnished by it [the "Documents of Service"] and shall retain all common law, statutory and other reserved rights, including copyrights. CLIENT shall have a limited, non-exclusive license to use copies of the Documents of Service provided to it in connection with its Project for which the Documents of Service are provided until the completion of the Project.
- 11.2 ECS' Services are performed and Documents of Service are provided for the CLIENT'S sole use. CLIENT understands and agrees that any use of the Documents of Service by anyone other than the CLIENT and its Contractors is not permitted. CLIENT further agrees to indemnify and hold ECS harmless for any errors, omissions or damage resulting from its contractors' use of ECS' Documents of Service.
- 11.3 Without ECS' prior written consent, CLIENT agrees to not use ECS' Documents of Service for the Project if the Project is subsequently modified in scope, structure or purpose. Any reuse without ECS' written consent shall be at CLIENT'S sole risk and without liability to ECS or its Subconsultants. CLIENT agrees to indemnify and hold ECS harmless for any errors, omissions or Damage resulting from its use of ECS' Documents of Service after any modification in scope, structure or purpose.
- 11.4 CLIENT agrees to not make any modification to the Documents of Service without the prior written authorization of ECS. To the fullest extent permitted by law, CLIENT agrees to indemnify, defend, and hold ECS harmless from any damage, loss, claim, liability or cost (including reasonable attorneys' fees and defense costs) arising out of or in connection with any unauthorized modification of the Documents of Service by CLIENT or any person or entity that acquires or obtains the Documents of Service from or through CLIENT. CLIENT represents and warrants that the Documents of Service shall be used only as submitted by ECS.

12.0 SAFETY

- 12.1 Unless expressly agreed to in writing in its Proposal, CLIENT agrees that ECS shall have no responsibility whatsoever for any aspect of site safety other than for its own employees. Nothing herein shall be construed to relieve CLIENT and/or its Contractors from their responsibility for site safety. CLIENT also represents and warrants that the General Contractor is solely responsible for Project site safety and that ECS personnel may rely on the safety measures provided by the General Contractor.
- 12.2 In the event ECS assumes in writing limited responsibility for specified safety issues, the acceptance of such responsibilities does not and shall not be deemed an acceptance of responsibility for any other non-specified safety issues, including, but not limited to those relating to excavating, fall protection, shoring, drilling, backfilling, blasting, or other construction activities.

13.0 CONSTRUCTION TESTING AND REMEDIATION SERVICES

- 13.1 CLIENT understands that construction testing and observation services are provided in an effort to reduce, but cannot eliminate, the risk of problems arising during or after construction or remediation. CLIENT agrees that the provision of such Services does not create a warranty or guarantee of any type.
- 13.2 Monitoring and/or testing services provided by ECS shall not in any way relieve the CLIENT'S contractor(s) from their responsibilities and obligations for the quality or completeness of construction as well as their obligation to comply with applicable laws, codes, and regulations.
- 13.3 ECS has no responsibility whatsoever for the means, methods, techniques, sequencing or procedures of construction selected, for safety precautions and programs incidental to work or services provided by any contractor or other consultant. ECS does not and shall not have or accept authority to supervise, direct, control, or stop the work of any of CLIENT'S Contractors or any of their subcontractors.
- 13.4 ECS strongly recommends that CLIENT retain ECS to provide construction monitoring and testing services on a full time basis to lower the risk of defective or incomplete work being installed by CLIENT'S Contractors. If CLIENT elects to retain ECS on a part-time or on-call basis for any aspect of construction monitoring and/or testing, CLIENT accepts the risk that a lower level of construction quality may occur and that defective or incomplete work may result and not be detected by ECS' part time monitoring and testing in exchange for CLIENT'S receipt of an immediate cost savings. Unless the CLIENT can show that ECS' errors or omissions are contained in ECS' reports, CLIENT waives, releases and discharges ECS from and against any other claims for errors, omissions, damages, injuries, or loss alleged to arise from defective or incomplete work that was monitored or tested by ECS on a part-time or on-call basis. Except as set forth in the preceding sentence, CLIENT agrees to indemnify and hold ECS harmless from all Damages, costs, and attorneys' fees, for any claims alleging errors, omissions, damage, injury or loss allegedly resulting from work that was monitored or tested by ECS on a part-time or on-call basis.

14.0 **CERTIFICATIONS** - CLIENT may request, or governing jurisdictions may require, ECS to provide a "certification" regarding the Services provided by ECS. Any "certification" required of ECS by the CLIENT or jurisdiction(s) having authority over some or all aspects of the Project shall consist of ECS' inferences and professional opinions based on the limited sampling, observations, tests, and/or analyses performed by ECS at discrete locations and times. Such "certifications" shall constitute ECS' professional opinion of a condition's existence, but ECS does not guarantee that such condition exists, nor does it relieve other parties of the responsibilities or obligations such parties have with respect to the possible existence of such a condition. CLIENT agrees it cannot make the resolution of any dispute with ECS or payment of any amount due to ECS contingent upon ECS signing any such "certification."

15.0 BILLINGS AND PAYMENTS

- 15.1 Billings will be based on the unit rates, plus travel costs, and other reimbursable expenses as stated in the professional fees section of the Proposal. Any estimate of professional fees stated shall not be considered as a not-to-exceed or lump sum amount unless otherwise explicitly stated. CLIENT understands and agrees that even if ECS agrees to a lump sum or not-to-exceed amount, that amount shall be

limited to number of hours, visits, trips, tests, borings, or samples stated in the Proposal.

- 15.2 CLIENT agrees that all professional fees and other unit rates may be adjusted annually to account for inflation based on the most recent 12-month average of the Consumer Price Index (CPI-U) for all items as established by www.bls.gov when the CPI-U exceeds an annual rate of 2.0%.
- 15.3 Should ECS identify a Changed Condition(s), ECS shall notify the CLIENT of the Changed Condition(s). ECS and CLIENT shall promptly and in good faith negotiate an amendment to the scope of Services, professional fees, and time schedule.
- 15.4 CLIENT recognizes that time is of the essence with respect to payment of ECS' invoices, and that timely payment is a material consideration for this Agreement. All payment shall be in U.S. funds drawn upon U.S. banks and in accordance with the rates and charges set forth in the professional Fees. Invoices are due and payable upon receipt.
- 15.5 If CLIENT disputes all or part of an invoice, CLIENT shall provide ECS with written notice stating in detail the facts of the dispute within fifteen (15) calendar days of the invoice date. CLIENT agrees to pay the undisputed amount of such invoice promptly.
- 15.6 ECS reserves the right to charge CLIENT an additional charge of one-and-one-half (1.5) percent (or the maximum percentage allowed by Law, whichever is lower) of the invoiced amount per month for any payment received by ECS more than thirty (30) calendar days from the date of the invoice, excepting any portion of the invoiced amount in dispute. All payments will be applied to accrued interest first and then to the unpaid principal amount. Payment of invoices shall not be subject to unilateral discounting or set-offs by CLIENT.
- 15.7 CLIENT agrees that its obligation to pay for the Services is not contingent upon CLIENT'S ability to obtain financing, zoning, approval of governmental or regulatory agencies, permits, final adjudication of a lawsuit, CLIENT'S successful completion of the Project, settlement of a real estate transaction, receipt of payment from CLIENT'S client, or any other event unrelated to ECS provision of Services. Retainage shall not be withheld from any payment, nor shall any deduction be made from any invoice on account of penalty, liquidated damages, or other sums incurred by CLIENT. It is agreed that all costs and legal fees including actual attorney's fees, and expenses incurred by ECS in obtaining payment under this Agreement, in perfecting or obtaining a lien, recovery under a bond, collecting any delinquent amounts due, or executing judgments, shall be reimbursed by CLIENT.
- 15.8 Unless CLIENT has provided notice to ECS in accordance with Section 16.0 of these Terms, payment of any invoice by the CLIENT shall mean that the CLIENT is satisfied with ECS' Services and is not aware of any defects in those Services.

16.0 DEFECTS IN SERVICE

- 16.1 CLIENT and CLIENT'S Contractors shall promptly inform ECS during active work on any project of any actual or suspected defects in the Services so to permit ECS to take such prompt, effective remedial measures that in ECS' opinion will reduce or eliminate the consequences of any such defective Services. The correction of defects attributable to ECS' failure to perform in accordance with the Standard of Care shall be provided at no cost to CLIENT. However, ECS shall not be responsible for the correction of any deficiency attributable to client-furnished information, the errors, omissions, defective materials, or improper installation of materials by CLIENT'S personnel, consultants or contractors, or work not observed by ECS. CLIENT shall compensate ECS for the costs of correcting such defects.
- 16.2 Modifications to reports, documents and plans required as a result of jurisdictional reviews or CLIENT requests shall not be considered to be defects. CLIENT shall compensate ECS for the provision of such Services.

17.0 **INSURANCE** - ECS represents that it and its subcontractors and subconsultants maintain workers compensation insurance, and that ECS is covered by general liability, automobile and professional liability insurance policies in coverage amounts it deems reasonable and adequate. ECS shall furnish certificates of insurance upon request. The CLIENT is responsible for requesting specific inclusions or limits of coverage that are not present in ECS insurance package. The cost of such inclusions or coverage increases, if available, will be at the expense of the CLIENT.

18.0 LIMITATION OF LIABILITY

18.1 **CLIENT AGREES TO ALLOCATE CERTAIN RISKS ASSOCIATED WITH THE PROJECT BY LIMITING ECS' TOTAL LIABILITY TO CLIENT ARISING FROM ECS' PROFESSIONAL LIABILITY, I.E. PROFESSIONAL ACTS, ERRORS, OR OMISSIONS AND FOR ANY AND ALL CAUSES INCLUDING NEGLIGENCE, STRICT LIABILITY, BREACH OF CONTRACT, OR BREACH OF WARRANTY, INJURIES, DAMAGES, CLAIMS, LOSSES, EXPENSES, OR CLAIM EXPENSES (INCLUDING REASONABLE ATTORNEY'S FEES) RELATING TO PROFESSIONAL SERVICES PROVIDED UNDER THIS AGREEMENT TO THE FULLEST EXTENT PERMITTED BY LAW. THE ALLOCATION IS AS FOLLOWS.**

- 18.1.1 If the proposed fees are \$10,000 or less, ECS' total aggregate liability to CLIENT shall not exceed \$20,000, or the total fee received for the services rendered, whichever is greater.
- 18.1.2 If the proposed fees are in excess of \$10,000, ECS' total aggregate liability to CLIENT shall not exceed \$50,000, or the total fee for the services rendered, whichever is greater.

18.2 CLIENT agrees that ECS shall not be responsible for any injury, loss or damage of any nature, including bodily injury and property damage, arising directly or indirectly, in whole or in part, from acts or omissions by the CLIENT, its employees, agents, staff, consultants, contractors, or subcontractors to the extent such injury, damage, or loss is caused by acts or omissions of CLIENT, its employees, agents, staff, consultants, contractors, subcontractors or person/entities for whom CLIENT is legally liable.

18.3 CLIENT agrees that ECS' liability for all non-professional liability arising out of this Agreement or the services provided as a result of the Proposal be limited to \$500,000.

19.0 INDEMNIFICATION

- 19.1 Subject to Section 18.0, ECS agrees to hold harmless and indemnify CLIENT from and against damages arising from ECS' negligent performance of its Services, but only to the extent that such damages are found to be caused by ECS' negligent

acts, errors or omissions, (specifically excluding any damages caused by any third party or by the CLIENT.)

19.2 To the fullest extent permitted by law, CLIENT agrees to indemnify, and hold ECS harmless from and against any and all liability, claims, damages, demands, fines, penalties, costs and expenditures (including reasonable attorneys' fees and costs of litigation defense and/or settlement) ("Damages") caused in whole or in part by the acts, errors, or omissions of the CLIENT or CLIENT's employees, agents, staff, contractors, subcontractors, consultants, and clients, provided such Damages are attributable to: (a) the bodily injury, personal injury, sickness, disease and/or death of any person; (b) the injury to or loss of value to tangible personal property; or (c) a breach of these Terms. The foregoing indemnification shall not apply to the extent such Damage is found to be caused by the sole negligence, errors, omissions or willful misconduct of ECS.

19.3 It is specifically understood and agreed that in no case shall ECS be required to pay an amount of Damages disproportional to ECS' culpability. **IF CLIENT IS A HOMEOWNER, HOMEOWNERS' ASSOCIATION, CONDOMINIUM OWNER, CONDOMINIUM OWNER'S ASSOCIATION, OR SIMILAR RESIDENTIAL OWNER, ECS RECOMMENDS THAT CLIENT RETAIN LEGAL COUNSEL BEFORE ENTERING INTO THIS AGREEMENT TO EXPLAIN CLIENT'S RIGHTS AND OBLIGATIONS HEREUNDER, AND THE LIMITATIONS, AND RESTRICTIONS IMPOSED BY THIS AGREEMENT. CLIENT AGREES THAT FAILURE OF CLIENT TO RETAIN SUCH COUNSEL SHALL BE A KNOWING WAIVER OF LEGAL COUNSEL AND SHALL NOT BE ALLOWED ON GROUNDS OF AVOIDING ANY PROVISION OF THIS AGREEMENT.**

19.4 **IF CLIENT IS A RESIDENTIAL BUILDER OR RESIDENTIAL DEVELOPER, CLIENT SHALL INDEMNIFY AND HOLD HARMLESS ECS AGAINST ANY AND ALL CLAIMS OR DEMANDS DUE TO INJURY OR LOSS INITIATED BY ONE OR MORE HOMEOWNERS, UNIT-OWNERS, OR THEIR HOMEOWNER'S ASSOCIATION, COOPERATIVE BOARD, OR SIMILAR GOVERNING ENTITY AGAINST CLIENT WHICH RESULTS IN ECS BEING BROUGHT INTO THE DISPUTE.**

19.5 **IN NO EVENT SHALL THE DUTY TO INDEMNIFY AND HOLD ANOTHER PARTY HARMLESS UNDER THIS SECTION 19.0 INCLUDE THE DUTY TO DEFEND.**

20.0 CONSEQUENTIAL DAMAGES

20.1 CLIENT shall not be liable to ECS and ECS shall not be liable to CLIENT for any consequential damages incurred by either due to the fault of the other or their employees, consultants, agents, contractors or subcontractors, regardless of the nature of the fault or whether such liability arises in breach of contract or warranty, tort, statute, or any other cause of action. Consequential damages include, but are not limited to, loss of use and loss of profit.

20.2 ECS shall not be liable to CLIENT, or any entity engaged directly or indirectly by CLIENT, for any liquidated damages due to any fault, or failure to act, in part or in total by ECS, its employees, agents, or subcontractors.

21.0 SOURCES OF RECOVERY

21.1 All claims for damages related to the Services provided under this Agreement shall be made against the ECS entity contracting with the CLIENT for the Services, and no other person or entity. CLIENT agrees that it shall not name any affiliated entity including parent, peer, or subsidiary entity or any individual officer, director, or employee of ECS.

21.2 In the event of any dispute or claim between CLIENT and ECS arising out of in connection with the Project and/or the Services, CLIENT and ECS agree that they will look solely to each other for the satisfaction of any such dispute or claim. Moreover, notwithstanding anything to the contrary contained in any other provision herein, CLIENT and ECS' agree that their respective shareholders, principals, partners, members, agents, directors, officers, employees, and/or owners shall have no liability whatsoever arising out of or in connection with the Project and/or Services provided hereunder. In the event CLIENT brings a claim against an affiliated entity, parent entity, subsidiary entity, or individual officer, director or employee in contravention of this Section 21, CLIENT agrees to hold ECS harmless from and against all damages, costs, awards, or fees (including attorneys' fees) attributable to such act.

21.3 For projects located in Florida, the parties agree that **PURSUANT TO FLA. STAT. SECTIONS 558.002 AND 558.0035, CLIENT AGREES THAT AN INDIVIDUAL EMPLOYEE OR AGENT OF ECS MAY NOT BE HELD INDIVIDUALLY LIABLE FOR NEGLIGENCE FOR ACTS OR OMISSIONS ARISING OUT OF THE SERVICES.**

22.0 THIRD PARTY CLAIMS EXCLUSION - CLIENT and ECS agree that the Services are performed solely for the benefit of the CLIENT and are not intended by either CLIENT or ECS to benefit any other person or entity. To the extent that any other person or entity is benefited by the Services, such benefit is purely incidental and such other person or entity shall not be deemed a third party beneficiary to the Agreement. No third-party shall have the right to rely on ECS' opinions rendered in connection with ECS' Services without written consent from both CLIENT and ECS, which shall include, at a minimum, the third-party's agreement to be bound to the same Terms and Conditions contained herein and third-party's agreement that ECS' Scope of Services performed is adequate.

23.0 DISPUTE RESOLUTION

23.1 In the event any claims, disputes, and other matters in question arising out of or relating to these Terms or breach thereof (collectively referred to as "Disputes"), the parties shall promptly attempt to resolve all such Disputes through executive negotiation between senior representatives of both parties familiar with the Project.

The parties shall arrange a mutually convenient time for the senior representative of each party to meet. Such meeting shall occur within fifteen calendar (15) days of either party's written request for executive negotiation or as otherwise mutually agreed. Should this meeting fail to result in a mutually agreeable plan for resolution of the Dispute, CLIENT and ECS agree that either party may bring litigation.

23.2 CLIENT shall make no claim (whether directly or in the form of a third-party claim) against ECS unless CLIENT shall have first provided ECS with a written certification executed by an independent engineer licensed in the jurisdiction in which the Project is located, reasonably specifying each and every act or omission which the certifier contends constitutes a violation of the Standard of Care. Such certificate shall be a precondition to the institution of any judicial proceeding and shall be provided to ECS thirty (30) days prior to the institution of such judicial proceedings.

23.3 Litigation shall be instituted in a court of competent jurisdiction in the county or district in which ECS' office contracting with the CLIENT is located. The parties agree that the law applicable to these Terms and the Services provided pursuant to the Proposal shall be the laws of the Commonwealth of Virginia, but excluding its choice of law rules. Unless otherwise mutually agreed to in writing by both parties, CLIENT waives the right to remove any litigation action to any other jurisdiction. Both parties agree to waive any demand for a trial by jury.

24.0 CURING A BREACH

24.1 A party that believes the other has materially breached these Terms shall issue a written cure notice identifying its alleged grounds for termination. Both parties shall promptly and in good faith attempt to identify a cure for the alleged breach or present facts showing the absence of such breach. If a cure can be agreed to or the matter otherwise resolved within thirty (30) calendar days from the date of the termination notice, the parties shall commit their understandings to writing and termination shall not occur.

24.2 Either party may waive any right provided by these Terms in curing an actual or alleged breach; however, such waiver shall not affect future application of such provision or any other provision.

25.0 TERMINATION

25.1 CLIENT or ECS may terminate this Agreement for breach, non-payment, or a failure to cooperate. In the event of termination, the effecting party shall so notify the other party in writing and termination shall become effective fourteen (14) calendar days after receipt of the termination notice.

25.2 Irrespective of which party shall effect termination, or the cause therefore, ECS shall promptly render to CLIENT a final invoice and CLIENT shall immediately compensate ECS for Services rendered and costs incurred including those Services associated with termination itself, including without limitation, demobilizing, modifying schedules, and reassigning personnel.

26.0 TIME BAR TO LEGAL ACTION - Unless prohibited by law, and notwithstanding any Statute that may provide additional protection, CLIENT and ECS agree that a lawsuit by either party alleging a breach of this Agreement, violation of the Standard of Care, non-payment of invoices, or arising out of the Services provided hereunder, must be initiated in a court of competent jurisdiction no more than two (2) years from the time the party knew, or should have known, of the facts and conditions giving rise to its claim, and shall under no circumstances shall such lawsuit be initiated more than three (3) years from the date of substantial completion of ECS' Services.

27.0 ASSIGNMENT - CLIENT and ECS respectively bind themselves, their successors, assigns, heirs, and legal representatives to the other party and the successors, assigns, heirs and legal representatives of such other party with respect to all covenants of these Terms. Neither CLIENT nor ECS shall assign these Terms, any rights thereunder, or any cause of action arising therefrom, in whole or in part, without the written consent of the other. Any purported assignment or transfer, except as permitted above, shall be deemed null, void and invalid, the purported assignee shall acquire no rights as a result of the purported assignment or transfer and the non-assigning party shall not recognize any such purported assignment or transfer.

28.0 SEVERABILITY - Any provision of these Terms later held to violate any law, statute, or regulation, shall be deemed void, and all remaining provisions shall continue in full force and effect. CLIENT and ECS shall endeavor to quickly replace a voided provision with a valid substitute that expresses the intent of the issues covered by the original provision.

29.0 SURVIVAL - All obligations arising prior to the termination of the agreement represented by these Terms and all provisions allocating responsibility or liability between the CLIENT and ECS shall survive the substantial completion of Services and the termination of the Agreement.

30.0 TITLES; ENTIRE AGREEMENT

30.1 The titles used herein are for general reference only and are not part of the Terms.

30.2 These Terms together with the Proposal, including all exhibits, appendixes, and other documents appended to it, constitute the entire agreement between CLIENT and ECS ("Agreement"). CLIENT acknowledges that all prior understandings and negotiations are superseded by this Agreement.

30.3 CLIENT and ECS agree that subsequent modifications to the Agreement shall not be binding unless made in writing and signed by authorized representatives of both parties.

30.4 All preprinted terms and conditions on CLIENT'S purchase order, Work Authorization, or other service acknowledgement forms, are inapplicable and superseded by these Terms and Conditions of Service.

30.5 CLIENT's execution of a Work Authorization, the submission of a start work authorization (oral or written) or issuance of a purchase order constitutes CLIENT's acceptance of this Proposal and these Terms and their agreement to be fully bound to them. If CLIENT fails to provide ECS with a signed copy of these Terms or the attached Work Authorization, CLIENT agrees that by authorizing and accepting the services of ECS, it will be fully bound by these Terms as if they had been signed by CLIENT.

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DIVISION 1 - GENERAL REQUIREMENTSREQUIREMENTS FOR QUALITY ASSURANCE TESTING AND INSPECTIONS1. GENERAL

- (A) The Owner will employ and pay for the services of an independent testing agency to provide quality assurance testing and inspections. The testing agency shall be licensed in the state where the structure is located and shall meet the requirements of "Recommended Practices for Inspection and Testing Agencies for Concrete, Steel, Soil, Masonry and Bituminous Materials as Used in Construction" (ASTM E329). All testing and inspections shall be performed under the supervision of an engineer registered in the state where the structure is located.
- (B) Materials and operations shall be tested and inspected as the work progresses. Failure to detect any defective work or material shall not in any way prevent later rejection when such defect is discovered, nor shall it obligate the Owner's Representative for final acceptance.
- (C) The testing agency shall report all test and inspection results to CASCO + R|5, Owner and Contractor immediately after they are performed. All test and inspection reports shall be signed and sealed by an engineer registered in the state where the structure is located and shall include the exact location in the work represented by the test.
- (D) At the completion of all work the testing agency shall submit a quality assurance certification (control inspection report for site work, concrete, masonry, structural steel roofing) signed and sealed by an engineer registered in the state where the structure is located, stating that all work subject to quality assurance testing and inspections has been constructed in accordance with the contract documents and all other applicable code requirements and that all noted deficiencies have been corrected or accepted.. Submit a quality assurance certification for each specifications section requiring quality assurance testing and inspections.
- (E) The testing agency and its representatives are not authorized to revoke, alter, relax, enlarge or release any requirement of the contract documents, approve or accept any portion of the work, perform any duties of the Contractor, or be a party to scheduling of work.
- (F) The Contractor shall notify the testing agency a minimum of 24 hours in advance of all required testing and all reasonable facilities shall be made available for technicians.
- (G) Records of inspection shall be kept available to the building official during progress of work for two years after completion of the project. Records shall be preserved by the independent testing agency.
- (H) Testing agency personnel shall have their time sheets signed by an authorized representative of the general contractor. Copies of signed time sheets must be submitted with all invoices for payment.
- (I) Professional Liability, General Liability and Worker's Compensation Insurance are required. Minimum coverage for Professional Liability Insurance is \$2,000,000; General Liability \$2,000,000; and Worker's Compensation \$1,000,000.

2. SCOPE OF WORK

- (A) The specific requirements for quality assurance testing are shown in each section of the specifications and included, but is not necessarily limited to the following:
 - (1) Section 02211 Site Grading.
 - (2) Section 02221 Excavation and Backfill.
 - (3) Section 02511 Paving.
 - (4) Section 02711 Site Drainage.
 - (5) Section 03301 Concrete.

- (6) Section 04201 Unit Masonry Work.
 - (7) Section 05120 Structural Steel.
 - (8) Section 05210 Steel Joists.
 - (9) Section 05211 Steel Joist Girders.
 - (10) Section 05311 Metal Roof Deck.
 - (11) Section 07540 Single Ply TPO Membrane Roofing.
 - (12) Section 08421 Curtainwall System
- (B) Furnish all labor, materials, tools and supplies, and perform operations in connection with quality assurance testing and inspections.

- END OF SECTION -

ROOMS TO GO

111 7th Avenue South, Suite 100, Franklin, TN 37064
PO Box 1247, Franklin, TN 37065
Telephone: 615-595-5881 Fax: 615/595-9995

Date

Salutation

Company

Address

City, State, Zip

Re: Warranty Manual
Rooms To Go Showroom, *City, State, Zip*

Dear *Project Manager*:

Enclosed please find a warranty manual Table of Contents. This table contains all items that should be included in the warranty manuals. Please forward two (2) copies of the manual and (2) sets of required as-built drawings to this office within 30 days of project turnover.

If you have any questions regarding any of these items, please call Chyrl Miller or myself.

Sincerely,

Project Manager
RTG Sr. Construction Manager

Initials/xx

Enclosures

**ROOMS TO GO SHOWROOM
WARRANTY MANUAL TABLE OF CONTENTS**

Cover letter (by Owner)

I. Permits/Certificates/Administrative Forms Obtained by General Contractor

- Certificate of Occupancy
- Building Permit
- Other Pertinent Permits
- Notice of Commencement
- Signed Turn-Over/Acceptance Form by Store Manager

II. General Contractor, Subcontractor, and Material Supplier Directory (include project/showroom location, owner(s), company name (General Contractor, Subcontractor, Material Supplier), address, phone number(s), contact person and scope of work performed)

III. Warranty/Guarantee of Labor, Materials and Work Performed by all applicable Subcontractors and Material Suppliers (Form attached for your use): * See IV for specific requirements.

- General Contractor
- Division 2 - Site Work Contractor(s)/Subcontractor(s) and/or Material Supplier(s) who provided:
 - ⇒ 02011 Testing
 - ⇒ 02050 Demolition (utilities, demolition & removal, asbestos removal work, if applicable)
 - ⇒ 02211 Site Grading (erosion control, clearing & removal of debris, tree protection (as applicable), topsoil removal & stockpiling, grading, proof-rolling, compaction, cleanup)
 - ⇒ 02221 Excavation and Backfill
 - ⇒ 02241 Limestone Stabilized Sub-grade
 - ⇒ 02252 Cement Stabilized Sand
 - ⇒ 02280 Soil Treatment *
 - ⇒ 02511 Asphalt Paving
 - ⇒ 02521 Concrete Pavement
 - ⇒ 02523 Concrete Joints
 - ⇒ 02525 Concrete Curbs
 - ⇒ 02526 Pre-cast Concrete Wheel Stops
 - ⇒ 02530 Concrete Sidewalks
 - ⇒ 02532 Curb, Curb & Gutters and Headers
 - ⇒ 02668 Water Piping
 - ⇒ 02711 Site Drainage
 - ⇒ 02730 Sanitary Sewers
 - ⇒ 02770 Asphalt Seal Coat
 - ⇒ 02811 Underground Sprinkler/Irrigation System *
 - ⇒ 02871 Fencing & Gates
 - ⇒ 02900 Landscape
- Division 3 - Concrete Contractor(s)/Subcontractor(s) and/or Material Supplier(s) who provided:
 - ⇒ 03301 Concrete
 - ⇒ 03450 Polymer Modified Glass Fiber Reinforced Cement (Exterior Column Covers) *
 - ⇒ 03456 Glass Fiber Reinforced Gypsum (KIDS Interior Column Covers) *

- Division 4 - Masonry Contractor(s)/Subcontractor(s) and/or Material Supplier(s) who provided:
 - ⇒ 04201 Unit Masonry Work including: concrete masonry units, brick, natural stone, and glass block units *
 - ⇒ 04730 Simulated Stone Veneer *

- Division 5 - Structural Metal/Steel Contractor(s)/Subcontractor(s) and/or Material Suppliers(s) who provided:
 - ⇒ 05120 Structural Steel
 - ⇒ 05210 Steel Joists
 - ⇒ 05211 Steel Joist Girders
 - ⇒ 05311 Metal Roof Deck
 - ⇒ 05400 Cold Rolled Structural Metals
 - ⇒ 05500 Miscellaneous Metals

- Division 6 - Carpentry Contractor(s)/Subcontractor(s) and/or Material Suppliers(s) who provided:
 - ⇒ 06100 Carpentry, Access Panels
 - ⇒ 06650 Solid Polymer Fabrications *

- Division 7 - Thermal & Moisture Protection Contractor(s)/Subcontractor(s) and/or Material Suppliers(s) who provided:
 - ⇒ 07210 Building Insulation
 - ⇒ 07241 Exterior Insulation & Finish System (EIFS) *
 - ⇒ 07273 Roofing Underlayment
 - ⇒ 07401 Metal Roofing (Zeelock/Ceelock) *
 - ⇒ 07402 Metal Siding
 - ⇒ 07420 Aluminum Composite Panel System (KIDS) *
 - ⇒ 07465 Aluminum Soffit Panels *
 - ⇒ 07540 Single Ply TPO Membrane Roofing *
 - ⇒ 07600 Flashing & Sheet Metal *
 - ⇒ 07701 Roof Accessories
 - ⇒ 07800 Insulated Translucent Skylight
 - ⇒ 07901 Joint Sealants *

- Division 8 - Doors & Windows Contractor(s)/Subcontractor(s) and/or Material Suppliers(s) who provided:
 - ⇒ 08101 Hollow Metal Work
 - ⇒ 08421 Storefront System *
 - ⇒ 08422 Impact Resistant Storefront System *
 - ⇒ 08711 Finish Hardware *
 - ⇒ 08811 Glass and Glazing *
 - ⇒ 08812 Impact Resistant Glass and Glazing *

- Division 9 - Finishes Contractor(s)/Subcontractor(s) and/or Material Suppliers(s) who provided:
 - ⇒ 09261 Gypsum Drywall
 - ⇒ 09331 Tile Work
 - ⇒ 09511 Suspended Acoustical Ceiling System
 - ⇒ 09640 Wood Flooring *
 - ⇒ 09650 Resilient Flooring *
 - ⇒ 09680 Carpeting *
 - ⇒ 09900 Painting *

- Division 10 - Specialties Contractor(s)/Subcontractor(s) and/or Material Suppliers(s) who provided:
 - ⇒ 10165 Plastic Laminate Toilet Compartment
 - ⇒ 10522 Fire Extinguishers and Accessories *

- ⇒ 10538 Wall Hung Canopies *
- ⇒ 10811 Toilet Room Accessories
- ⇒ 10900 Interior Space Frame (*KIDS*)
- ⇒ 10999 Decorative Metals
- Division 12 - Furnishings
 - ⇒ 12484 Floor Mats and Frames *
- Division 14 – Hydraulic Passenger Elevator Contractor(s)/Subcontractor(s) and/or Material Suppliers(s) who provided:
 - ⇒ 14240 Hydraulic Passenger Elevator *
- Division 15 - Mechanical Contractor(s)/Subcontractor(s) and/or Material Suppliers(s) who provided:
 - ⇒ 15301 Fire Protection System *
 - ⇒ 15401 Plumbing System and Equipment *
 - ⇒ 15501 HVAC Systems and Equipment *
- Division 16 - Electrical Contractor(s)/Subcontractor(s) and/or Material Suppliers(s) who provided:
 - ⇒ 16052 Low Voltage Electrical Work (Security and Fire Alarm System) *
 - ⇒ 16401 Power Distribution Systems *
 - ⇒ 16501 Lighting Systems *

IV. Manufacturer's Product Warranty and Guarantee to include Operation, Service and Maintenance Manuals

- 02280 Soil Treatment 1) Special written guarantee that materials & application was made at the concentration, rate and methods specified; 2) a five (5) year warranty against termites from date of acceptance of project.
- 02811 Underground Irrigation Sprinkler System Include disk in closeout containing a PDF of the final approved Certified Lawn Irrigation shop drawings. 1) Sign off and acceptance by Owner and/or its Representative confirming proper training on operation and maintenance of system; 2) pipe warranty installation data form shall be completed and forwarded to company, the warranty presented to Owner after completion and prior to payment; 3) two (2) sets of as-built drawings which details and locates all underground sprinkler features (i.e. sleeves,, piping, valves, heads, etc.).
- 03450 Polymer Modified GFRC (Exterior Column Covers) – 1) Manufacturer shall warrant all materials against defect for two (2) years after acceptance of final installation; 2) Contractor shall provide two (2) year installation warranty and guarantee.
- 03456 Glass Fiber Reinforced Gypsum GFRG (*KIDS* Interior Column Covers) - 1) Manufacturer's two (2) year warranty after acceptance against defective materials; 2) Contractor shall warrant installation and installation materials for two (2) years after acceptance.
- 04201 Unit Masonry – 1) Contractor shall, upon completion of work contained herein, issue a written warranty to the Owner covering workmanship and material. Said warranty shall become effective upon completion and acceptance of work under this Section by Owner's representative and shall cover workmanship for one year and include material manufacturer's warranty for a period of one year against failure due to product which did not conform to formula or meet manufacturer's quality control standards at time of its production.
- 04730 Simulated Stone Veneer - 1) Special Warranty: Prepare and submit in accordance with section 01700. 2) Provide 40-year warranty against Manufacturer, the most current version of ACI 530.1, "Building Code Requirements for Concrete Masonry Structures".
- 05210, 05211 Structural Steel – Include disk in closeout containing a PDF of the final approved Certified Structural Steel and Joist shop drawings sealed by the Manufacturer's Engineer with the Registered Engineer's Seal for the State where showroom is located.
- 06650 Solid Polymer Fabrications – 1) Manufacturer's ten (10) warranty against defects in materials. Warranty shall provide material and labor to repair or replace defective materials. Damage caused by physical or chemical abuse or damage from excessive heat will not be warranted. 2) Contractor to provide a commercial care and maintenance video,

review maintenance procedures and warranty details with Director of Maintenance and/or his Representative upon completion of project.

- 07241 Exterior Insulation and Finish System (EIFS) – 1) Manufacturer’s standard five (5) year limited warranty for materials. 2) Inspection of the EIFS installation shall be performed by a representative of the Manufacturer. A report of the field visit shall be developed describing the materials and workmanship to be in compliance with Manufacturer’s recommendations, or to describe any deficiencies, with associated corrections identified during the site visit. Report shall be on EIFS manufacturer’s company letterhead. A copy of report shall be sent to Owner, Contractor and Architect of record.
- 07401 Metal Roofing (Zee-Lock/Cee-Lock) – 1) Paint finish shall have a twenty (20) year guarantee against cracking, peeling and fade (not to exceed 5 NBS units); 2) Galvalume material shall have a twenty (20) year guarantee against failure due to corrosion, rupture or perforation; and 3) Applicator shall furnish guarantee covering water-tightness of the roofing system for a period of two (2) years from date of substantial completion.
- 07420 Aluminum Composite Panel System – 1) Manufacturer’s three (3) year warranty system free from defects in materials and workmanship; 2) Sheet Rock Manufacturer to provide standard product warranty; 3) Finish warranty five (5) year against chalk, peel, crack or check; three to five (3-5) year against fade (will vary by color selection and jobsite environment)
- 07465 Aluminum Soffit Panels – A warranty and guarantee against contact with dissimilar materials (i.e. copper, zinc, steel, concrete, stucco, etc) which may affect product.
- 07540 Single Ply TPO Membrane Roofing – 1) Maintenance data for roofing system. 2) Manufacturer’s Representative shall provide written certification that the workmanship and installation have been properly and correctly performed and that the Manufacturer’s warranty is valid. If Manufacturer’s inspection and certification is not provided, then General Contractor is to be responsible for obtaining roof test cuts and analysis provided by a Certified Independent Testing Laboratory. Copies of results provided to Owner’s Representative. 3) Special Warranty: Manufacturer’s standard form, without monetary limitation in which Manufacturer agrees to repair or replace all components of membrane roofing system that fail in materials, application or workmanship within specified warranty period. Failure includes roof leaks. Special warranty includes roofing membrane, base flashing, roofing membrane accessories, roof insulation, fasteners and other components of membrane roofing system; 4) Warranty Period: Fifteen (15) years minimum from date of Certificate of Occupancy.
- 07600 Flashing and Sheet Metal – 1) A two (2) year guarantee.
- 07800 Insulated Translucent Skylight – 1) Manufacturer’s (25) twenty-five year warranty that exterior face shall have permanent glass erosion barrier to provide maximum long-term resistance to reinforcing fiber exposure. 2) Manufacturer’s guarantee that exterior face shall not change color more than 3.0 Hunter or CIE Units or five (5) years outdoor South Florida weathering at 7 degrees facing South.
- 07901 Joint Sealants – 1) A two (2) year guarantee.
- 08421 Storefront System and 08422 Impact Resistant Storefront System – Include disk in closeout containing a PDF of the final approved Certified Storefront System shop drawings.
- 08711 Finish Hardware – 1) Manufacturer’s written guarantee for all hardware items as stated in their catalogs, vendor shall assume all responsibility; Guarantees shall in writing by the Manufacturer and shall be delivered to the Owner, guarantee shall begin from date of acceptance of the building; Defective hardware within the guaranteed period must be replaced at Contractor’s expense, including labor for removal and reinstallation. 2) Copy of final Hardware Schedule.
- 08811 Glass and Glazing and 08812 Impact Resistant Glass and Glazing – 1) Warranty: High-Performance coated glass standard limited warranty of (10) ten years; 2) All clear plexi-glass material to have a ten (10) year non-yellowing warranty and all frosted Plexiglas to have a one (1) one-year warranty.
- 09640 Wood Flooring – 1) Manufacturer’s written product guarantee; 2) Manufacturer’s suggested maintenance and care instructions.
- 09650 Resilient Flooring – 1) Manufacturer’s written product guarantee; 2) Manufacturer’s suggested maintenance and care instructions.
- 09680 Carpeting – 1) Manufacturer’s written product guarantee; 2) Manufacturer’s suggested maintenance and care instructions.

- 09900 Painting – 1) Water repellent “Prime-a-Pell 200” shall cover workmanship for (5) five years and include material manufacturer’s warranty for a period of (5) five years against failure due to product which did not conform to formula or meet manufacturer’s quality control standards at time of its production. 2) Final paint schedule with color mix codes.
- 10522 Fire Extinguishers and Accessories - 1) Operational and Maintenance Data: In compliance with Section 01700 to include testing, refill or recharge schedules, procedures and recertification requirements. 2) Copy of Final Schedule Floor Plan depicting fire extinguisher size, type and locations.
- 10538 Wall Hung Canopies – 1) A two (2) year guarantee. 2) Finish Warranty for all finishes against blistering, peeling or any other separation of coating from substrate and against color loss of more than five NBS units. 3) Maintenance Data: include instructions for general maintenance and repair of surfaces and finishes.
- 12484 Floor Mats and Frames - 1) Maintenance data.
- 14240 Hydraulic Passenger Elevator – 1) Maintenance agreement to include regular maintenance for one year after completion of work, periodic examinations and perform work including adjustments and preventative maintenance (i.e. greasing, oiling and replacement of parts, this does not include accidents, vandalism, misuse or negligence other than manufacturer).
- 15301 Fire Protection System – Include disk in closeout containing a PDF of the final approved Certified Fire Protection shop drawings. 1) Equipment use and operating manuals with recommended and/or required maintenance instructions to include manufacturer’s guarantees and certificates (i.e. sprinklers, risers, alarms, fire pump, backflow prevention devices, etc.). 2) Copy of all inspection and test reports. 3) As-built drawings.
- 15401 Plumbing System - 1) Equipment use and operating manuals with recommended and/or required maintenance instructions to include the manufacturer’s guarantees and certificates (i.e. water closet, urinal, lavatory, sinks, faucets, water cooler, water heater, wall hydrant, etc.). 2) Copy of all inspection and test reports. 3) As-built drawings.
- 15501 HVAC Systems and Equipment - 1) Equipment use and operating manuals including required and recommended maintenance instructions; 2) Manufacturer’s Special Warranty, standard form to replace components of RTU that fail materials or workmanship within specified warranty periods A. Compressors: Manufacturer’s standard but no less than (5) five years from date of Substantial Completion; B. Heat Exchanger: Manufacturer’s standard but not less than (10) ten years from date of Substantial Completion and C. Solid-State Ignition Modules: Manufacturer’s standard but not less than (3) three years from date of Substantial Completion. 3) Copy of all inspection and test reports. 4) As-built drawings. 4) HVAC Test & Balance Report.
- 16052 Low Voltage Electrical Work – 1) Fire Alarm System Supplier one (1) year guarantee equipment; 2) Equipment catalogs with operation and maintenance instructions.
- 16401 Power Distribution Systems – 1) Product and equipment manuals with operation and maintenance instructions; 2) Electrical Contractor shall provide copy of ground test report for Owner’s records.
- 16501 Lighting Systems – 1) Product and equipment manuals with operation and maintenance instructions

III. Miscellaneous Items

- As-Built Drawings all changes red-lined (two paper copies and two electronic copies in PDF format).
 - ⇒ Lawn Irrigation (detailing locations & descriptions of sleeves, piping, valves, heads, etc)
 - ⇒ Fire Protection
 - ⇒ Plumbing
 - ⇒ HVAC (detailing layout of thermostats and remote sensors)
 - ⇒ Fire & Security Alarm Installation
 - ⇒ Electrical including Site Lighting
- A Disk containing PDF file of the following Certified shop drawings –
 - ⇒ Structural Steel – *(Signed & sealed by Fabricator’s Engineer with the registered Engineer’s seal for the State where structure is located. Engineer’s seal may be qualified “For Design of Connections Only”).*
 - ⇒ Storefront/Curtainwall System Design – *(Written Certification, signed & sealed by an Engineer registered in State where structure is located, stating curtainwall system and its anchorage to the structure has been designed to support the required design wind load as specified in the appropriate building code without exceeding the allowable stresses of the material and without exceeding the deflection of 1/175 of the span or 3/4”, whichever is less.)*

- ⇒ Fire Protection – *(Provide seal and signature of licensed Professional Engineer on shop drawings, calculations, and any other related documents as required to obtain State & local approvals and/or Certificate of Occupancy.)*

SAMPLE

Note this Guarantee must be typed as shown below, under General Contractor’s letterhead.

GENERAL CONTRACTOR GUARANTEE

PROJECT:

OWNER:

We, _____, General Contractor for the above referenced project, do hereby warrant that all labor, materials and equipment furnished and work performed in conjunction with the above referenced project are in accord with the Contract Documents and authorized modifications thereto, and will be free from defects or arrangement the same, including adjacent work displaced for a period of one year from Date of Substantial Completion (date of Certificate of Occupancy).

Should any defect develop during warranty period due to improper or defective materials, equipment, workmanship or arrangement thereof, including adjacent work displaced the Contractor agrees corrective work shall be made good at no expense to Owner.

This warranty commences on ___/___/___ and expires on ___/___/___.

The Owner will give General Contractor written notice of any defective work which develops during warranty period. Should General Contractor fail to correct work within 5 days after receiving written notice, Owner may at his option correct the work and General Contractor agrees to pay such charges upon demand.

Nothing in the above shall be deemed to apply to work which has been abused or neglected by the Owner.

Date: ___/___/___

For: _____
(General Contractor/Company Name)

By: _____
(It’s Authorized Officer/Representative’s Signature)

Printed Name: _____

Title: _____

Witness

***Note this Guarantee must be typed as shown below, under Subcontractor’s Letterhead.**

SUBCONTRACTOR GUARANTEE

PROJECT:

OWNER:

GENERAL CONTRACTOR:

Scope of Work: _____

We, _____, Subcontractor for the above referenced project, do hereby warrant that all labor, materials and equipment furnished and work performed in conjunction with the above referenced project are in accord with the Contract Documents and authorized modifications thereto, and will be free from defects or arrangement the same, including adjacent work displaced for a period of ____ year(s) from Date of Substantial Completion (date of Certificate of Occupancy).

Should any defect develop during warranty period due to improper or defective materials, equipment, workmanship or arrangement thereof, including adjacent work displaced the Subcontractor agrees that corrective work shall be made good at no expense to Owner.

This warranty commences on ___/___/___ and expires on ___/___/___

The Owner will give General Contractor and Subcontractor written notice of any defective work which develops during warranty period. Should Subcontractor fail to correct work within **5** days after receiving written notice, Owner may at his option correct the work and Subcontractor agrees to pay such charges upon demand.

Nothing in the above shall be deemed to apply to work which has been abused or neglected by the Owner.

Date: ___/___/___ For: _____
(Subcontractor/Company Name)

By: _____
(It’s Authorized Officer/Representative’s Signature)

Printed Name: _____

Title: _____

Witness

General Contractor’s Authorized Officer’s Signature: _____

(Revision 02/29/2012)

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DIVISION 2 - SITE WORK1. GENERAL

- (A) Include all labor, material and equipment to perform all work in this Section.
- (B) The GC shall be responsible for providing a copy of Division 1 specifications to each Subcontractor and for coordinating the work accordingly.
- (C) Submittal data, shop drawings, and samples:
 - (1) Shall be submitted for review only when required by and in accordance with the procedure set forth in Section 00011 of these specifications.
 - (2) All references to submittal data, shop drawings, and samples in the context of the technical specifications shall be taken to mean "if required under the provisions of Section 00011", unless stipulated otherwise.
- (D) Refer to Section 00011 for requirements relating to Base Bid Products, Alternates, and Substitutions.
- (E) The Owner will employ and pay for the services of an independent testing agency to provide testing and inspection of soil, concrete steel erection, roofing, curtainwall, framing, erection and paving work as applicable. The Contractor shall schedule and coordinate his work with the testing agency. All costs for retesting or reinspection of materials, trip charges, excess standby time and overtime premiums incurred because of failure or inability of testing laboratory to execute the testing or reinspection initially shall be paid for by the General Contractor.
- (F) The testing agency shall be selected by the Owner prior to beginning work. The testing agency shall be licensed in the state where the structure is located. All testing and inspections shall be performed under the supervision of an engineer registered in the state where the structure is located.
- (G) At the completion of the work the testing agency shall submit a letter of certification stating that all concrete work has been constructed in accordance with the contract documents and all applicable code requirements.
- (H) The Owner may elect to change testing agencies at his own discretion.
- (I) Invoices for testing work shall be made to the Owner. Testing agency personnel shall have their time sheets signed by an authorized representative of the General Contractor. Copies of signed time sheets must be submitted with all invoices for payment.

2. WORK INCLUDED

- (A) Inspection of asbestos removal work (if applicable).
- (B) Testing of compaction throughout site for compliance with these specifications.
- (C) Inspection and approval of subgrade prior to placement of all soil fill, footings, foundations and slabs. All footing subgrades shall meet the design bearing capacity criteria as outlined in the Soils Report.
- (D) Testing of all excavation and backfill compaction including that for mechanical and electrical trenches shall comply with these specifications.
- (E) Off-site fill must be approved by testing agency prior to placement.
- (F) Inspection and testing of all grading operations for compliance with these specifications.
- (G) Inspection and testing of all site drainage work for compliance with these specifications.
- (H) Inspection and testing of asphaltic concrete and pavement base materials, installation, and compaction. Refer to Specification Section 02511 for paving and base criteria.

3. COMPACTION TEST REQUIREMENTS

- (A) Compaction test shall include but be limited to site inspections with a minimum of one density test for every 2500SF of area per lift in the building area, one density test for every 5000SF of area per lift in the pavement area, one density test below each utility structure and one density test for every 30 linear feet per lift at utility trenches.
 - (1) Said inspections shall be pre-scheduled.
 - (2) A report shall be submitted, following each inspection, and prior to next inspection, that shall include observations, recommendations and test results.

4. REPORTING

- (A) Reports shall be distributed to the General Contractor, the Civil Engineer, the Architect and the Owner. The field supervisor shall be notified immediately of results.
- (B) All field reports and test reports shall be signed and sealed by a licensed engineer in the state where the structure is located.
- (C) Records of inspection shall be kept available to the building official during progress of work for two years after completion of the project. Records shall be preserved by the independent testing agency.

- END OF SECTION -

DIVISION 2 - SITE WORK1. GENERAL

- (A) Include all labor, material and equipment necessary for and incidental to the execution of all demolition and removal work within the limits established on the plans.
- (B) Visit the site and examine all conditions that may affect the scope of work required under this Section.

2. UTILITIES

- (A) Preserve in operating condition all active utilities traversing the site. Protect all property, including but not limited to; mains, manholes, catch basins, valve boxes, poles, guys and other appurtenances (as applicable). Repair damage to any such utility due to work under this contract.
- (B) Contact the local underground utility locator prior to beginning work.

3. DEMOLITION AND REMOVAL

- (A) Demolish and remove existing buildings, foundations, steps, porches, posts, driveways, walks curbs, pavement, signs and footings as shown on the plans, and/or as specified herein.
- (B) Provide protection to persons and property. Execute the work so as to avoid interference with the use of adjoining facilities.
- (C) All demolished work, unless otherwise noted, shall become the property of the Contractor and shall be removed from the site. All debris caused by demolition and all existing debris (above ground and discovered below ground), shall be cleared and removed from the site. No filling of excavations with materials from demolition will be permitted. Do not allow material and debris to accumulate on site. Burning will not be allowed.
- (D) Contractor shall not reuse existing materials unless specifically noted in contract agreement.

4. ASBESTOS REMOVAL WORK (If Applicable)

- (A) Prior to starting demolition work, all asbestos shall be removed from the existing buildings. Refer to Environmental Assessment Report. (The report is included in Section 1 of these specifications).
- (B) All asbestos removal work including but not limited to, removal, transportation and deposition shall be in compliance with all local, state and Federal requirements.
- (C) The General Contractor shall secure all permits and provide all necessary notifications to the required agencies.
- (D) Contractor shall indemnify and hold harmless the Owner and CASCO from all lawsuits arising from or caused by the removal of the asbestos.
- (E) Liability insurance policies naming the Owner, Rooms To Go, and CASCO, as additional insured, must be provided by the Contractor with minimum limits of \$3,000,000.00.

- END OF SECTION -

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DIVISION 2 - SITE WORK1. GENERAL

- (A) Include all labor, material and equipment necessary for and incidental to the execution of all asbestos removal work, erosion control, clearing, grubbing, and grading work as shown on the plans.
- (B) Visit the site and examine all conditions that may affect the scope of work.
- (C) Maintain bench marks and other reference points. If disturbed or destroyed, replace as necessary.
- (D) Take necessary precautions to prevent blocking of sewers, filling of ditches and washing of earth onto existing pavement during heavy rains. After heavy rains promptly clean up any debris and sedimentation that may have occurred, or might be damaging to sewers, ditches, and pavements. Comply with all local ordinances relative to erosion control. Comply with requirements of the National Pollutant Discharge Elimination System (NPDES) and/or Water Pollution Prevention, as required. The General Contractor to comply with general and specific permit requirements (e.g. notifications, inspection/monitoring, recordkeeping/reporting, maintenance of all erosion control devices, etc.).
- (E) Topographic and property surveys giving lot size, ground elevations, obstructions on site, locations and depths of sewers, conduits, pipes, existing structures, curbs, pavements, tracts, and soil boring data giving the nature of ground and sub-surface conditions have been obtained from reliable sources. The accuracy of this data is not guaranteed and is furnished solely as an accommodation to the Contractor. Use of this data shall be made at the Contractor's discretion. No additional compensation will be granted due to the Contractor's lack of knowledge of site conditions. Prior to bid submission, conduct any additional surveys and soils tests you may deem necessary to verify the accuracy of the information provided.
- (F) All site work is to be done in accordance with the plans and specification. The soils report is made available for the convenience of the Contractor. Data on indicated subsurface conditions are not intended as representations or warranties of accuracy or continuity between soil borings. It is expressly understood that Owner will not be responsible for interpretations or conclusions drawn therefrom by Contractor. Additional test borings and other exploratory operations may be made by Contractor for the purpose of preparing his bid but these will be at no cost to the Owner.
- (G) Site grading materials and workmanship shall meet or exceed the requirements and recommendations noted in the Soils Report, which may exceed the requirements of this Specification Section.
- (H) Contractor is responsible for estimating and calculating all cut and fill quantities. Prior to bid submission the Contractor shall conduct any additional surveys and soil tests he deems necessary to calculate the cut and fill quantities properly. Additional surveys and tests made by the Contractor shall be made at no cost to the Owner.
- (I) Contractor is responsible for restoring offsite areas disturbed in performance of the work.
- (J) Contractor to maintain a clean access entry drive. Keep mud and construction debris onsite. Clean offsite roadways when needed.
- (K) Contractor to provide select unit prices (See Section 00301 Proposal Form).
- (L) The Civil Engineer will prepare and submit a Storm Water Pollution Prevention Plan (SWPPP). The Contractor shall implement the SWPPP including installation and maintenance of controls per the drawings, specifications and the SWPPP. A qualified responsible person(s) shall be designated by the Contractor to perform inspections, reporting, record-keeping and file notices including a Notice of Intent (NOI) and Notice of Termination (NOT) as required by and for the SWPPP.

2. WORK INCLUDED

- (A) Erosion Control measures

- (B) Clearing and removal of debris.
 - (C) Protection of trees (as applicable).
 - (D) Topsoil removal and stockpiling.
 - (E) Grading.
 - (F) Proofrolling
 - (G) Compaction.
 - (H) Clean-up.
3. WORK SPECIFIED ELSEWHERE
- (A) Excavating and backfill.
 - (B) Excavation and backfill for Mechanical and Electrical trades.
 - (C) Geotechnical Report
4. QUALITY ASSURANCE
- (A) General
 - (1) The Owner will employ and pay for the services of an independent testing agency to provide testing and inspection of the site grading work. The testing agency shall be licensed in the state where the structure is located, and all testing and inspections shall be performed under the supervision of an engineer registered in the state where the structure is located.
 - (2) Site grading work and materials shall be tested and inspected as the work progresses. Failure to detect any defective work or material shall not in any way prevent later rejection when such defect is discovered, nor shall it obligate the Owner's Representative for final acceptance.
 - (3) The testing agency shall report all test and inspection results to the Project Manager, Owner and Contractor immediately after they are performed. All test and inspection reports shall be signed and sealed by an engineer registered in the state where the structure is located and shall include the exact location of the work represented by the test.
 - (4) The testing agency and its representatives are not authorized to revoke, alter, relax, enlarge or release any requirement of the contract documents, approve or accept any portion of the work, perform any duties of the Contractor, or be a party to scheduling of work.
 - (5) The Contractor shall notify the testing agency a minimum of 24 hours in advance of all site grading work.
 - (6) Records of inspection shall be kept available to the building official during progress of work and for two (2) years after completion of the project. Records shall be preserved by the independent testing agency.
 - (B) The testing agency shall conduct pre-grading inspections as necessary to determine that:
 - (1) All erosion control measures have been installed per the drawings and local ordinances.
 - (2) All demolition work is executed per the drawings and specifications.
 - (3) All demolished materials have been removed from the site.
 - (C) The testing agency shall conduct site grading inspections and testing as necessary to determine that:

- (1) All topsoil and organic matter have been removed from the building and paved areas.
 - (2) All grading and proofrolling have been performed per the specifications.
 - (3) Approval of all on-site and off-site fill materials.
 - (4) All fill materials have been compacted per the specifications.
- (D) The testing agency shall conduct post-grading inspection as necessary to determine that:
- (1) All excess materials, trash, etc. have been removed from the site in accordance with the project specifications.

5. EROSION CONTROL

- (A) Install and maintain during construction all erosion control measures as required by local ordinance and as specified on the drawings.
- (B) Unless specifically noted otherwise, a Stormwater Pollution Prevention Plan (SWPPP) will be prepared by others. Comply with all requirements of the site specific SWPPP as shown and described on the drawings, SWPPP manual and provided elsewhere in the contract documents.
- (C) File a SWPPP Notice of Intent (NOI) to obtain permit coverage as locally required.
- (D) Before starting construction, post a copy of the Construction Site Notice at the construction site for the duration of the construction activities.
- (E) Install structural Best Management Practices (BMPs) specified in the SWPPP including initiation of temporary and permanent stabilization practices within 14 days where construction activities have temporarily or permanently ceased, unless disrupting activities will resume within 14 calendar days.
- (F) Designate a duly authorized representative to perform inspections and sign all inspection forms and reports. Inspection of controls shall be conducted at least once every seven (7) calendar days and within 24 hours of the end of a storm event of 0.5" or greater. Perform additional specific inspections as locally required. Maintain a copy of the SWPPP, inspection forms and reporting in the jobsite office.
- (G) Maintain structural BMPs during the life of the construction project including performance of procedural BMPs needed to supplement structural BMPs such as street sweeping.
- (H) Update the SWPPP as necessary based upon changes during construction and based upon input from Inspection reports.
- (I) Removal of BMPs once construction is complete.
- (J) File a Notice of Termination (NOT) once the site is stabilized to terminate permit coverage.

6. CLEARING AND REMOVAL OF DEBRIS

- (A) All obstructions within the building, paving or planted areas shall be removed. Grub out roots of all trees and remove stumps. Any existing asphalt, curb and gutter and utilities should be removed in addition to topsoil and organic materials (soils with more than 5 percent organics content).

- (B) Remove from site all trees, stumps, debris piles, or other refuse encountered during clearing and grading.
 - (C) Refer to Section 02050 and Drawings for demolition work required.
7. PROTECTION OF TREES (as applicable)
- (A) All trees which are outside the limits of grading operations are to remain in place and be maintained, unless otherwise noted on the plans.
8. TOPSOIL REMOVAL & STOCKPILING
- (A) Remove all topsoil and organic matter from cut and fill areas before grading operations start.
 - (B) Stockpile a sufficient amount of topsoil for later distribution in planted areas. All excess topsoil is to be removed from the site.
 - (C) Before placing fill, remove all debris subject to termite attack, rot or corrosion, and all other deleterious materials from areas to be filled.
 - (D) If, during the course of excavation work, unsuitable soil per the Soils Report is encountered, compensation for soil removal shall be based on the unit prices quoted. Soil undercut volume (if any) will be measured in the ground (i.e. in place). Contract unit cost will be based upon the in-ground volume.
9. GRADING
- (A) Prior to grading, set grade stakes to establish finish contours.
 - (B) Perform grading to a tolerance of plus or minus 1 inch within building and paved areas.
 - (C) Allow for the thicknesses of the floor slab and base material within building limits, for the pavement and its base in paved areas and for topsoil replacement in landscaped areas.
 - (D) Unless otherwise indicated on the plans, grading shall be evenly sloped to provide drainage. Round top and bottom of banks and at other breaks in grade.
 - (E) Provide suitable off-site fill material, or alternately, dispose of all excess material as required, to achieve the final grades shown on the plans.
 - (F) The finished grades in the parking lot landscaped islands shall be graded to be sloped and crowned so that water can drain over the surrounding curbs and onto the adjacent parking lot.
 - (G) Refer to Geotechnical Report
10. ROCK EXCAVATION:
- (A) All excavation work shall be considered unclassified.
 - (B) Should rock be encountered in the cut areas or in the trenches, use a backhoe or ripper until the use of such equipment is not practical.
 - (C) Remove all rock if encountered, at no additional cost to Owner.
 - (D) Remove rock to depths designated on plans below slabs, footings, and pavement, and below areas to receive lawns and planting.
 - (E) When blasting is required, such work shall be conducted only by firms who are specialized and are licensed to do this work and have adequate insurance coverage.
11. PROOFROLLING
- (A) After clearing, grubbing and organic topsoil removal, the exposed soils within the construction areas shall be moisture conditioned to +/- 2 percent of the optimum moisture content (ASTM D-698) and compacted with a steel-wheeled, self-propelled vibratory roller having a minimum drum centrifugal force of 25,000 pounds, to a depth of 24 inches below

stripped grade or to a depth of 24 inches below bottom of foundation elevation, whichever is greater, to a minimum of 98 percent of the Standard Proctor (ASTM D-698) maximum dry density at +/- 2 percent of the optimum moisture content. Refer to Geotechnical Report.

- (B) The steel-wheeled vibratory roller shall be operated at a forward speed not greater than one (1) mile per hour. The roller shall not be operated within 25 feet of any existing structure.
- (C) Exposed soils within the construction area shall be proofrolled with a loaded tandem axle, pneumatic-tired dump tank or similar heavy rubber-tired vehicle. The amount of load shall be determined by the Geotechnical Engineer. Soils that are observed to rut or deflect excessively under the moving load shall be undercut and replaced with properly compacted fill. The proofrolling and undercutting activities shall be observed by a representative of the independent testing agency and shall be accomplished during a period of dry weather.
- (D) Soft, organic, highly plastic, or excessively wet soils or old fill materials encountered during the proofrolling operation, causing deflection or not acceptable by the Geotechnical Engineer, shall be excavated and replaced with clean fill or material specified by the Geotechnical Engineer in the field to facilitate compaction.

12. COMPACTION AND SUBGRADES

- (A) Suitable on-site materials may be used as fill. All fill shall consist of clean soil which is free of roots, organic or other deleterious materials and debris, and have a maximum particle size of less than 3 inches. The liquid limit to be no more than 40 and plasticity index be no more than 6 for structural fill soils in building and pavement areas. The testing frequency of 1 compaction test per 2,000 square feet per lift at the expanded building limits, 1 compaction test per 200 lineal feet per lift of pipeline at the bedding, spring line, and for each lift above the pipe, 1 compaction test per 5,000 square feet per lift at the pavement areas, and 1 compaction test per 5,000 square feet at all other non-structural areas. Refer to Geotechnical Report.
- (B) Off-site borrow material must meet the requirements outlined in the Soils Report and be approved by the independent testing agency. Approval will be based upon the results of tests conducted by a qualified soils testing laboratory.
- (C) Fill within building lines and under paved areas shall be placed in loose horizontal layers not more than eight inches (8") thick. Interim grade shall always be kept sloped and crowned to facilitate run-off. Place no fill on frozen or on excessively wet or dry subgrade.
- (D) The bottom of all trenches, and the soil under areas where underground structures are to be constructed and/or installed, shall be compacted to a minimum of 98% of the Standard Proctor maximum dry density, per ASTM D-698 prior to pipe and structure installations. All fill material placed adjacent to and above piping and structures shall be placed in four (4) to six (6) inch layers and shall be compacted to 98% per ASTM D-698.
- (E) Fill under building slabs & paved areas shall be compacted to 98% of the Standard Proctor maximum dry density (ASTM D-698), or as recommended in the site-specific geotechnical report, Section 01051.
- (F) Continuous wall footing trenches and individual footing pits shall be excavated to footing line and bottom grade. Foundation soils shall be moisture conditioned to +/- 3 percent of the optimum moisture content (ASTM D-698) compacted with suitable mechanical equipment to achieve the specified level of density to the required depth. Foundation bottom grade shall be tested to confirm that a minimum density of 98% of the Standard Proctor maximum dry density exists to a depth of 24 inches below footing bottom.
- (G) Contractor shall protect and maintain all finished compacted areas. Any finished compacted subgrade area which deflects one inch (1") or more as a result of construction traffic shall be cut, disced, and recompacted. The depth of the cut, discing procedure and compaction requirements shall be determined by the Geotechnical Engineer in the field. There shall be no extra cost under the base contract for this subgrade recompaction.
- (H) All fill material shall be free of debris and fibrous organic material.
- (I) To ensure workability with a minimum compactive effort, it is essential that the material be kept at or near the optimum moisture content during compaction.

- (J) Moisture Control: Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer of soil material, to prevent free water appearing on surface during or subsequent to compaction operations.
 - (1) Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.
 - (2) Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing or pulverizing until moisture content is reduced to a satisfactory value.
- (K) Subgrade soils for sidewalks and site concrete shall be conditioned, treated, compacted and installed equal to or greater than pavement subgrades.

13. CLEAN-UP

- (A) The entire site shall be raked clean of all trash and other debris after completion of grading work and excess material removed from the site, prior to proceeding with seeding/sodding. Remove all pavement base, etc. from planting areas.
- (B) Erosion control measures will be removed after permanent landscaping has been established, or at a time set by the local authorities.
- (C) Seed or sod all area disturbed by construction when otherwise not designated with groundcover. Overseed with winter rye grass at a rate of 4 pounds per 1000 sf when seasonally and locally appropriate.

- END OF SECTION -

DIVISION 2 - SITE WORK1. GENERAL

- (A) Include all labor, material and equipment necessary for and incidental to the execution and completion of all excavation, fine grading and filling, backfilling and topsoil work within the limits established on the plan.
- (B) Excavation and backfill materials and workmanship shall meet or exceed the requirements and recommendations noted in the Soils Report, which may exceed the requirements of this Specification Section.
- (C) Contractor shall be solely responsible for determining the quantities of materials to be excavated and handled and for the amount of backfilling, to be done in order to completely perform all work required as shown on the drawings.
- (D) Excess or unsuitable materials from excavation shall be removed from the site.
- (E) Control grading in vicinity of buildings and paved areas so ground surface is at all time properly sloped to drain surface water away from excavated areas. Promptly remove water that accumulates in excavations, using pumps where required.
- (F) Cooperate fully with other trades in all phases of the work so that the work under this heading shall be coordinated with the sequences and operations of such other trades.
- (G) Suitable backfilling materials and any topsoil needed shall be furnished by this Contractor.

2. WORK SPECIFIED ELSEWHERE

- (A) Excavation and backfill, except as noted above, for mechanical, plumbing and electrical work.
- (B) Geotechnical Report

3. QUALITY ASSURANCE

(A) General

- (1) The Owner will employ and pay for the services of an independent testing agency to provide testing and inspection of the excavation and backfill work. The testing agency shall be licensed in the state where the structure is located, and all testing and inspections shall be performed under the supervision of an engineer registered in the state where the structure is located.
 - (2) Excavation and backfill operations shall be tested and inspected as the work progresses. Failure to detect any defective work or material shall not in any way prevent later rejection when such defect is discovered, nor shall it obligate the Owner's Representative for final acceptance.
 - (3) The testing agency shall report all test and inspection results to the Project Manager, Owner and Contractor immediately after they are performed. All test and inspection reports shall be signed and sealed by an engineer registered in the state where the structure is located and shall include the exact location of the work represented by the test.
 - (4) The testing agency and its representatives are not authorized to revoke, alter, relax, enlarge or release any requirement of the contract documents, approve or accept any portion of the work, perform any duties of the Contractor, or be a party to scheduling of work.
 - (5) The Contractor shall notify the testing agency a minimum of 24 hours in advance of all excavation and backfill work.
 - (6) Records of inspection shall be kept available to the building official during progress of work and for two (2) years after completion of the project. Records shall be preserved by the independent testing agency.
- (B) The testing agency shall conduct excavation inspections and tests as necessary to determine that:
- (1) Subgrade areas have been constructed per the Soils Report and specifications criteria.

- (2) Building pad excavations including all footing subgrade areas have been inspected, tested and accepted prior to placement of concrete.
 - (3) All excavations are free of water at all time.
 - (4) All footing excavations are protected from freezing temperatures.
 - (5) All over-excavations are inspected, tested, and accepted prior to backfilling.
- (C) The testing agency shall conduct backfilling inspections as necessary to determine that:
- (1) Backfilling materials meet the criteria for fill per the specifications and the Soils Report.
 - (2) Foundation walls are braced and foundation concrete is of adequate strength prior to backfilling.
 - (3) Backfill has been placed and compacted per the specifications and the Soils Report.
- (D) The testing agency shall conduct post-excavation and backfilling inspections as necessary to determine that:
- (1) All excess and unsuitable materials have been removed from the site.
4. FINE GRADING
- (A) Fine grading shall consist of fine excavation and filling necessary to bring subgrade to elevations shown, prior to spreading topsoil and/or granular base.
 - (B) Any additional fill required beneath the building and in paved areas shall be compacted per Section 02211, "COMPACTION" paragraph and per the Soils Report recommendations.
5. EXCAVATION
- (A) Excavate subgrades for placing of footings, retaining walls, pits, trench, slabs etc., to depths given on drawings.
 - (B) Where forms for concrete are required within excavations, such excavations shall be made to allow sufficient space to permit erection and removal of forms and inspection of work; minimum 1'-6" from wall face.
 - (C) Excavate or backfill to subgrade elevations required for concrete slabs and paving, allowing for thickness plus granular base.
 - (D) Where previously unknown soft earth or soil with vegetation is encountered in the building area, at footing bottom and in pavement subgrade areas, excavate to firm material, and fill additional excavation with approved fill and compact the additional fill to 98% per ASTM D-698. Soil undercut volume (if any) will be measured in the ground (i.e. in place). Contract unit cost will be based upon the in-ground volume.
 - (E) Foundation backfill on sides of formed footing and building slab subgrade fill shall consist of select fill, free of roots and debris, which is placed in lifts not to exceed 8" and compacted to 98 percent of the Standard Proctor maximum dry density (ASTM D-698).
 - (F) Keep excavations free from water at all times. Keep all excavations clean of all loose earth and rock at all times.
 - (G) When freezing temperatures may be expected, excavation shall not be made to full depth indicated, unless footings can be poured immediately after excavation work is completed. When the excavation has been carried to required depth, and concrete cannot be immediately deposited the bottoms of excavations shall be protected from frost by suitable means. Any protective covering so placed shall not be removed until immediately before concrete is placed.
6. BACKFILLING
- (A) When backfill is to be placed before floor slabs are in-place and of proper strength, this Contractor shall be responsible to see that all foundation walls are properly braced and that the foundation concrete is of adequate strength (28 days cure) before backfilling operations are started.

- (B) Materials for backfilling may be site borrow earth material, free from broken masonry, rock, frozen earth, roots, or other organic matter and shall comply with the Soils Report requirements for compacted fill.
- (C) Earth backfill in building and paved areas shall be placed in lifts not to exceed 8" and shall be compacted per Section 02211, paragraph 11, 12 and per the Geotechnical Report recommendations.
- (D) The bottom of all trenches, and the soil under areas where underground structures are to be constructed and/or installed, shall be compacted to a minimum of 98% per ASTM D-698 prior to pipe and structure installations. All fill material placed adjacent to and above piping and structures shall be placed in four (4) to six (6) inch layers and shall be compacted to 98% per ASTM D-698.
- (E) Obtaining satisfactory densities is the responsibility of this Contractor, but the Owner's Representative shall have the right to access to the working areas at all times and shall verify compliance with the specifications.
- (F) Backfill behind curbs with topsoil, tamp well and shape to drain.

7. PLACING TOPSOIL

- (A) After completion of building work, loosen subgrade and remove debris, concrete, asphalt, and pavement base in all seeded and landscaped areas to a depth of at least two inches (2") by scarifying or other approved method to permit bonding of topsoil to subgrade.
- (B) Uniformly distribute topsoil on designated areas and spread uniformly to such depth that when properly compacted, finish grade will conform to indicated finish elevations. Finished topsoil grades shall not deviate from elevations shown by more than 2" plus or minus. In no case shall topsoil be less than 6" deep.
- (C) Grade to prevent irregularities and depressions in which water will be retained.
- (D) Place no topsoil on frozen sub-grade or on exceedingly wet or dry sub-grades, as determined by the testing agency.
- (E) Topsoil shall be furnished by this Contractor.

8. CLEAN-UP

- (A) The entire area of the site where excavation, filling, backfilling and grading is to be performed, shall be raked clean of all trash and other debris after completion of the work and excess material removed from the site.

- END OF SECTION -

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DIVISION 2 - SITE WORK

1. GENERAL:
 - (A) Include all labor, material and equipment to perform all work in this Section. The area to be treated shall be soils under the building.
 - (B) Work included shall be all labor, materials and installation required to complete the project.
2. SCOPE:
 - (A) Furnish all materials, equipment, supervision and all incidentals necessary to complete all termite treatment of soil.
 - (B) The following areas are to be chemically treated before vapor barrier (Polyethylene film) is installed and/or concrete slabs are poured.
 - (1) The compacted soil under all concrete slabs, within a line one (1) foot outside of building line.
3. SUBMITTALS
 - (A) Product data and application instructions.
 - (B) Sample guarantee
 - (C) Certification that products used comply with U.S. Environmental Protection Agency (EPA) regulations for termiticide.
4. MATERIALS:
 - (A) The type and application of all chemicals must be approved by and meet requirements of Federal, State, and Local Governmental Agencies having jurisdiction.
5. WORKMANSHIP:
 - (A) Application shall be by a Certified Pest Control Operator and the type and application of all chemicals must be approved by and meet requirements of Federal, State, and Local Governmental Agencies having jurisdiction.
 - (B) Tint or color termiticide for visual identification of treated areas.
 - (C) Treatment shall not be made when soil is excessively wet nor when rains are expected during that day.
 - (D) Coordinate the work with other trades to arrange for all surfaces to be covered with vapor barrier as soon as work is completed for any or all areas treated.
6. GUARANTEE
 - (A) Upon completion furnish a written guarantee covering the following:
 - (1) That materials, and application was made at the concentration, rate and methods specified herein.
 - (2) Effectiveness of treatment against termites for a period of five (5) years from date of acceptance of the project.

– END OF SECTION –

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DIVISION 2 - SITE WORK1. GENERAL

- (A) Include all labor, material and equipment to completely install all bituminous paving.
- (B) Bituminous requirements and recommendations noted in the Soils Report, which may exceed the requirements of this Specification Section. Paving materials and workmanship shall meet or exceed the requirements of this Specification Section.

2. WORK SPECIFIED ELSEWHERE

- (A) Excavation, grading, preparation of sub-grade to required elevation with a tolerance of plus or minus 1 inch, and concrete curbs.

3. SUBMITTALS

- (A) Asphalt mix design shall be submitted to the Civil Engineer.

4. MINIMUM INSTALLER QUALIFICATIONS

- (A) Engage an experienced installer who has completed hot-mix asphalt paving similar in material, design, and extent to that indicated for this project and with a minimum 10-year record of successful in-service performance.

5. QUALITY ASSURANCE

(A) General

- (1) The Owner will employ and pay for the services of an independent testing agency to provide testing and inspection of the asphaltic concrete and stone base work. The testing agency shall be licensed in the state where the structure is located and shall meet the requirements of "Recommended Practices for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials as Used in Construction" (ASTM E329). All testing and inspections shall be performed under the supervision of an engineer registered in the state where the structure is located.
- (2) Asphalt and stone base materials and operations shall be tested and inspected as the work progresses. Failure to detect any defective work or material shall not in any way prevent later rejection when such defect is discovered, nor shall it obligate the Owner's Representative for final acceptance.
- (3) The testing agency shall report all test and inspection results to the Project Manager, Owner and Contractor immediately after they are performed. All test and inspection reports shall be signed and sealed by an engineer registered in the state where the structure is located and shall include the exact location of the work represented by the test.
- (4) The testing agency and its representatives are not authorized to revoke, alter, relax, enlarge or release any requirement of the contract documents, approve or accept any portion of the work, perform any duties of the Contractor, or be a party to scheduling of work.
- (5) The Contractor shall notify the testing agency a minimum of 24 hours in advance of all asphaltic concrete and stone base work.
- (6) Records of inspection shall be kept available to the building official during progress of work and for two years after completion of the project. Records shall be preserved by the independent testing agency.

- (B) The testing agency shall conduct pre-placement inspections as necessary to determine that:
 - (1) Paving subgrade areas have been constructed per the Soils Report and specifications criteria.
 - (2) All paving section subgrade areas have been inspected, tested and accepted.
- (C) The testing agency shall conduct tests as necessary to determine that:
 - (1) All materials used in the production of asphalt and stone base meet the requirements of the project specifications.
- (D) The testing agency shall conduct asphalt and stone base placement inspections as necessary to determine that:
 - (1) Asphalt has been mixed and transported in accordance with the project specifications.
 - (2) Asphalt is conveyed to the place of final deposit by methods which prevent separation or loss of material.
 - (3) Asphalt and stone base are properly compacted. Perform at least one density test for every 5,000 SF of base and asphalt concrete pavement.
 - (4) Asphalt stone base thickness (depth) shall be measured once every 10,000 s.f.
 - (5) Asphalt is finished within the tolerances of the project.
 - (6) Pavement stabilization to a minimum LBR of 40 percent. All stabilized subgrade materials should be compacted to 98 percent of the Modified Proctor (ASTM D-1557) maximum dry density and meet specification requirements for Type B or Type C Stabilized Subgrade by the Florida Department of Transportation.
- (E) The testing agency shall conduct post-placement inspection as necessary to determine that:
 - (1) All surface defects are repaired in accordance with the project specifications.

6. TRANSPORTATION OF MIXTURES

- (A) The mixture shall be transported from the paving plant to the work in tight vehicles with metal bottoms previously cleaned of all foreign materials. The truck beds shall be raised and the inside lubricated with a thin oil to prevent the mixture from adhering to the bed. An excess of lubricant will not be permitted. Each load shall be covered with canvas or other suitable material of sufficient size to protect it from the weather.

7. MATERIALS

- (A) Aggregate for rolled stone base course shall be clean, crushed rock, free from thin or elongated pieces, soft or disintegrated materials, or other foreign matter. Stone shall meet the criteria established for crushed stone base established by the local Department of Transportation.
- (B) Base Paving Section Bid: Include in bid the cost to install pavement cross section as recommended in the Soils Report and as detailed on the drawings.

8. AGGREGATE FOR ASPHALT

- (A) Coarse Aggregate shall be natural crushed stone produced from sound, durable rock, free from objectionable coatings. This aggregate shall conform to the requirements of ASTM D-692 and local D.O.T. Standard Specification.
- (B) Fine Aggregate shall consist of natural sand or by special permission may be fines produced by the crushing of natural stone. The fine aggregate shall conform to the requirements of ASTM D-1073 and mineral filler shall conform to ASTM D-242 and local D.O.T. Standard

Specification.

- (B) Asphalt Cement shall conform to ASTM D-946 and local D.O.T. Standard Specification.

9. ASPHALT MIXTURES

- (A) Asphalt mixture shall consist of mineral aggregates and asphalt cement combined in such proportions that the composition by weight of the finished mix shall be within the following range for the type specified.
- (B) Asphalt mixture shall be type per local D.O.T. Standard Specifications for Road and Bridge (latest edition).

10. ROLLED STONE BASE

- (A) Preparation of Mixture: The exact proportions of aggregate and water shall be regulated so as to produce a uniform satisfactory mixture. The order of sequence in which the aggregate and water shall be drawn or weighted may vary under different conditions. The percentage of water in the mixture may vary with moisture conditions and sources of aggregate, but in no case shall the percentage of water be more than 12 percent by weight, of the total mixture. The finished mixture shall have a moisture content necessary to obtain the maximum density required to comply with the standard compaction test herein specified. In general, the proper moisture content can be judged by the appearance of free water on the surface of the particles. Excess moisture resulting in run-off shall be avoided.

11. CONSTRUCTION OF STONE BASE

- (A) In no case will the Contractor be permitted to place the mixture or manipulate it on muddy or frozen subgrade. Also, no frost or frozen particles shall be placed on the subgrade or compacted.
- (B) Before starting the construction of surface courses, the base shall be cleaned and adjusted to conform with the cross section shown on the plans and to the lines, grades and thickness established. For the purpose of these specifications, this work shall include sweeping, removing all loose, caked or foreign materials. The total cost of adjusting and compacting subgrades and for cleaning and restoring base courses shall be included in the contract price.
- (C) After the subgrade has been properly prepared, the mixture shall be uniformly spread by blades, or other approved equipment, in successive layers of courses to such depth that, when compacted, the base will have the minimum thickness shown on the typical cross section. The Contractor may construct the base in any number of layers which he may find convenient to facilitate compacting, except that, in no case, shall any individual layer have a compacted thickness of more than 4". Each layer shall be compacted, as hereinafter specified, before any succeeding layer is placed. Placement of base shall be in accordance with local D.O.T. Standard Specification (latest edition).
- (D) If the mixture becomes too dry to permit compaction, water shall be added during the compacting operations in such an amount as to insure proper compaction. If for any reason, the mixture is too wet for proper compaction it shall be allowed to dry until the proper moisture content is obtained.
- (E) The mixture shall be handled in such manner as to avoid undue segregation. If segregation occurs or if the mixture becomes contaminated, such segregated or contaminated materials shall be replaced with materials of suitable quality and gradation, except that areas of surface segregation may be corrected by spreading a quantity of stone screening sufficient to close the voids and bind the loose material firmly in place. The screening shall be wet and rolled so as to create a dense and uniform surface. Segregated or contaminated materials shall be removed and replaced with suitable material at the sole expense of the Contractor. The Contractor shall restrict hauling over the completed or partially completed work after inclement weather, or at any time when subgrade material is soft and there is tendency for the subgrade material to work into the surface material. Any screenings used in correcting areas of surface segregation will be measured and paid for as a part of the aggregate constituting the base course. All extra work or expense involved due to

screenings being required shall be the Contractor's obligations without extra cost to Owner. Compaction shall be performed by the use of any approved equipment, within the limits of these specifications, which will produce satisfactory results.

- (F) Shaping and compaction shall be carried on until a true, even, uniform base course of the proper grade, cross section and density is obtained. Proper moisture content shall be maintained by wetting the surface as required during shaping and compacting operations. The use of excess water, resulting in run-off or in the formation of a slurry on the surface, shall be avoided.
- (G) Final rolling on the top course of multiple course construction or the top of single course construction shall be accomplished by self-propelled smooth-wheeled roller weighing not less than seven (7) tons, nor more than ten (10) tons.
- (H) The density to be obtained in the completed base shall be at least 98% of the Modified Proctor maximum dry density, per ASTM D-698. Refer to Geotech report for testing frequency. Limerock should follow a minimum LBR of 100 percent and should be mined from an Florida Department of Transportation approved source. Place limerock in maximum six-inch lifts.
- (I) The thickness shown on the plans is the minimum thickness allowed.

12. CONSTRUCTION OF ASPHALT SURFACE

- (A) Mixing Plant shall conform to ASTM D-995 and local D.O.T. Standard Specification.
- (B) Preparation of Mixture: The bituminous cement shall be carefully heated without damage by overheating to a workable temperature. The final mixture shall not exceed 350 degrees F. when discharged.
- (C) Application
 - (1) Spreading of mixture shall be done at mixture temperature above 250 degrees F. and only when weather conditions are suitable.
 - (2) Use hand rakers for inaccessible locations and mechanical spreading and finishing machine of type approved by owner's Representative.
 - (3) Side forms to serve as screed or strikeoff control to ensure surface true to elevation or to prevent squeezing out or side shoving under roller or lateral displacement shall be used where applicable. Forms shall be of height equal to thickness of finished course.
 - (4) Rolling shall be carried out while mixture is still hot, with self-propelled roller having weight of 200 lbs. per lineal inch of roller. Rolling shall be paralleled to spreading of mixture, from edge toward center, and in manner consistent with good practice getting proper compaction without cracking, shoving or otherwise displacing mixture during hardening process. During rolling the roller wheels shall be kept moist with only the sufficient water to avoid picking up the materials. All places inaccessible to roller shall be compacted by hand tampers or vibratory plates.
 - (5) Mixture shall be placed continuously. Roller shall not pass over unprotected end of freshly laid mixture unless further laying is to be delayed for sufficient time to permit mixture to become chilled. In such case, edge of mixture shall be cut back and trimmed to expose unsealed or granular surface for full specified depth of finish course.
 - (6) At end of each day's work, joints shall be formed by laying and rolling mixture against boards of thickness of compacted mixture. When laying is resumed, above mentioned exposed edges shall be painted with thin coat of asphaltic cement, and fresh mixture shall be raked against joint, thoroughly tamped with hand tampers, and rolled.

- (7) After final compression, the surface shall be smooth and true to the established crown and grade. It shall have the minimum thickness specified and shall at no point vary more than one quarter (1/4) inch from the specified thickness. Any low or defective places shall immediately be remedied by cutting out the course at such spots and replacing it with fresh hot mixture which shall be immediately compacted to conform with surrounding area and shall be thoroughly bonded to it. The finished pavement shall be set free from depressions exceeding one-eighth (1/8) inch as measured with a ten (10) foot straight edge paralleling the center line of the roadway. Areas which have variations exceeding one-eighth (1/8) inch shall be corrected or replaced as directed by the Civil Engineer or owner. No traffic shall be permitted on the finished pavement until it has cooled to atmospheric temperature.
- (8) The thickness shown on the drawings is the minimum thickness allowed.

13. PAVEMENT PAINTING

(A) Scope of Work

- (1) Layout and paint striping on parking lot surfaces designating parking spaces, driving lanes and other elements noted on the site drawings. Comply with local ordinances when completing this work.
- (2) Paint face of curb and 6' return where sidewalks abut pavement. Color: Yellow.
- (3) Do not apply paint in snow, rain, fog or mist, or when relative humidity exceeds 85% unless otherwise permitted by manufacturer. When surface temperature is below 50 degrees F. do not apply paints and special coatings, unless otherwise specified. Stop exterior work sufficiently early to permit film to set up before condensation, frost and moisture, caused by night temperature drops, occur. Do not begin exterior painting until frost or condensation evaporates and surface is moisture free. Comply with manufacturer's written requirements and local D.O.T Standard Specification.
- (4) Traffic paint shall be installed in two (2) coats. The minimum required total Dry Film Thickness (DFT) shall be measured in mils.

(B) Materials

- (1) Parking Areas: All parking lot striping and arrows:

2 coats Sherwin Williams B97 Series ProPark at 9.3 mils DFT or PPG Paints 11-53 Series Zoneline at 8.6 mils DFT. Colors: White unless local ordinance requires yellow. Red as locally required for fire lanes. Yellow for face of curbs and six-inch return where sidewalks abut pavement. Apply second coat after 60 days.

Striping and arrow uniform thicknesses and dimensions to be specified on construction drawings.

(C) Thermoplastic (if applicable)

- (1) Provide thermoplastic pavement marking, if required by governmental agency having jurisdiction, over portion of pavement falling within that agency's right-of-way.

14. PROTECTION

- (A) Provide adequate protection for all adjacent work and areas against any damage or injury by employees, materials, tools, or equipment used in connection with this contract.
- (B) Maintenance of finished asphalt surfacing will be required until acceptance of work by Owner.

- END OF SECTION -

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DIVISION 2 - SITE WORK1. GENERAL

- (A) The general provisions of Division 1 apply to the work specified in this Section.
- (B) Include all labor, material, equipment and services required to execute and complete all items of work in connection with furnishing and installing the precast concrete wheel stops as shown on the drawings and herein specified.

2. SUBMITTALS

- (A) Submit product data and shop drawings for precast concrete wheel stops to Owner's Representative. Show elevations, sections, dimensions, reinforcing, details of construction, method of anchorage, etc.

3. MATERIALS

- (A) Precast concrete wheel stops shall be air entrained, reinforced 4000 psi concrete.
- (B) Precast concrete wheel stops shall be 72" overall length, 8"-9" wide at base, 6" high and be cast with 2 #3 reinforcing rods.

4. INSTALLATION

- (A) Parking precast concrete wheel stops shall be installed with 2, 3/4" diameter (#6 reinforcing bar) standard steel anchoring pins, 24 inches length, through preformed holes into pavement at 30" from edge of pavement to centerline of wheel stop.

- END OF SECTION -

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DIVISION 2 - SITE WORK1. GENERAL

- (A) Related documents
 - (1) Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.
 - (2) Local Department of Transportation Standard Specifications and Details and/or the local water utility agency specifications and details.
- (B) Summary
 - (1) This Section includes water line and fire line extensions and water service piping and appurtenances from the source of potable water to a point 1 foot above finished floor inside the building.
 - (2) Related Sections: The following Sections contain requirements that relate to this Section:
 - (a) Division 2 Section "Earthwork" for excavation and backfill required for water service piping and structures.
 - (b) Division 2 Section "Underground Sprinkler System" for lawn irrigation system supplied from water service piping.
 - (c) Division 15 Section "Plumbing Systems" for interior building water piping systems and equipment.
 - (3) Products installed but not furnished under this Section include water meters provided by the utility company to the site, ready for installation.
- (C) Submittals
 - (1) General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
 - (2) Product data for pipes, valves, meter setter yoke, backflow preventers and identification devices.
 - (3) Shop drawings for precast concrete valve pits and meter pit, including frames and covers, also above ground enclosures (if applicable).
 - (4) Record drawings at project closeout of service piping and products in accordance with requirements of Division 1.
 - (5) Maintenance data for valves and backflow preventer, for inclusion in Operating and Maintenance Manuals.
- (D) Quality Assurance
 - (1) Comply with requirements of the local D.O.T. Standard Specifications and Details and local water utility agency specifications and details.
 - (2) Obtain approval from governing agencies for taps, public waterline extensions and private water line extensions.
- (E) Delivery, Storage and Handling
 - (1) Handling: Use a sling to handle valves whose size requires handling by crane or lift. Rig valves to avoid damage to exposed valve parts. Do not use handwheels or stems as lifting or rigging points.

- (F) Project Conditions
 - (1) Site Information: Perform site survey, research public utility records, and verify existing utility locations. Verify that water service piping may be installed in compliance with the original design and referenced standards. Notify Owner and Architect of differences between field conditions and plans.
- (G) Sequencing and Scheduling
 - (1) Coordinate work on public water mains and connection to public water main with governing agencies having authority for water main management.
 - (2) Coordinate service location to building with interior water distribution piping as shown on plumbing plans.
 - (3) Coordinate with other utility work.

2. PRODUCTS

- (A) Refer to the site construction drawings for any specifications on pipes and pipe fittings, valves, anchorages, pits and vaults. The more restrictive specifications shall apply.
- (B) Pipe and Pipe Fittings, General
 - (1) Pipe and pipe fitting materials shall be compatible with each other. Where more than one type of material or product is indicated, selection is Installer's option.
 - (2) Ductile-Iron Pipe 4 inches and larger: AWWA C151, Class 50, except that pipe smaller than 6-inch size shall be Class 51.
 - (3) PVC (Polyvinyl Chloride) Pipe 4 inches and larger: AWWA C900; Class 200; with bell end and elastomeric gasket, with plain end for cast-iron or ductile-iron fittings, or with plain end for PVC elastomeric gasket fittings.
 - (a) Ductile-Iron and Cast-Iron Fittings: AWWA C110, ductile-iron or cast-iron, 250-psi pressure rating; or AWWA C153, ductile-iron compact fittings, 350-psi pressure rating; of dimension to match pipe outside diameter.
 - (4) Copper Water Tube 2 Inches and Smaller: ASTM B 88; Type K, seamless, annealed temper.
 - (5) PVC (Polyvinyl Chloride) Pipe 3 Inches and Smaller: ASTM D 1785, Schedule 40.
 - (6) Couplings: Iron body sleeve assembly fabricated to match outside diameters of pipes to be joined.
- (C) Valves
 - (1) Nonrising Stem Gate Valves 3 Inches and Larger: AWWA C500, cast-iron double disc, bronze disc and seat rings, or AWWA C509, resilient seated; bronze stem, cast-iron or ductile-iron body and bonnet, stem nut, 200-psi working pressure, mechanical joint ends.
 - (2) Rising Stem Gate Valves, 3 Inches and larger: AWWA C500, cast-iron double disc, bronze disc and seat rings, or AWWA C509, resilient seated; cast-iron or ductile-iron body and bonnet, OS&Y, bronze stem, 200-psi working pressure, flanged ends.
 - (3) Nonrising Stem Gate Valves, 2 Inches and Smaller: MSS SP-80; body and screw bonnet of ASTM B 62 cast bronze; with Class 125 threaded ends, solid wedge, nonrising copper-silicon alloy stem, brass packing gland, Teflon-impregnated packing, and malleable iron handwheel.
 - (4) Valve Boxes: Cast-iron box having top section and cover with lettering "WATER", bottom section with base of size to fit over valve and barrel approximately 5 inches in diameter, and adjustable cast-iron extension of length required for depth of bury and valve.

- (5) Curb Stops: Bronze body, ground key plug or ball, and wide tee head, with inlet and outlet to match service piping material.
 - (6) Tapping Sleeve and Tapping Valve: Provide a complete assembly, including tapping sleeve, tapping valve, and bolts and nuts. The sleeve and the valve shall be compatible with the tapping machine to be used.
 - (7) Service Clamps and Corporation Stops: Provide a complete assembly, including service clamp, corporation stop, and bolts and nuts. The clamp and stop shall be compatible with the drilling machine to be used.
- (D) Anchorages
- (1) Clamps, Straps, and Washers: ASTM A 506, steel.
 - (2) Rods: ASTM A 575, steel.
 - (3) Rod Couplings: ASTM A 197, malleable iron.
 - (4) Bolts: ASTM A 307, steel.
 - (5) Cast-Iron Washers: ASTM A 126, gray iron.
 - (6) Concrete Reaction Backing: Portland cement concrete mix, 3000 psi.
- (E) Valve Pits, Meter Pit, and Above Ground Vaults
- (1) Concrete: Portland cement mix, 3000 psi.
 - (2) Reinforcement: Steel conforming to the following:
 - (a) Fabric: ASTM A 185, welded wire fabric, plain.
 - (b) Reinforcement Bars: ASTM A 615, Grade 60, deformed.
 - (3) Ladder: ASTM A 36, steel, or may be polyethylene-encased cast-iron or steel steps.
 - (4) Manhole: ASTM A 48, Class 35, gray iron, 24-inch minimum diameter traffic frame and cover, of size and weight indicated.
 - (5) Manhole Frame: ASTM A 536, Grade 60-40-18, ductile iron, 24-inch minimum diameter traffic frame and cover, of size and weight indicated.
 - (6) Drain: ANSI A112.21.1M, area drain, cast iron, of size indicated. Body shall have anchor flange, light-duty cast-iron grate, and bottom outlet. Drain shall have integral or field-installed bronze ball or clapper-type backwater valve. Above ground vaults shall have positive drainage to the exterior of the vault.
 - (7) Above-Ground Backflow: Where water backflow devices are installed above grade and do not otherwise require housing as shown on the civil drawings or per local authority having jurisdiction, provide protective cage as manufactured by Houston Irrigation Services or other product approved equal by the Owner.
- (F) Water Meter: Water meter and box will be furnished by the Local water utility agency on payment of meter setting fee.
- (G) Meter Setter: Meet Local water utility agency requirements for size specified on plans.

3. EXECUTION

- (A) Refer to the site construction drawings for any specifications on the installation of piping and pipe fittings, valves and anchorages. Also refer to the site drawings for specifications on pipe tests and cleaning. The more restrictive specifications shall apply.

- (B) Preparation of Buried Pipe Foundation
- (1) Refer to Specification Section 02211- Site Grading, for trench compaction criteria. If rock or unsuitable soils are encountered, all work shall comply with Specification Section 02211.
 - (2) Grade trench bottom to provide a smooth, firm, stable, and rock-free foundation throughout the length of the piping.
 - (3) Remove unstable, soft, and unsuitable materials at the surface upon which pipes are to be laid and backfill with clean sand or gravel to indicated level.
- (C) Installation of Pipe and Pipe Fittings
- (1) Ductile-Iron Pipe: Install with cement-mortar-lined, ductile-iron or cast-iron, mechanical joint or push-on joint fittings and rubber gaskets in accordance with AWWA C600.
 - (2) PVC (Polyvinyl Chloride) Pipe: Install with cement-mortar-lined, ductile-iron or cast-iron, mechanical joint or push-on fittings and rubber gaskets in accordance with AWWA M23.
 - (3) Copper Tube: Install with wrought copper, solder joint, pressure fittings, and Sn95 Tin-Antimony solder in accordance with CDA "Copper Tube" Handbook.
 - (4) PVC (Polyvinyl Chloride) Pipe: Install with PVC, Schedule 30 socket-type, solvent cement or elastomeric gasketed fittings in accordance with manufacturer's installation instructions.
 - (5) Depth of Cover: Provide minimum cover over piping of 12 inches below average location frost depth or 36 inches below finished grade, whichever is greater.
 - (6) Water Main Connection: Arrange and pay for tap in water main, of size and in location as indicated, from the Local water utility agency.
 - (7) Water Main Connection: Tap water main with size and in location as indicated, in accordance with requirements of the Local water management agency.
 - (8) Water Service Termination: Terminate water service piping 1 foot above finished floor inside the building in location and invert as indicated. Provide temporary pipe plug for piping extension into building.
- (D) Installation of Valves
- (1) General Application: Use mechanical joint end valves for 3-inch and larger buried installation. Use threaded and flanged end valves for installation in pits and inside building. Use bronze corporation stops and valves, with ends compatible to piping, for 2-inch and smaller installation.
 - (2) AWWA-Type Gate Valves: Comply with AWWA C600. Install buried valves with stem pointing up and with cast-iron valve box.
 - (3) Bronze Corporation Stops and Curb Stops: Comply with manufacturer's installation instructions. Install buried curb stops with head pointed up.
- (E) Installation of Anchorages: Provide anchorages for tees, plugs and caps, bends, crosses, valves, and hydrant branches.
- (F) Application of Protective Coatings: Apply full coat of asphalt or other acceptable corrosion-retarding material to surfaces of installed ferrous anchorage devices.
- (G) Field Quality Control
- (1) Piping Tests: Conduct piping tests before joints are covered and after thrust blocks have sufficiently hardened. Fill pipeline 24 hours prior to testing and apply test pressure to stabilize system. Use only potable water.

- (2) Hydrostatic Tests: Test at not less than 1-1/2 times working pressure for 2 hours minimum, or as required by local or state agencies.

Increase pressure in 50-psi increments and inspect each joint between increments. Hold at test pressure for one hour; decrease to 0 psi. Slowly increase gain to test pressure and hold for one more hour. Maximum allowable leakage is 2 quarts per hour per 100 joints. Remake leaking joints with new materials and repeat test until leakage is within above limits.

- (H) Cleaning - Clean and disinfect water distribution piping.
- (I) Valve Schedule: Nonrising Stem Gate Valves - 4 Inches and Larger.

- END OF SECTION -

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DIVISION 2 - SITE WORK1. GENERAL

- (A) Furnish and install all storm water spillways and baffles outside the building line.
- (B) Storm drainage shall be as shown on the plans.
- (C) Do all shoring and bracing required to prevent cave-ins.
- (D) All structures shall be constructed per local standards and detailed on the drawings.
- (E) Comply with the requirements of the National Pollutant Discharge Elimination System (NPDES) and/or Water Pollution Prevention, as required. The General Contractor to comply with general and specific permit requirements (e.g. notifications, inspection/monitoring, recordkeeping/reporting, maintenance of all erosion control devices, etc.).

2. QUALITY ASSURANCE

(A) General

- (1) The Owner will employ and pay for the services of an independent testing agency to provide testing and inspection of the site drainage work. The testing agency shall be licensed in the state where the structure is located, and all testing and inspections shall be performed under the supervision of an engineer registered in the state where the structure is located.
 - (2) Site drainage materials including, but not limited to, piping, structures, covers, grates, backfill materials, etc. and operations shall be tested and inspected as the work progresses. Failure to detect any defective work or material shall not in any way prevent later rejection when such defect is discovered, nor shall it obligate the Owner's Representative for final acceptance.
 - (3) The testing agency shall report all test and inspection results to the Project Manager, Owner and Contractor immediately after they are performed. All test and inspection reports shall be signed and sealed by an engineer registered in the state where the structure is located and shall include the exact location of the work represented by the test.
 - (4) The testing agency and its representatives are not authorized to revoke, alter, relax, enlarge or release any requirement of the contract documents, approve or accept any portion of the work, perform any duties of the Contractor, or be a party to scheduling of work.
 - (5) The contractor shall notify the testing agency and the Owner's Representative a minimum of 24 hours in advance of all site drainage.
 - (6) Records of inspection shall be kept available to the building official during progress of work for two years after completion of the project. Records shall be preserved by the independent testing agency.
- (B) The testing agency shall conduct pre-site drainage inspections as necessary to determine that:
- (1) Subgrade areas have been constructed per the Soils Report and specifications criteria.
- (C) The testing agency shall conduct site drainage inspections and testing as necessary to determine that:
- (1) All site drainage excavations and backfill are performed in compliance with the project specifications.
 - (2) All trenches are properly shored and braced to prevent cave-ins.

- (3) All materials used in the site drainage meet the requirements of the project specifications.
- (4) All excavation is free of water at all times.
- (5) All excess and unsuitable materials have been removed from site.
- (6) All surface defects are repaired in accordance with the project specifications.
- (D) All excess and unsuitable materials have been removed from the site.
 - (1) All surface defects are repaired in accordance with the project specifications.

3. SUBMITTALS

- (A) Submit shop drawings of piping, structures, grates, cast iron covers and rungs for approval by the Civil engineer prior to installation.

4. MATERIALS (AS APPLICABLE)

- (A) Castings: Conform to the requirements of the Specifications for Gray Iron Castings, ASTM-A48, shall be clean and free of scale, adhesions, or inclusions, and shall be fabricated of Class 30B cast iron.
- (B) Concrete, reinforcing, placing, etc., to be in accordance with Section 03301 of the specifications.
- (C) Reinforced Concrete Pipe: Precast, with circular reinforcement, conforming to the Specifications for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe, ASTM-C76, Wall B, Class III.
- (D) Reinforced Concrete Manholes: Precast reinforced concrete manholes shall conform to the standard specifications for precast reinforced concrete manhole sections, ASTM-C478 and the approved local standard details of Sewer Construction.
- (E) Corrugated Metal Pipe: Conform to the following specifications:

Material	Description	Specification		
		AASHTO	ASTM	Federal
Sewer and Drainage Pipe	1. Galvanized corrugated steel pipe	M-36	A760	WWP 405
	2. Polymeric pre-coated sewer & drainage pipe	M-245	A762	
	3. Aluminized corrugated steel pipe	M-36		WWP 405
	4. Structural plate pipe	M-167	A761	WWP 405
Asphalt Coated Steel Sewer Pipe	Corrugated steel pipe of any of the types shown above with a 0.050 in, high purity asphalt cover.	M-190		WWP 405
Invert Paved Steel Sewer Pipe	Corrugated steel pipe of any one of the types shown above with an asphalt pavement poured in the invert to cover the corrugation by 1/8 in.	M-190		WWP 405
Fully Lined Steel Sewer Pipe	Corrugated steel pipe of the types shown above with an internal asphalt lining centrifugally spun in place or... Corrugated steel pipe with a smooth steel	M-190		WWP 405

	liner integrally formed with the corrugated shell.	M-36 M-190 M-245	A760 A762	WWP 405
Cold Applied Bituminous Coatings	Fibrated mastic or coal tar base coatings of various viscosities or field or shop coating of corrugated pipe or structural plate.	M-243		WWP 405
Gaskets and Sealants	1. Standards o-ring gaskets 2. Sponge neoprene sleeve gaskets 3. Gasketing strips, butyl or neoprene		D1056	

5. INSTALLATION

- (A) Make all excavation and trenching to proper grades and depths shown on the drawings.
- (B) The bottom of all pipe trenches and the bottom of all associated structures shall be compacted to a minimum of 98% per ASTM D-698 prior to pipe and structural installations. All backfill (material adjacent and above) piping and associated structures shall be placed in eight (8) inch layers and shall be compacted to 98% of the Standard Proctor maximum dry density, per ASTM D-698.
- (C) Avoid water accumulation in trenches. Waste unsuitable backfill material offsite and provide acceptable replacement material as required.
- (D) Do all shoring and bracing required to prevent cave-ins.
- (E) Do no backfilling until system is approved by the testing agency and local government agency, as appropriate.
- (F) Castings shall be wire-brushed or otherwise prepared for painting with a flat black rust inhibitive paint.
- (G) All storm drain lines and structures shall be flushed and cleaned of sediment and or debris prior to final acceptance.

- END OF SECTION -

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DIVISION 2 - SITE WORK1. GENERAL

- (A) Related documents: Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.
- (B) Construction shall conform to the requirements of the local Department of Transportation standard specifications and details and/or the local sewer utility agency specifications and details.
- (C) Summary: This Section includes sanitary sewerage system piping and appurtenances from a point 5 feet outside the building to the point of connection to public sewer. Connection to the public sewer to be by Contractor, unless sewer agency has that responsibility.
- (D) Submittals
 - (1) General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
 - (2) Product data for drainage piping specialties.
 - (3) Shop drawings for precast concrete sanitary manholes, including frames and covers.
 - (4) Record drawings at project closeout of installed sanitary sewer service piping and products in accordance with requirements of Division 1.
- (E) Project Conditions
 - (1) Site Information: Perform site survey, research public utility records, and verify existing utility locations. Verify that sanitary sewerage system piping may be installed in compliance with original design and referenced standards.
- (F) Sequencing and Scheduling
 - (1) Coordinate connection to public sewer with sewer utility agencies having jurisdiction and approval authority.
 - (2) Coordinate with interior building sanitary drainage piping.
 - (3) Coordinate with other utility work.

2. PRODUCTS

- (A) Refer to the site construction drawings for any specifications on pipes and pipe fittings, manholes and cleanouts. The more restrictive specifications shall apply.
- (B) Pipe and Fittings
 - (1) General: Provide pipe and pipe fitting materials compatible with each other. Where more than one type of materials or products is indicated, selection is Installer's option.
 - (2) Hub and Spigot Cast-Iron Soil Pipe and Fittings: ASTM A 74, gray cast iron for compression gasket joints.
 - (3) Hubless Cast-Iron Soil Pipe and Fittings: CISPI 301, gray cast iron, for coupling joints.
 - (4) Ductile-Iron Pressure Pipe: AWWA C151, Class 50, for push-on joints.
 - (5) Ductile-Iron Sewer Pipe: ASTM A 746, Class 50, for push-on joints.

- (6) PVC (Polyvinyl Chloride) Sewer Pipe and Fittings: ASTM D 3034, SDR 35, for elastomeric gasket joints.
- (7) PVC (Polyvinyl Chloride) Sewer Pipe and Fittings: ASTM D 1785, Schedule 40 for solvent weld joints.
- (8) Couplings: Rubber or elastomeric sleeve and stainless steel band assembly fabricated to match outside diameters of pipes to be jointed.
- (9) Couplings: Rubber or elastomeric compression gasket, made to match pipe inside diameter or hub, and adjoining pipe outside diameter.
- (C) Manholes: Precast Concrete Manholes: Use sewer utility agencies having jurisdiction and approval authority standard specifications and details.
- (D) Cleanouts: General - Provide cast-iron or Schedule 80 PVC ferrule and countersunk brass cleanout plug. Provide round cast-iron access frame and heavy-duty, secured, scored cast-iron cover in paved areas with a concrete apron (18" x 18" x 12" deep).

3. EXECUTION

- (A) Refer to the site construction drawings for any specifications on the installation of sanitary sewer piping, pipe joints, manholes, cleanouts and tap connection. Also refer to the site drawings for specifications on pipe testing and cleaning. The more restrictive specifications shall apply.
- (B) Preparation of Foundation for Buried Sanitary Sewerage Systems
 - (1) Refer to Specification Section 02211- Site Grading, for trench compaction criteria. If rock or unsuitable soil are encountered, all work shall comply with Specification Section 02211.
 - (2) Grade trench bottom to provide a smooth, firm, stable, and rock-free foundation, throughout the length of the pipe.
 - (3) Remove unstable, soft, and unsuitable materials at the surface upon which pipes are to be laid and backfill with clean sand or gravel to indicated level.
- (C) Pipe Applications for Underground Sanitary Sewers
 - (1) Pipe sizes 4 to 54 inches: Ductile-iron sewer pipe.
 - (2) Pipe sizes 15 inches and smaller: PVC gasket joint sewer pipe and fittings.
 - (3) Pipe sizes 6 inches and smaller: PVC solvent cement joint sewer pipe and fittings.
- (D) Installation, General
 - (1) General Locations and Arrangements: Drawings (plans and details) indicate the general location and arrangement of the underground sanitary sewerage system piping. Location and arrangement of piping layout take into account many design considerations. Install the piping as indicated, to the extent practical. Prior to any rerouting, obtain Owner's approval.
 - (2) Install piping pitched down in direction of flow, at minimum slope of 2 percent, except where indicated otherwise.
 - (3) Extend sanitary sewerage system piping to connect to building sanitary drains, of sizes and in locations indicated.
- (E) Pipe Joint Construction and Installation
 - (1) Join and install ductile-iron pipe with ductile-iron or cast-iron push-on joint fittings and rubber gaskets in accordance with AWWA C600, except that anchorages are not required.

- (2) Join and install PVC pipe as follows:
 - (a) Solvent cement joint pipe and fittings, joining with solvent cement in accordance with ASTM D 2855 and ASTM F 402.
 - (b) Pipe and gasketed fittings, joining and elastomeric seals in accordance with ASTM D 3212.
 - (c) Installation in accordance with ASTM D 2321.
 - (3) Join different types of pipe with standard manufactured couplings and fittings intended for that purpose.
- (F) Manholes
- (1) General: Install manholes complete with accessories as indicated. Form continuous concrete or split pipe section channels and benches between inlets and outlets. Set tops of frames and covers flush with finish surface where manholes occur in pavements. Elsewhere, set tops 1 foot above finish surface, unless otherwise indicated.
 - (2) Construct brick manholes as indicated.
 - (3) Construct cast-in-place manholes as indicated.
 - (4) Castings shall be wire-brushed or otherwise prepared for painting with a flat black rust inhibitive paint.
- (G) Cleanouts
- (1) Install cleanouts and extension from sewer pipe to cleanout at grade as indicated. Set cleanout frame and cover in concrete block 18 by 18 by 12 inches deep, except where location is in concrete paving. Set top of cleanout 1 inch above surrounding earth grade or flush with grade when installed in paving.
 - (2) Castings shall be wire-brushed or otherwise prepared for painting with a flat black rust inhibitive paint.
- (H) Tap Connections
- (1) Make connections to existing piping and underground structures piping that is indicated to remain in place. Provide sufficiently strong closures to withstand hydrostatic or earth pressure that may result after ends of abandoned utilities have been closed.
- (I) Closing Abandoned Sanitary Sewerage System
- (1) Abandoned Piping: Close open ends of abandoned underground piping that is indicated to remain in place. Provide sufficiently strong closures to withstand hydrostatic or earth pressure that may result after ends of abandoned utilities have been closed.
 - (2) Abandoned Structures: Remove structure and close open ends of the remaining piping or remove top of structure down to not less than 3 feet below final grade; fill structure with stone, rubble, gravel, or compacted dirt, to within 1 foot of top of structure remaining, and fill with concrete.
- (J) Field Quality Control
- (1) Testing: Perform testing of completed piping in accordance with the local governing authorities and Specifications.
 - (2) Cleaning: Clear interior of piping and structures of dirt and other superfluous material as work progresses. Maintain swab or drag in piping and pull past each joint as it is completed.

- (3) Interior Inspection: Inspect piping to determine whether line displacement or other damage has occurred.

- END OF SECTION -

DIVISION 2 - SITE WORK

PART 1: GENERAL

1. SCOPE OF WORK:

- (A) Provide complete commercial underground sprinkler system as shown and/or noted on Drawings and as hereinafter specified.
- (B) Subject to compliance with requirements, provide products of the following company:
Rain Bird Corporation with rotor pop-up sprinklers by Hunter Industries.

2. SUBMITTALS:

- (A) No submittals required - comply with specifications.

PART 2: PRODUCTS

3. MATERIALS

(A) Pipe:

- (1) 2-1/2" and Larger: High-impact Virgin Polyvinylchloride (PVC-1120), Schedule 40 (IPS) conforming to ANSI/ASTM D strength ratings, size and standards. Fittings to be PVC solvent weld type. No saddles allowed.
- (2) 2" and Smaller: Flexible, non-toxic plastic pipe made from 100% Virgin Polyethylene (PE-2306), medium density, with minimum 80 PSI test strength conforming to NSF Standard 14 and ASTM D2239 for Thermoplastic Pipe. Pipe shall have Standard Thermoplastic Pipe Dimension Ratio of SDR-15 and shall be marked every five feet to indicate brand, strength rating, size and standards.

- (B) Valve Boxes: All valves shall be protected by two-piece valve box assembly consisting of removable thermoplastic lid (7-12" dia.) and thermoplastic box (15-1/2" deep).

(C) Remote Control Valves: Rain Bird or equal Hunter – NO SUBSTITUTIONS

- (1) Units shall be serviceable from top and constructed of heavy duty glass filled nylon, bodies of ABS. Diaphragm shall be of nylon reinforced Buna-N. All metal parts of valve shall be of highly corrosion resistant materials with brass or stainless steel studs and nuts for body to bonnet connection.
- (2) Performance:

Model	Flow GPM	PSI Loss
1-1/2"	60	5 psi or less
1"	25	5 psi or less

(D) Spray Sprinkler Heads: Rain Bird or equal Hunter – NO SUBSTITUTIONS

- (1) Sprinkler body, stem, and screen shall be constructed of heavy-duty plastic, and serviceable from top. Sprinkler shall have pressure activated comolded wiper seal as part of cap. Maximum bypass flow (not including nozzle flow) shall be no more than .25 GPM at 6 PSI. Nozzle shall be constructed of heavy-duty plastic with matched precipitation rated dual slotted orifice. Each nozzle shall have adjusting screw, capable of shutting off and regulating radius and flow of water.
- (2) Sprinkler shall have strong stainless steel retract spring with pop-up height no less than three inches (3").
- (3) Performance:

Model	Operating Pressure	Flow	Radius
Q	30 psi	1.0	15'
120 deg	30 psi	1.4	15'
H	30 psi		2.0 15'
F	30 psi		4.0 15'
Low Angle Quarter	30 psi		0.4 10'

4. LAY-OUT AND STAKING: Stake-out entire irrigation system to line and grade in accordance with Drawings to assure proper drainage and pipe cover. Deviations from Drawings may be made where it is beneficial to construction and only if acceptable to Landscape Architect. No mainline shall be placed outside site property line.
5. TRENCHING:
 - (A) Trenches shall be excavated so that irrigation lines are installed to following minimum depths for pipe cover;
 - (1) All P.E. Distribution Pipe -15" deep for spray circuits.
 - (2) All P.V.C. Distribution Pipe - 15" deep.
 - (3) All P.V.C. Live Mains and sleeves - 24" deep (or as noted on Drawings).
 - (B) All PVC piping shall be trenched.
 - (C) P.E. distribution pipe may be "pulled", with approval of Landscape Architect, if proper drainage and minimum depth requirements are maintained.
 - (D) Trench excavation in excess of required depth shall have bottom graded and tamped to required gradient for proper drainage prior to any pipe placement.
 - (E) Electric Power Service: Electrical Contractor will provide 120-volt power source at controller assembly locations. Irrigation Contractor shall make all required connections to activate timer assembly.
 - (F) Where trenching of PVC or polyethylene pipe lines is not possible because of adverse soil conditions or obstructions, and "backhoe operation" is required, provide labor, materials and equipment for this operation, including full trench backfilling with sand if required in opinion of Landscape Architect. Site restoration of these areas, including sodding, or hydro-seeding with 6" of topsoil as directed by Landscape Architect shall be part of this contract.
6. PIPE INSTALLATION:
 - (A) All lines shall be kept minimum of two feet (2') from all existing or proposed trees.
 - (B) Polyethylene pipe connections shall be made with insert fittings held tightly in place with stainless steel clamps at ferrules. Pipe 1-1/2" diameter and over shall be double clamped.
 - (C) PVC pipe shall be laid on solid undisturbed soil or on thoroughly compacted full bed of sand so as to assure full bedding, proper alignment and minimum slope for drainage.
 - (D) PVC pipe ends and PVC fittings shall be thoroughly cleaned for full depth of fitting with liquid cleaner cement. Method of application shall be in accordance with manufacturer's recommendations for solvent weld connections.
 - (E) Where piping is to be installed in areas containing established turf, sod shall be removed from trench line to necessary width, and to depth of at least one inch (1"). All sod shall be stored in shaded area (or building) and shall be replaced within three (3) days. In areas where sod is unsuitable for lifting in opinion of Landscape Architect, trenching may be done without regard to topsoil and existing turf and backfilled with six inches (6") of topsoil and sodded with new sod.
7. HEAD AND VALVE INSTALLATION:
 - (A) All irrigation heads on PVC lines shall have adjustable riser assembly assembled in accordance with standard detail. Use flex-pipe.
 - (B) Sprinklers set on risers above finished grade shall be securely supported by 3/4" x 3/4" x 18" galvanized steel angle of required length set 24" in ground and secured with two (2) stainless steel clamps. Paint risers and support with green GALVANOLEUM paint.
 - (C) All irrigation heads, unless otherwise noted, shall be set to finish ground grade and threaded pipe connections shall be installed "wrench-tight" so as to prevent hand removal of heads.

- (D) All heads mounted on risers (above grade) shall be secured with PERMATEX or an approved epoxy cement.
8. DRAIN VALVE(S):
- (A) The mainline and laterals shall be drained with manual drain valves.
- (B) Drain valves shall be installed at the lowest point(s) in the system to allow for the complete drainage of all piping and the winterization of the system.
9. BACKFILL: Backfill material shall be sand, free from rocks, large stones, clay lumps or other unsuitable substances and care shall be taken to prevent settling and damage to pipe during and after backfilling operations. When backfilling, sand shall be tamped in 6" layers with minimum of 6" of acceptable topsoil in turf areas and 12" in plant bed areas. Turf areas shall be re-sodded with new sod. Coordinate work with Landscape Contractor as directed by General Contractor.
10. TESTING AND INSPECTION: All joints on live mains, which are under pressure at all times, shall be static water pressure tested at rated systems operating pressure, holding said pressure for minimum period of one (1) hour. Lines shall be tested in presence of Landscape Architect and if pressure drop occurs, leaks shall be repaired and line retested until approved by Landscape Architect. Mains shall be filled slowly so as to prevent rapid temperature change at solvent weld connections. All drip distribution points must be visible at time of inspection.
11. ADJUSTING: All irrigation heads shall be adjusted for height, pattern coverage and throw. Nozzle sizes shall be changed where necessary to assure efficient performance. Risers shall be adjusted for height as determined in field by plant material requirements.
12. MAINTENANCE, GUARANTEE AND WARRANTY:
- (A) After completion, testing and acceptance of system, Contractor shall instruct Owner in operation and maintenance of system. Following acceptance, Contractor shall put system into operation at no additional expense to Owner.
- (B) For period of one (1) year from date of final acceptance of work on Contract, Contractor shall promptly furnish and install, without cost to Owner, any and all parts which prove defective in material or workmanship.
- (C) Pipe warranty installation data form shall be filled out and forwarded to company and warranty presented to Owner after completion and prior to payment.
13. AS-BUILTS:
- (A) At the completion of underground sprinkler system installation, Contractor shall submit 2 copies of an as-built drawing to the Owner which details and locates all underground sprinkler features. Items which shall be located and described on the as-built drawings shall be, but not limited to; sleeves, piping, valves, heads, etc.

END OF SECTION

DIVISION 2 - SITE WORK

PART 1: GENERAL

1. GENERAL

- (A) Include all labor, material and equipment required to furnish and install the fencing and gates as specified herein and indicated on the drawings.

PART 2: PRODUCTS

2. MATERIALS

- (A) Posts: Galvanized posts shall be minimum Schedule 40 steel, galvanized pipe, encased in 3,000 psi concrete unless otherwise indicated. Put a cap on posts.
- (B) Chain Link Fabric (for site fencing only): Chain link fabric shall be No. 9 gauge and have a uniform square mesh measuring approximately 2" between its paralleled sides. It shall be woven from good commercial steel wire with a minimum breaking strength for individual wire of 1,200 pounds. Fabric shall be heavily zinc coated, after weaving, by the hot-dip process. The selvage shall be formed by twisting and barbing the ends of the wires.
- (C) Galvanizing: All parts of the fence posts and gates, above and below ground, shall be zinc coated by the hot-dip process.
- (D) Dumpster Screen Gates:
- (1) If gate pickets are detailed and not allowed inform Architect.
- (a) Provide gate frame of hot dip galvanized steel with single cross brace. Miter at corners. Fully weld at frame and brace. Gate frame shall be as detailed on the drawings.
- (b) Pickets to be 6" wide, 7/8" thick minimum, PVC board and of length to hide dumpster to be provided. Notify Architect if picket height is expected to exceed cmu wall height. Frame 4 sides with 1-1/2" x 5-1/2" slotted PVC rails. PVC Frame to be secured with adhesive caulk. Secure PVC components to steel frame with galvanized metal screws. Screws are to have snap on plastic caps to cover screw heads. Attach with adhesive caulk. Color: Manufacturer standard white, unless noted otherwise on drawings. Approved manufacturer: Everstrong Profiles (800) 339-3362 **No substitutions.**
- (2) Hardware for Gates: All swinging gates shall be equipped with hinges as detailed on drawings (weld to posts and steel gate frame) and fitted with latch for padlocking. Each gate leaf shall be equipped with a plunger bar or drop rod. Provide manufacturer's stops for each leaf of a 2" I.D. x 6" long pipe sleeve cast into slab at both the closed and fully opened positions, to engage the drop rod or plunger bar.
- (3) Wheels: When operating gate is greater than 6 feet wide, provide steel ball bearing swivel wheels securely fastened to the bottom rail of each gate at the latch side to support gate at open end in any position.

PART 3: EXECUTION

3. INSTALLATION:

- (A) Installation of fencing and gates shall be per governing codes and manufacturer's requirements.
- (B) Installation of tongue and groove boards per manufacturer's recommendations.

- END OF SECTION -

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DIVISION 2 - SITE WORK

PART 1 - GENERAL

1.1 SUMMARY

A. Related Documents:

1. Drawings and general provisions of the Subcontract apply to this Section.
2. Review these documents for coordination with additional requirements and information that apply to work under this Section.

B. Section Includes:

1. Fence framework, fabric, and accessories.
2. Excavation for posts.
3. Concrete encasement for posts.
4. Manual gates and related hardware.

C. Related Sections:

1. Division 01 Section "General Requirements."
2. Division 01 Section "Special Procedures."

1.2 REFERENCES

A. General:

1. The following documents form part of the Specifications to the extent stated. Where differences exist between codes and standards, the one affording the greatest protection shall apply.
2. Unless otherwise noted, the referenced standard edition is the current one at the time of commencement of the Work.
3. Refer to Division 01 Section "General Requirements" for the list of applicable regulatory requirements.
Federal Specifications (FS)

B. FS RR-F-191/1C Fencing, Wire and Post Metal (Chain-Link Fence Fabric)

C. State of California - California Department of Transportation (CALTRANS):

1. Standard Specifications: Chapter 80-4 excluding Section 80-4.04

D. American Society for Testing and Materials (ASTM)

1. ASTM A123 / A123M Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
2. ASTM C94 / C94M Standard Specification for Ready-Mixed Concrete
3. ASTM D 412 Standard Test Methods for Vulcanized Rubber and Thermoplastic

- | | | |
|----|--------------------|--|
| | Elastomers-Tension | |
| 4. | ASTM D 792 | Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement |
| 5. | ASTM D 1499 | Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Plastics |
| 6. | ASTM D 2240 | Test Method for Rubber Property—Durometer Hardness |
| 7. | ASTM F 668 | Standard Specification for Polyvinyl Chloride (PVC) and Other Organic Polymer-Coated Steel Chain-Link Fence Fabric |

1.3 SUBMITTALS

- A. Submit under provisions of Division 01 Section "General Requirements."
- B. Submit shop drawings and product data.
 - 1. Include accessories, fittings, hardware, anchorages, and schedule of components.
- C. Manufacturer's installation instructions.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Vinyl Fencing: Materials for vinyl-coated chain link fence shall be as specified herein. Material shall be of the same color of vinyl coating. Painted finishes are not acceptable. The color for this job is the manufacturer's standard black as approved by the University.
- B. Posts and Braces: Section 80-4.01A of CALTRANS
- C. Fabric: Section 80-4.01B of CALTRANS
- D. Accessories: Section 80-4.01C of CALTRANS
- E. Gates: Section 80-4.01D of CALTRANS

2.2 CONCRETE MIX

- A. Concrete: ASTM C 94; type II Portland Cement; 2500 psi at 28 days; 3-inch (75 mm) slump; 3/4-inch (20 mm) maximum size aggregate.

2.3 COMPONENTS

- A. Line Posts: 2.375-inch (59 mm) outside diameter, Schedule 40 galvanized steel pipe or galvanized "H" columns weighing not less than 2.7 lb./ft (13.18 kg/m²).
- B. Corner and Terminal Posts: 2.875-inch (73 mm) outside diameter, Schedule 40 galvanized steel pipe.

- C. Gate Posts: 3.500-inch (89 mm) diameter for man gates and 6.625-inch (168 mm) diameter for vehicular gates; gateposts to be galvanized steel pipe.
- D. Top, Bottom and Brace Rail: 1.660-inch (42.16 mm) outside diameter, plain end, sleeve coupled galvanized steel pipe.
- E. Gate Frame: 1.9-inch (48.26 mm) outside diameter Schedule 40 galvanized steel pipe for fittings and truss rod fabrication.
- F. Fabric/Vinyl Coated Steel: Chain link fence fabric shall be galvanized steel wire with a continuously bonded vinyl coating, with a finish size (i.e., size after coating) of 8 gauge, and shall comply with ASTM F 668. Fabric height shall be 8 feet (2.44 m), +/- 3/4 inch (20 mm), with knuckled, selvage edges on the bottom and top. Mesh shall be vertically-woven diamond mesh, with a nominal distance of 2 inches (50 mm) between parallel wires.
- G. Tension Bars: 3/16 inches by 3/4-inch (4.76 mm by 20 mm) galvanized steel flat bars.
- H. Caps: Cast steel or malleable iron, galvanized, sized to post dimension, set-screw retained.
- I. Fittings: Sleeves, bands, clips, rail ends, tension bars, fasteners and fittings shall be galvanized steel.
- J. Extension Arms: Cast steel, to accommodate 3 strands of barbed wire, single arm, 12-inches (305 mm) high (measured vertically) above the top edge of the fence fabric, sloped to 45 degrees.
- K. Barbed Wire: 12-AWG wire, 3 strands, zinc-coated steel with bonded vinyl coating and 4 point barbs at 5-inches (127 mm) O.C., painted black.
- L. Gate Hardware: Fork type latch with gravity drop; center gate stop and drop rod; three 180 degree gate hinges per leaf.
- M. Privacy Slats: Plastic fencing slats manufactured from 97 percent recycled plastic containing 97 percent post-consumer recycled plastic.

2.4 FINISHES

- A. Galvanized Surfaces: Galvanize surfaces in accordance with ASTM A 123, with a coating of at least 1.20 oz/sq. ft.
- B. Accessories and Components: Same finish as fabric.

2.5 VINYL COATING

- A. The vinyl coating shall conform to FS RR-F-191/1C.
- B. Colors shall be stabilized, and shall have a light fastness to withstand a minimum Weather-O-Meter exposure of at least 1500 hours without deterioration when tested in accordance with ASTM D 1499.

- C. Specific gravity shall be between 1.26 and 1.30 in accordance with ASTM D 792.
- D. Hardness shall be A90 +/-5 in accordance with ASTM D 2240.
- E. Tensile strength shall be between 2600 and 3000 psi (17.94 MPa and 20.7 MPa) in accordance with ASTM D 412.
- F. Vinyl coating shall be exposure-resistant to dilute solutions of most common mineral acids, sea water, salts, and alkali.
- G. Vinyl coating shall be continuously bonded to the wire under 5000 psi (34.5 MPa) pressure before the wire is woven into fabric.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install framework, fabric, accessories, and gates in accordance with section 80-4.02 of CALTRANS.
- B. Install security fence of 8-foot (2.45 m) fabric height with 1-foot (0.9 m) barbed extension on support arms as shown on Drawings.
- C. Space line posts at intervals not exceeding 10 feet (3 m).
- D. Set gate and posts plumb, in concrete footings with top of footing 1 inch (25 mm) above finish grade. Slope top of concrete for water runoff. Footings for line end and corner posts are to be 8 inches (203) diameter by 3 feet (0.9 m) deep below finish grade and for gates are to be 12 inches (305 mm) diameter by 3 feet 6 inches (1 m) deep below finish grade.
- E. Provide top rail through line-post tops and splice with 7-inch (178 mm) long rail sleeves.
- F. Brace each gate and corner post back to adjacent line post with horizontal center brace rail and diagonal truss rods. Install brace rail, one bay from end and gate posts.
- G. Install center and bottom brace rail on corner and gate leaves.
- H. Stretch fabric between terminal posts or at intervals of 100 feet (30,5 m) maximum, whichever is less.
- I. Position bottom of fabric to no more than 2 inches (50 mm) above concrete or asphalt grade and touching dirt finish grade.
- J. Fasten fabric to top rail, line posts, braces, and bottom tension wire with 11-AWG galvanized wire ties 24 inches (610 mm) maximum on centers.
- K. Attach fabric to end, corner, and gateposts with tension bars and tension bar clips.

- L. Install bottom rail supported at each line and terminal post in such a manner that a continuous brace between posts is formed.
- M. Install gates with fabric and barbed wire overhang to match fence. Install three hinges per leaf, latch, catches, drop bolt, foot bolts and sockets.

3.2 GROUNDING

- A. 40 feet (13 m) on either side of overhead high voltage electrical transmission lines the fence is to be grounded as shown on the Drawings.

3.3 CONSTRUCTION WASTE MANAGEMENT

- A. Conform with Division 01 Section "Construction Waste Management."
- B. Before concrete pours, designate locations or uses for excess concrete and a location for clean out water from concrete trucks. Designated locations shall meet environmental standards and conform with Section 7-1.01 of CALTRANS.

END OF SECTION

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DIVISION 2 - SITE WORK1. GENERAL

- (A) The general provisions of Division 1 apply to the work specified in this Section
- (B) The work in this Section consists of furnishing all materials, accessories, equipment, tools, transportation and performing all services and labor required to completely execute the fertilizing, liming, seeding, and landscaping work as per the drawings and as herein specified.
- (C) Liming, fertilizing, and seeding shall include all disturbed areas and all areas shown on plans.
- (D) Location, quantity, and size of all plants shall be as indicated on the drawings.
- (E) All materials shall be subject to the approval of the Owner's Representative.
- (F) All soil and rubbish resulting from the work to be removed from site.
- (G) Contractor shall repair damage of any kind done to the building, or to the work of other Contractors by the carelessness of his own workmen, or otherwise during the progress of work.

2. JOB CONDITIONS

- (A) Before commencing work, this contractor shall verify all conditions at the job. Report any necessary corrections immediately to the General Contractor. Do not proceed until corrections (if any required) are made. Commencing work implies this contractor's acceptance of job conditions.

3. TOPSOIL

- (A) Refer to Section 02211 for the removal, stockpile and placement criteria of the existing onsite topsoil.
- (B) When imported topsoil is required, the topsoil shall be screened, fertile, friable loam with no less than 6% organic matter from a local source. Imported topsoil material shall be reasonably free of subsoil, clay, lumps, brush, reproductive parts of noxious weed and other litter, and free of roots, stumps, sticks and stones larger than 2" in any dimensions. Topsoil shall be fertile, friable, natural topsoil of loamy character and characteristic of the locality with pH Level 5.8 to 6.2; Phosphorus (P-I) Index of 50; Potassium (K-I) Index of 50; Calcium (Ca%) 40-60% of Cation Exchange Capacity (CEC); Magnesium (Mg%) 8-10% of CEC; Base saturation (BS%) 60-80% of CEC; Manganese (Mn-I) Index > 25; Zinc (Zn-I) Index > 25; Copper (Cu-I) Index > 25.

4. PLANTS

- (A) Plants shall be typical of their species and variety; have normal growth habits; well-developed branches, densely foliated vigorous fibrous root systems, and shall be free from defects and injuries.
- (B) Quality and size of plants, spread of roots, and size of balls shall be in accordance with ASA Z60.1-1959, "American Standard for Nursery Stock" as published by the American Association of Nurserymen, Inc.
- (C) Plants shall be pruned as specified before planting.
- (D) Plants shall be freshly dug and nursery grown.
- (E) Each bundle of plants and all separate plants shall be properly identified by weatherproof

labels securely attached thereto before delivery to project site. Label shall identify plant by name and provide any specific data as to location and arrangement.

- (F) Shrubs shall be well-shaped and full.
- (G) All trees must have straight trunks with a single leader intact. Bark shall be free of abrasion; all fresh cuts over 1-1/4 inch shall be calloused over.
- (H) Trees will not be accepted which have had their leaders cut or which have leaders damaged so that cutting is necessary.

5. DIGGING AND HANDLING

- (A) Handle all plants so that roots and foliage are adequately protected at all times.
- (B) No plant shall be bound with rope or wire at any time so as to damage the bark, break branches or destroy its natural shape.
- (C) Balled, burlapped plants shall come from soil which will hold firm ball.
- (D) Sizes refer to inside diameter of pot. The plants must have been growing in the specified pot for a minimum of three months and a maximum of one year prior to delivery.

6. PLANTING TREES AND SHRUBS

- (A) Work shall be done under the supervision of an experienced nurseryman approved by the Owner's Representative.
- (B) When conditions are such, by reason of drought, high winds, excessive moisture, or other similar factors, that satisfactory results are not likely to be obtained, work shall be stopped. It shall not be resumed until desired results can be obtained or until approved alternate or corrective measures and procedures are adopted.
- (C) Stake out on the ground proposed location of all plant pits and shrub beds prior to excavation. (Do not dig pits until location has been approved by the Project Manager.) Adjustments in locations and outline shall be as directed.
- (D) The depth for excavation of plant pits shall be the depth below finished grade required to accommodate beneath the ball or roots a bed of top soil not less than 6 inches in depth. The ball or roots shall rest on this bed when the plant is properly set to finished grade.
- (E) Set all plants plumb and straight. Set at such a level that, after settlement, a normal relationship of the crown of the plant with the ground surface will be established. Locate plant in the center of the pit.
- (F) When balled, burlapped plants are set, tamp topsoil carefully under and around base of ball to fill all voids. Remove all burlap, ropes, and wires from sides and tops of balls, but do not remove burlap from under ball.
- (G) Plant pits and shrub beds shall not be backfilled with topsoil until approved by Owner's Representative.
- (H) Backfilling topsoil shall be placed in not more than 6 inches increments of depth between tappings. Water thoroughly at each level with a solution of root stimulant and water.
- (I) All planted areas, not including seeded or sod areas, shall receive a permeable fabric weed barrier prior to placing mulch or ground cover.

7. GUYING AND STAKING

- (A) All guying, staking and wrapping shall be done immediately after planting.
- (B) Protect all trees from contact with wires and stakes by sections of rubber hose sufficient length to prevent injury to the tree.
- (C) For balled, burlapped plants: Drive stakes into ground outside periphery of ball of tree.

- (D) Stakes shall be flush with finished grade.
 - (E) Plants shall stand plumb after staking and guying.
 - (F) All seals and labels are to remain unbroken and visible on plant material until final inspection. Remove all seals and labels immediately after final inspection.
8. PRUNING
- (A) Prune in a manner to retain height and spread as given in the Plant List.
 - (B) Prune in a manner to preserve natural character of plant and in a manner appropriate to its particular requirement in the landscape design.
9. GROUND PREPARATION
- (A) Not earlier than 24 hours before sod is to be laid, the soil surface to be sodded shall be worked to a depth of not less than two (2) inches with a weighted disc rototiller, pulvimixer, or other equipment approved by the Owner's Representative, until the surface is smooth, free from debris, washes, gulleys, clods and stones. If as a result of a rain, the prepared surface becomes eroded or crusted before the sod is to be laid, it shall again be placed in condition for sodding.
10. GRASSING AND TURF
- (A) Fine grade areas to achieve final grade contours as indicated on the drawings.
 - (B) Adjust grade contours to achieve positive drainage away from buildings. Provide uniform rounding at top and bottom of slopes and other breaks in grade. Correct irregularities and areas where water may stand.
 - (C) All lawn areas to receive solid sod shall be left a maximum of 1" below final finish grade. Coordinate operations with on-site construction supervisor.
 - (D) All lawn areas to be finish graded and irrigation trenches completely settled.
 - (E) All rocks ¾" in diameter and larger, dirt clods, sticks, concrete spoils, construction debris, etc. shall be removed prior to placing topsoil, sod, seed or any landscape installation.
 - (F) Plant sod by hand and cover turf areas completely. Ensure edges of sod are touching. Top dress joints by hand with topsoil to fill voids
 - (G) Roll sod grass to achieve a smooth, even surface, free from unnatural undulations.
 - (H) Water sod thoroughly as sod installation progresses.
 - (I) Contractor shall guarantee establishment of an acceptable turf area and shall provide replacement, if necessary.
 - (J) Overseed with winter rye grass at a rate of 4 pounds per 1000 sf when seasonally and locally appropriate.
 - (K) Seed or sod all area disturbed by construction when otherwise not designated with groundcover.

11. FINISH GRADES IN LANDSCAPED ISLANDS

- (A) The finished grades in the parking lot landscaped islands shall be graded to be sloped and crowned so that water can drain over the surrounding curbs and onto the adjacent parking lot.

12. MULCHING

- (A) Mulch to be grade "A" shredded cypress mulch. Apply at least 3" of Mulch to earth saucers and plant beds immediately upon completion of planting. Refer to Section 02900, Paragraph 5(I), for weed barrier placement required prior to application of mulch.

13. MAINTENANCE AND WATERING

- (A) This contractor shall maintain all seeded areas for a period of two (2) months or until acceptance of construction, whichever is more.
- (B) Contractor to furnish watering hoses and sprinkling equipment for his use during watering period.

14. GUARANTEE

- (A) The work under this section shall be guaranteed for one (1) year from the date of acceptance. Guarantee shall cover replacement of unhealthy plants and defects in workmanship.

- END OF SECTION -

DIVISION 2 - SITE WORK**PART 1 – GENERAL****SUMMARY**

- (A) Section includes:
 - 1. Trex Pergola open-frame structure manufactured by Structureworks.

RELATED SECTIONS

- (A) Section 03 30 00 Cast-in-Place Concrete.

REFERENCES

- (A) ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
- (B) ASCE 7-16 – American Society of Civil Engineers, Minimum Design Loads for Buildings and other Structures.

DESIGN / PERFORMANCE REQUIREMENTS

- (A) Design members to withstand wind loads in accordance with ASCE 7-16 and applicable code.
- (B) Design foundations in accordance with applicable code and good construction practices for the specific structure and site conditions.
- (C) Cooperate with regulatory agencies or authorities and provide data as requested.
- (D) Design pergola for required allowable ground snow load in accordance with the applicable code.
- (E) Design pergola in accordance with applicable fire code and provide data on ASTM E84 testing.

SUBMITTALS

- (A) Submit under provisions of Division 01 – General requirements.
- (B) Product Data: Manufacturer’s data sheets on each product to be used, including:
 - 1. Product specification sheets.
 - 2. Installation instructions.
- (C) Shop Drawings: Indicate assembly dimensions, locations of structural members, connects, general construction details, anchorages; method of anchorage and method of installation.

QUALITY ASSURANCE

- (A) Manufacturer Qualifications: Single source manufacturer for design, engineering, structure fabrication and shipping.
- (B) Installer Qualifications: Familiar with manufacturer’s structures and installation techniques.

DELIVERY, STORAGE AND HANDLING

- (A) All packages and pallets shall be opened and inspected for damage upon receipt. Any missing or damaged components must be noted on the delivery receipt with the carrier before accepting the shipment.
- (B) Upon completion of inspection, all items shall be repackaged and stored where protected from moisture, dirt and excessive heat. Ensure that items are level and fully supported.

- (C) Hand materials so as to protect materials, coatings and finishes, during transportation and installation to prevent damage or staining.

SEQUENCING

- (A) Ensure that footing location plans 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.

WARRANTY

- (A) Provide manufacturer's warranties, as appropriate, for all pergola components.
 1. Trex Pergola 10-Year Limited Commercial Warranty.

PART 2 - PRODUCTS

- (A) Provide shade structure components to the overall size and configuration as indicated on architectural drawings.
 1. Color: Classic White
- (B) Apply anti-graffiti coating to shade structure components including columns, beams, rafters and stringers.
 1. Basis of Design: Sherwin Williams Anti-Graffiti Coating 1K Siloxane – B97C00150
 2. Color: Clear

PART 3 – EXECUTION

- (A) Do not begin installation until supporting structures have been properly prepared.
- (B) If foundation preparation is found to be unsatisfactory, Architect shall be notified before proceeding with installation.

PREPARATION

- (A) Clean component surfaces thoroughly prior to installation.

INSTALLATION

- (A) Install all products in accordance with manufacturer's instructions
- (B) Foundations shall be construction in accordance with local codes and good construction practices for the specific structure and site conditions.
- (C) Concrete shall conform to Section 03 30 00 Cast-in-Place Concrete.

CLEANING

- (A) Clean all surfaces and restore any marred surfaces to original conditions as approved by Architect.

PROTECTION

- (A) Protect installed products until completion of project.
- (B) Touchup, repair or replace damaged products before Substantial Completion.

- END OF SECTION -

DIVISION 3 - CONCRETE

PART 1: GENERAL

1. RELATED DOCUMENTS

- (A) The provisions of Division 1 apply to the work specified in this Section.
- (B) Unless otherwise shown or specified, the work shall conform to the following standards of the American Concrete Institute.
- | | |
|-------------------|---|
| ACI 117- (90) | Standard Tolerances for Concrete Construction and Materials |
| ACI 211.1- (91) | Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete |
| ACI 212.2R-81(91) | Guide for Use of Admixtures in Concrete |
| ACI 214-77 (89) | Recommended Practice for Evaluation of Strength Test Results of Concrete |
| ACI 302.1R-96 | Guide for Concrete Floor and Slab Construction |
| ACI 304R-89 | Guide for Measuring, Mixing, Transporting, and Placing Concrete |
| ACI 304.2R-71(96) | Placing Concrete by Pumping Methods |
| ACI 305R-89 (99) | Hot Weather Concreting |
| ACI 306R-88 (97) | Cold Weather Concreting |
| ACI 306.1-87 (98) | Standard Specifications for Cold Weather Concreting |
| ACI 308-81 (92) | Standard Practice for Curing Concrete |
| ACI 309R-87 (96) | Guide for Consolidation of Concrete |
| ACI 315-80 (95) | Details and Detailing of Concrete Reinforcement |
| ACI 318-99 | Building Code Requirements for Reinforced Concrete |
| ACI 347R-88 (94) | Guide to Formwork for Concrete |
- (C) Unless otherwise shown or specified, the work shall conform to the following standards of the Concrete Reinforcing Steel Institute.
- | |
|-----------------------------------|
| Manual of Standard Practice, 1986 |
| Placing Reinforcing Bars, 1997 |
- (D) Refer to drawings for extent and locations of all concrete work. Verify conditions and requirements of the job.

2. SCOPE OF WORK

- (A) Include all labor, materials and accessories, and perform all operations in connection with the installation of Concrete Work, and all related work incidental to the completion thereof, as shown on the drawings, complete, in strict accordance with the drawings and as specified herein. Concrete work includes:
- (1) Concrete and related reinforcing and formwork for foundations, pilasters, slabs, concrete pavement, exterior slabs, sidewalks around building, concrete curbs, all site work concrete, foundations for light poles and signs, foundation pads for equipment, etc. as shown on drawings.
 - (2) Installation of anchor bolts for steel columns, posts, and other anchored work as may be required.

- (3) Grouting of column bases.
- (4) All anchor slots, sleeves, and other inserts as required.
- (5) Shop drawings.
- (6) Vapor retarder under all interior concrete slabs on grade.
- (7) Granular subbase beneath slabs on grade as recommended by Geotechnical Report.
- (8) All dowels from concrete into masonry walls.
- (9) All other items required to make the work of this Section complete including staking for layout of footings, building layout, excavation, backfilling, etc.

3. SUBMITTALS

- (A) Shall be submitted for review only when required by and in accordance with the procedure set forth in these specifications.
- (B) Reinforcing steel shop drawings shall be provided showing all details of construction, bending and placing, completely dimensioned. Before proceeding with the work, review of all shop drawings must be secured from the Consultants.
- (C) Synthetic Fiber Reinforcement: Submit manufacturer's product data, including application rate and mixing instructions.
- (D) Fly ash: Submit laboratory test data indicating chemical composition compliance with ASTM C618 CLASS C.
- (E) Submit concrete mix designs for review by CASCO well in advance of concrete placement. Concrete mix design submittal with placement location clearly indicated shall include all strength data necessary to show compliance with the strength requirements of this specification for either the trial batch method or the field experience method.
- (F) Review of submittals will cover general design only. In no case shall this review relieve the Contractor of the responsibility for strength of concrete, general or detailed dimension, quality or quantity of materials, or any other conditions, functions, performance or guarantees required.
- (G) Refer to Section 04201 for submittal of masonry grout mix design.

4. QUALITY ASSURANCE

- (A) General
 - (1) The Owner will employ and pay for the services of an independent testing agency to provide testing and inspection of concrete work. The testing agency shall be licensed in the state where the structure is located and shall meet the requirements of "Recommended Practices for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials as Used in Construction" (ASTM E329).
 - (2) Concrete materials and operations shall be tested and inspected as the work progresses. Failure to detect any defective work or material shall not in any way prevent later rejection when such defect is discovered nor shall it obligate Owner's Representative for final acceptance.
 - (3) The testing agency shall report all test and inspection results to CASCO, Owner and General Contractor immediately after they are performed. All test and inspection reports shall include the exact location in the work represented by the test.
 - (4) At the completion of all concrete work the testing agency shall submit a letter of certification stating that all concrete work has been constructed in accordance

- with the contract documents and all applicable code requirements.
- (5) The testing agency and its representatives are not authorized to revoke, alter, relax, enlarge or release any requirement of the contract documents, approve or accept any portion of the work, perform any duties of the Contractor, or be a party to scheduling of work.
 - (6) The General Contractor shall notify the testing agency a minimum of 24 hours in advance of all concrete work and all reasonable facilities shall be made available for technicians, to include providing and maintaining for the sole use of the testing agency adequate facilities for safe and proper curing of concrete test specimens on the job for initial curing.
 - (7) Records of inspection shall be kept available to the building official during progress of work for two years after completion of the project. Records shall be preserved by the independent testing agency.
- (B) The testing agency shall conduct strength tests of the concrete during construction in accordance with the following procedures:
- (1) Secure composite samples in accordance with "Method of Sampling Fresh Concrete" (ASTM C172). Each sample shall be obtained from a different batch of concrete on a random basis, avoiding any selection of the test batch other than by a number selected at random before commencement of concrete placement.
 - (2) Mold and cure three specimens from each sample in accordance with "Method of Making and Curing Concrete Test Specimens in the Field" (ASTM C31). Any deviations from the requirements of this Standard shall be recorded in the test report.
 - (3) Test specimens in accordance with "Method of Test for Compressive Strength of Cylindrical Concrete Specimens" (ASTM C39). Two specimens shall be tested at 28 days and one shall be tested at 7 days. The acceptance test results shall be the average of the strengths of the two specimens tested at 28 days. If one specimen in a test manifests evidence of improper sampling, molding or testing, it shall be discarded, and the strength of the remaining cylinder shall be considered the test result. Should both specimens in a test show any of the above defects, the entire test shall be discarded.
 - (4) Make at least one strength test (3 cylinders) for each 50 cu. yd., or fraction thereof, of each mix design of concrete placed in any 1 day.
 - (5) Determine slump of the concrete sample for each strength test and whenever consistency of concrete appears to vary, using "Method of Test for Slump of Portland Cement Concrete" ASTM C143).
 - (6) Determine air content of normal weight concrete sample for each strength test in accordance with either "Method of Test for Air Content of Freshly Mixed Concrete by the Pressure Method" (ASTM C231), "Method of Test for Air Content of Freshly Mixed Concrete by the Volumetric Method" (ASTM C173) or "Method of Test for Unit Weight, Yield, and Air Content (Gravimetric) of Concrete" (ASTM C138).
 - (7) Determine temperature of concrete sample for each strength test.

PART 2: PRODUCTS

5. CONCRETE MATERIALS

- (A) Coarse Aggregate: ASTM C33.
- (B) Fine aggregate: ASTM C33.
- (C) Portland cement: ASTM C150, Type II.
- (D) Fly ash: ASTM C618, CLASS C.

- (E) Water: Clear and free from injurious amounts of oil, acid, alkali, organic or other deleterious matter.
- (F) Admixtures:
 - (1) When requested, a local qualified concrete technician employed by the admixture manufacturer shall be available to assist in proportioning admixture dosage for optimum use, proper use of the admixture and adjustment of concrete mis-proportions to meet jobsite and climatic conditions. Contractor shall give admixture manufacturer's representative a minimum of 48 hours notice when job service is required on the product.
 - (2) Consult fiber reinforcing manufacturer for water reducing admixture recommendation for fiber reinforcement material type, dosages and applications.
 - (3) Water reducing admixture; shall conform to ASTM C494 Type A. POZZOLIGH Normal Series of RLOYHEED Normal Series by Master Builders, Inc.
 - (4) Midrange Water Reducing Admixture: Shall conform to ASTM C494 Type A and Type F.
 - (a) POLYHEED Series by Master Builders, Inc.
 - (b) A minimum dosage of eight (8) ounces per 100 pounds (560 mi/100kg) of cementitious material shall provide a minimum of eight (8) percent water reduction and produce a concrete slump range of 6-8 inches (150-200 mm). Normal setting times shall be maintained throughout the dosage range of the midrange water-reducing admixture. Amount of admixture used shall be in accordance with manufacturer's recommendations.
 - (5) High Range Water Reducing Admixture: Shall conform to ASTM C494 Type F and G and ASTM C1017 Type I or II.
 - (a) RHEOBUILD by Master Builders, Inc.
 - (6) Non-Corrosive, Non-Chloride Accelerator: ASTM C494, Type C or E.
 - (a) Shall not contain more chloride ions that are present in municipal drinking water.
 - (b) Admixture manufacturer must have long term non-corrosive test data from an independent testing laboratory of at least one-year duration using an acceptable accelerated corrosion test method such as that using electrical potential measures.
 - (7) Air Entraining Admixture: ASTM C260.
 - (a) No air entrainment admixture shall be used for steel trowel finished concrete.
 - (b) Total entrapped air content shall be no greater than 2%.
 - (8) Maximum chloride ion due to admixtures shall not exceed 0.1% by weight.
 - (9) The addition of calcium chloride is not permitted.
 - (10) All admixtures shall be used in conformance with the manufacturer's recommendations.

6. REINFORCEMENT MATERIALS

- (A) Reinforcing Steel Bars: ASTM A615, Grade 60, unless noted otherwise.
- (B) Welded Wire Fabric: ASTM A185.
- (C) Steel Wire: ASTM A82.

- (D) Metal Accessories: Include all spacers, ties, chairs and other devices required to properly support and fasten reinforcing steel in place in accordance with the requirements of the ACI Manual of Standard Practice for Detailing Reinforcing Concrete Structures.
- (E) Synthetic Micro-Fiber: Monofilament polypropylene micro-fibers engineered and design for use in concrete, complying with ASTM C 1116/C 1116M, Type III, $\frac{3}{4}$ " long.
 - (1) Products: Subject to compliance with requirements, provide one of the following:
 - (a) Euclid Chemical Company, an RPM Company; Fiberstrand 100.
 - (b) Grace Construction Products, W. R. Grace & Co.; Grace MicroFiber.
 - (c) Propex Concrete Systems Corp.; Fibermesh 150.

7. FORM MATERIALS

- (A) Removable forms shall be wood, metal or other approved material.
- (B) Forms for unexposed concrete surfaces may be No. 2 common boards of dimension lumber of uniform thickness.
- (C) Earth cuts may be used for forms for footings if soil conditions and local codes permit.

8. RELATED MATERIALS

- (A) Vapor Retarder: **10** mil high density polyethylene meeting ASTM E1745 with a permeance of less than 0.3 perms as determined by ASTM E96.
- (B) Premolded Filler: Sealtight Ceramar filler at interior columns only, as manufactured by W.R. Meadows Inc. (no substitutions). At all locations other than interior columns use non-bituminous fiber type premolded filler as per ASTM D1741, Type III, Homasote "300" or approved equal all wood fiber board with the "Homex Plus" pull off strip for joints to be flash-patched.
- (C) Curing Compound: Dissipating water-based resin curing compound conforming to ASTM C 309, Type 1, Class B.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1. L&M Construction Chemicals, Inc.; L&M Cure R.
 - 2. Euclid Chemical Company, an RPM Company; Kurez DR-100.
 - 3. SpecChem; SpecRez.
 - 4. W.R. Meadows, Inc.; 1100.
- (D) Form Ties: Black iron snap ties with a minimum 1-inch breakback.
- (E) Form Releasing Agent: Non-staining.
- (F) Grout shall be "Crystex" grout by L & M Construction Chemical, Inc. **No Substitutions**
- (G) Acceptable system at all slab on grade construction joints (as an alternate to the "keyed" construction joint-see typical construction joint details on structural drawings): "Diamond Dowels" by PNA Construction Technologies (no substitutes); "Diamond Dowels" will be $\frac{3}{4}$ " x $4\frac{1}{2}$ " x $4\frac{1}{2}$ ", spaced at 24" o.c., located at mid-depth of the slab.

PART 3: EXECUTION

9. CONCRETE PROPORTIONS

- (A) The specified compressive strength of the concrete f'c shall be 3000 psi minimum or as shown on the drawings. Strength requirements shall be based on 28-day compressive strength.

- (B) Concrete exposed to weather shall be air entrained. Air content shall be between 4 and 8 percent.
- (C) Slump of concrete shall be 4" +/-1/2" unless a high range water-reducing admixture is used. The slump of concrete prior to addition of a high range water-reducing admixture shall not exceed 4". The slump of concrete containing a high range water-reducing admixture shall not exceed 10".
- (D) The maximum size of coarse aggregate shall not be more than one-fifth of the narrowest dimension between sides of forms, one-third of the depth of slabs, nor three-fourths of the minimum clear spacing between reinforcing bars, nor larger than 1-1/2".
- (E) The coarse aggregate size shall be number 57 or larger.
- (F) The minimum cement content shall be 470 pounds per cubic yard for non-air entrained concrete and 517 pounds per cubic yard for air-entrained concrete.
- (G) The maximum Fly ash content by weight shall be 25% of the cementitious material.
- (H) Concrete shall be proportioned by either the trial batch method or the field experience method.
 - (1) Where the trial batch method is used, make three test cylinders for each trial batch. Break one cylinder at 7 days and two at 28 days to verify strength requirements. Adjust proportions to produce a design mix at least 1200 psi greater than the specified strength, f'c.
 - (2) Where the field experience method is used, the required average compressive strength shall be determined in accordance with paragraph 5.3.2 of ACI 318. Documentation that proposed concrete proportions will produce an average compressive strength equal to or greater than the required average compressive strength shall consist of a field strength test record representing materials and proportions to be used for this project. A field strength test record shall consist of at least 10 consecutive tests encompassing a period of time of not less than 45 days and made within the past 18 months.

10. FORMWORK

- (A) Forms shall be used, wherever necessary, to confine the concrete and shape it to the required dimensions. Forms shall have sufficient strength to withstand the pressure resulting from placement and vibration of the concrete and shall have sufficient rigidity to maintain specified tolerances.
- (B) The design and engineering of the formwork, as well as its construction, shall be the responsibility of the Contractor.
- (C) Forms shall be sufficiently tight to prevent loss of concrete.
- (D) All exposed concrete corners shall have a 3/4" x 3/4" chamfer, except as otherwise noted.
- (E) Form ties shall be broken off 1" or more back from concrete surfaces. No wire or strap ties will be permitted. Ties shall be of sizes and weights as required for pressures developed and installed in accordance with manufacturer's recommendations. Form ties for exterior walls and grade beams shall be leakproof "waterseal type".
- (F) Forms for exposed surfaces shall be coated with non-staining releasing agent, applied before the reinforcing steel is placed.
- (G) Forms shall not be disturbed until the concrete has adequately hardened. Care shall be taken to avoid spalling the concrete surfaces.
- (H) All surfaces of forms and embedded materials shall be cleaned of any accumulated mortar or grout from previous concreting and of all other foreign material before concrete is placed in them.

11. STEEL REINFORCEMENT

(A) Fabrication:

- (1) Reinforcing steel shall be accurately fabricated to the dimensions shown.
 - (a) Bends shall conform to bend dimensions defined as standard in accordance with details in the ACI Detailing Manual - 1980 (SP-66) and/or CRSI Manual of Standard Practice, unless otherwise shown.
 - (b) Bars shall be bent cold and shall not be bent or straightened in a manner that will injure the material.
 - (c) Bars shall be fabricated within the tolerances shown in the ACI Detailing Manual - 1980 (SP-66) and/or CRSI Manual of Standard Practice.
- (2) Welding as an aid to fabrication and/or installation will not be permitted except as specifically shown on the drawings or as authorized by CASCO.

(B) Placing

- (1) Position reinforcement to $1/4" \pm$ in accordance with placement plans.
- (2) Unless noted otherwise, reinforcing shall be placed so that the minimum concrete cover shown on the drawings is provided.
- (3) It shall be the Contractors responsibility to ensure that the intended reinforcement location is maintained during concrete placement. Tie bars at intersections with soft steel wire.
- (4) Lap splices of reinforcing shall be as called for on the drawings.
- (5) Do no splicing at points of maximum stress. Lap all bars at all corners and abrupt changes in direction of walls. Provide steel dowels between footings and walls, pilasters, columns and elsewhere, as indicated on drawings and/or as conditions require.
- (6) Do not drive nails into wood forms to support reinforcement.
- (7) Provide two (2) No. 5 bars around all openings in concrete walls, and at all re-entrant corners in floor slabs.
- (8) Reinforcing bars partially embedded in concrete shall not be field bent.

(C) Cleaning and Protection:

- (1) Protect reinforcement from excessive rusting or mechanical injury. Store on skids or otherwise maintain at least 6 inches above ground.
- (2) After bars are tied in place take whatever precautions are necessary to protect bars from damage by construction equipment or careless workmen. Pay particular attention to bars projecting out of previously placed concrete. Damaged steel shall be replaced at no cost to the Owner.

12. SYNTHETIC FIBER REINFORCEMENT

(A) Delivery, Storage, and Handling:

- (1) Delivery:
 - a. Deliver synthetic fiber reinforcement in manufacturer's original, unopened, undamaged containers and packaging, with labels clearly identifying product name, unique identification number, code approvals, and weight of fibers.
- (2) Storage:

- a. Store synthetic fiber reinforcement in clean, dry area indoors in accordance with manufacturer's instructions.
 - b. Keep packaging sealed until ready for use.
- (B) Mixing:
- (1) Add synthetic fiber reinforcement to concrete mixture in accordance with manufacturer's instructions.
 - (2) Add synthetic fiber reinforcement at a minimum application rate of 1.0 lbs./yd. of concrete.
 - (3) Mix synthetic fiber reinforcement in concrete mixer in accordance with mixing time and speed of ASTM C 94 to ensure uniform distribution and random orientation of fibers throughout concrete.

13. JOINTS

(A) Construction Joints

- (1) Provide construction joints as required by the drawings, specifications, and job conditions. Provide deep key at joint per drawings.
- (2) Provide construction joints in walls at a maximum spacing of 50 feet unless otherwise indicated on the drawings.
- (3) Construction joints in slabs on grade are intended to function as formed control joints. See drawings for details. Locate construction joints in slabs on grade at locations shown on the drawings. For exterior slabs on grade the maximum spacing between construction joints shall be 20 feet.

(B) Control Joints

- (1) Locate control joints in interior slabs on grade as shown on the drawings not to exceed a maximum spacing of 15 feet.
- (2) Locate 1" deep tooled control joints in sidewalks as shown on the drawings. The maximum spacing of tooled joints shall be 8 feet.
- (3) All reinforcement shall be continued across joints. Remove all laitance from joints prior to placing adjoining concrete.

(C) Isolation Joints

- (1) Locate isolation joints at all columns and where exterior slabs or walks abut vertical surfaces and elsewhere, as shown on the plans or as job conditions require.
- (2) Locate isolation (expansion) joints in sidewalks at locations shown on the drawings. The maximum spacing between isolation joints in sidewalks shall be 32 feet.
- (3) Locate isolation (expansion) joints in curbs at a maximum spacing of 20 feet.
- (4) Premolded filler for isolation joints shall be 1/2" thick.
- (5) Joint at sidewalk/building wall transition and sidewalk/decorative column pilaster base shall be caulked and sealed.

14. PRODUCTION OF CONCRETE

- (A) Ready-mixed concrete shall be batched, mixed and transported in accordance with ASTM C94. The ready-mixed concrete producer shall furnish duplicate delivery tickets, one for the Contractor and one given to the Owner's Representative, for each batch of concrete. The information provided on the delivery ticket shall include the quantities of all material

batched including the amount of free water in the aggregate. The batch time as well as the quantity of water that can be added at the site without exceeding the maximum water cement ratio specified shall be noted on the delivery ticket.

- (B) The independent testing agency shall have access at all times to the batching and mixing plant for sampling of materials and inspection of all work performed for this job.
- (C) In cold weather, the temperature of the concrete at time of placement shall be at least 55 degrees F. The temperature of the surrounding materials must be greater than 32 degrees F.
- (D) In hot weather the ingredients shall be cooled before mixing, or flake ice or well-crushed ice of a size that will melt completely during mixing may be substituted for all or part of the mixing water if, due to high temperature, low slump, flash set or cold joints are encountered. When air temperature is between 80F and 90F, reduce maximum mixing and delivery time from 90 minutes to 75 minutes. When air temperature exceeds 90F, reduce maximum mixing and delivery time to 60 minutes.

15. PLACING

(A) Preparation for Placing Concrete

- (1) **All bearing material shall be inspected by the independent testing agency prior to placement of concrete. The geotechnical engineer shall be the sole judge as to the suitability of the bearing material.**
- (2) Before concrete is placed, all debris and ice shall be removed from the spaces to be occupied by the concrete. Remove surplus form releasing agent from the contact face of forms. Forms and the reinforcement shall be thoroughly cleaned of ice or other coatings.
- (3) Water shall be removed from place of deposit before concrete is placed. Concrete shall not be placed on frozen ground.
- (4) Notify all trades concerned and Owner's Representative sufficiently in advance of the scheduled time for concrete placement to permit installation of all required work by other trades.
- (5) Before placing concrete, all required embedded items, including dovetail anchor slots, anchors, inserts, curb angles, metal frames, fixtures, sleeves, drains, stair nosings, accessory devices for Mechanical and Electrical installations shall be properly located, accurately positioned and built into the construction, and maintained securely in place.
- (6) Build into construction all items furnished by the Owner and other trades. Provide all offsets, pockets, slabs, chases and recesses, as job conditions require including the safe location. Thicken slabs as required to maintain the intended slab thickness at embedded items.
- (7) Set anchor bolts furnished under the Structural Steel Section of these specifications.
- (8) Place and properly support reinforcing steel.

(B) Conveying

- (1) Concrete shall be conveyed from the mixer to the place of final deposit by methods that will prevent separation or loss of material.
- (2) Concrete for placement over prepared and certified pad shall be placed by means of a pump. Truck shall not tailgate.
- (3) Equipment for chuting, pumping and pneumatically conveying concrete shall be of such size and design as to ensure a practically continuous flow of concrete at the delivery without separation of material.

- (4) Provide runways or other means for wheeled equipment to convey concrete to point of deposit. Construct runways so that supports will not bear upon reinforcement or fresh concrete.
- (C) Depositing
- (1) Concrete shall be deposited as nearly as practicable in its final position to avoid segregation due to rehandling or flowing. No concrete shall have a free fall of over three feet from truck, mixer or buggies. The concreting shall be carried on at such a rate that the concrete is at all times plastic and flows readily into the spaces between the bars. No concrete that has partially hardened or been contaminated by foreign materials shall be deposited in the work, nor shall retempered concrete be used.
 - (2) When concreting is started, it shall be carried on as a continuous operation until the placing of the section is completed.
 - (3) All concrete shall be thoroughly consolidated by mechanical vibrators during the placing operation and shall be thoroughly worked around the reinforcement and embedded fixtures and into the corners of the forms. Mechanical vibrators shall be applied directly to the concrete and used only under experienced supervision. Vibrators shall not be secured to forms or reinforcement. Compaction shall be carried on continuously with the placing of concrete. Keep a minimum of two vibrators on the job during concreting operations.
 - (4) Protect adjacent surfaces from concrete drippings, spillage and splashes. Hardened or partially hardened splashes or accumulations of concrete on forms or reinforcement shall be removed before the work proceeds. Clean all damaged surfaces immediately.
 - (5) All conveyances shall be thoroughly cleaned at frequent intervals during the placing of the concrete, and before beginning a new run of concrete all hardened concrete and foreign materials shall be removed from the surfaces.
 - (6) The project superintendent shall mark on the drawings the time and date of the placing of the concrete in the different areas and members. Location of concrete batches from which concrete test cylinders are made shall also be recorded on these drawings. Such drawings shall be kept on file at the job until its completion and shall be subject to the inspection of the Owner's Representative at all times.

16. REPAIR OF SURFACE DEFECTS

- (A) Surface defects, including tie holes, shall be repaired immediately after form removal.
- (B) All honeycombed and other defective concrete shall be removed down to sound concrete. If chipping is necessary, the edges shall be perpendicular to the surface or slightly undercut. No feathered edges will be permitted. The area to be patched and an area at least 6 in. wide surrounding it shall be dampened to prevent absorption of water from the patching mortar. A bonding grout shall be prepared using a mix of approximately 1-part cement to 1-part fine sand passing a No. 300 mesh sieve, mixed to the consistency of thick cream, and then well brushed into the surface.
- (C) The patching mixture shall be made of the same materials and of approximately the same proportions as used for the concrete, except that the coarse aggregate shall be omitted, and the mortar shall consist of not more than 1-part cement to 2-1/2 parts sand by damp loose volume. White Portland cement shall be substituted for a part of the gray Portland cement on exposed concrete in order to produce a color matching the color of the surrounding concrete, as determined by a trial patch. The quantity of mixing water shall be no more than necessary for handling and placing. The patching mortar shall be mixed in advance and allowed to stand with frequent manipulation with a trowel, without addition of water, until it has reached the stiffest consistency that will permit placing.
- (D) After surface water has evaporated from the area to be patched, the bond coat shall be well brushed into the surface. When the bond coat begins to lose the water sheen, the premixed patching mortar shall be applied. The mortar shall be thoroughly consolidated into place and struck off so as to leave the patch slightly higher than the surrounding

surface. To permit initial shrinkage, it shall be left undisturbed for at least 1 hr. before being finally finished. The patched area shall be kept damp for 7 days. Metal tools shall not be used in finishing a patch in a formed wall that will be exposed.

- (E) After being cleaned and thoroughly dampened, all tie holes shall be filled solid with patching mortar.

17. FINISHING OF FORMED SURFACES

- (A) After removal of forms all concrete surfaces not exposed to view shall be finished with a rough form finish and all surfaces exposed to view shall be finished with a smooth form finish.
- (B) For a rough form finish, tie holes and defects shall be patched and fins exceeding 1/4 in. in height shall be chipped off or rubbed off. Otherwise, surfaces may be left with the texture imparted by the forms.
- (C) For a smooth form finish, the form facing material shall produce a smooth, hard, uniform texture on the concrete. The arrangement of the facing material shall be orderly and symmetrical, with the number of seams kept to the practical minimum. Tie holes and defects shall be patched. All fins shall be completely removed.

18. SLABS

- (A) Preparation of subgrade for slabs on grade.
 - (1) All bearing material shall be inspected by the independent testing agency prior to placement of all slabs on grade. The geotechnical engineer shall be the sole judge as to the suitability of the bearing material.
 - (2) Termite treatment is to be placed per manufacturer's recommendations during the slab preparation.
 - (3) The granular subgrade (if required) shall be well drained and of adequate and uniform loadbearing nature.
 - (4) Place granular subbase as recommended by the Geotechnical Report to thickness shown on the drawings and compact to a minimum of 98% of maximum density at optimum moisture per ASTM D698. Recompact immediately prior to placement of vapor retarder.
 - (5) Place vapor retarder over subgrade. Lap joints a minimum of twelve inches. All joints shall be continuously taped/sealed. Care shall be taken to prevent tears in the vapor retarder. Surface preparation, placement, joint sealing, protection and repair shall meet ASTM E1643.
 - (6) The subgrade shall be free of frost before concrete placing begins. If the temperature inside a building where concrete is to be placed is below freezing it shall be raised and maintained above 50° F long enough to remove all frost from the subgrade.
- (B) Edge forms and intermediate screed strips shall be set accurately to produce the designated elevations and contours of the finished surface and shall be sufficiently strong to support vibrating screeds or roller pipe screeds. The concrete surface shall be aligned to the contours of screed strips by the use of strike-off templates or acceptable compacting type screeds.
- (C) Placement
 - (1) Mixing and placing shall be carefully coordinated with finishing. Concrete shall not be placed on the subgrade or forms more rapidly than it can be spread, straightedged, and darbied or bull floated. These operations must be performed before bleeding water has an opportunity to collect on the surface. Placement of concrete for slabs shall be accomplished using a pump only.

- (2) To obtain good surfaces and avoid cold joints, the size of finishing crews shall be planned with due regard for the effects of concrete temperature and atmospheric conditions on the rate of hardening of the concrete.
 - (3) Concrete floor slabs shall be placed by means of pumping and shall be thoroughly consolidated. Internal vibration shall be used along the bulkheads of slabs on grade. Consolidation of slabs shall be obtained with vibrating screeds, roller pipe screeds, internal vibrators, or other approved means.
- (D) Interior Concrete Floor Slab Surface Profile Tolerances
- (1) Slab on Grade Flatness and Levelness Tolerances:
 - (a) Floor Flatness Number: F_f
Specified Overall Value = 35
Minimum Local Value = 24
 - (b) Floor Levelness Number: F_l
Specified Overall Value = 25
Minimum Local Value = 18
 - (c) ACI Straightedge Level Tolerance of 1/8" in 10'-0" per ACI 117R-90
 - (2) Suspended Slab Flatness Tolerances:
 - (a) Floor Flatness Number: F_f
Specified Overall Value = 30
Minimum Local Value = 20
 - (b) ACI Straightedge Level Tolerance of 1/8" in 10'-0" per ACI 117R-90
 - (3) F_f and F_l tolerances shall be tested in accordance with ASTM E 1155. Actual overall F-numbers shall be calculated using the inferior/superior area method.
 - (4) All floor tolerance methods shall be made immediately prior to the flooring installer prepares to install the flooring. Coordinate with the Owner and General Contractor prior to testing. Results of all slab profile tests shall be provided to the General Contractor prior to the installation of the flooring.

19. FINISHES

- (1) General: All finishes must be adequate in all respects to receive material to be applied to it, true to line and free of defects or blemishes. No driers, dry cement, nor cement-sand mixture shall be used in connection with any finish surfaces to absorb water, stiffen mix or for any other purpose.
- (2) Finish
 - (a) Floated finish - After the concrete has been placed, consolidated, struck off, and leveled, the concrete shall not be worked further until ready for floating. Floating with a hand float or with a bladed power trowel equipped with float shoes, or with a powered disc float shall begin when the water sheen has disappeared and when surface has stiffened sufficiently to permit the operation. Adjustments shall be made during or after the first floating as required to meet or exceed the minimum specified floor flatness and levelness criteria. The slab shall then be refloated immediately to a uniform sandy texture.
 - (b) Troweled finish - The surface shall first be float-finished as specified above. It shall next be power troweled. The first troweling after power floating shall produce a smooth surface, which is relatively free of defects, but which may still show some trowel marks. Additional trowelings shall be done by power trowel after the surface has hardened sufficiently. The final troweling shall be done when a ringing sound is produced as the trowel is moved over the surface. The finished surface shall be essentially free of trowel marks, uniform in texture and

appearance and shall meet or exceed the minimum specified floor flatness and levelness criteria. On surfaces intended to support floor coverings, any defects of sufficient magnitude to show through the floor covering shall be removed by grinding.

- (c) Light broom finish - The surface shall first be trowel-finished as specified above. Immediately after final troweling, it shall be given a light transverse texture by drawing a broom across the surface.
- (d) Rough broom finish - Immediately after the concrete has received a float finish as specified above, it shall be given a coarse transverse scored texture by drawing a broom or burlap belt across the surface.

(3) Schedule of finishes:	
Interior floor slabs	Troweled/Light Broom (as required by the drawings)
Equipment Pads	Troweled
Exterior stairs and sidewalks	Light Broom
Exterior slabs except stairs and sidewalks	Rough Broom

20. CURING AND PROTECTION

- (A) Beginning immediately after placement, concrete shall be protected from premature drying, excessively hot or cold temperatures, and mechanical injury, and shall be maintained with minimal moisture loss at a relatively constant temperature for the period necessary for hydration of the cement and hardening of the concrete.
- (B) Apply curing compound immediately after completion of placement and finishing. The compound shall be applied in accordance with the recommendations of the manufacturer immediately after any water sheen which may develop after finishing has disappeared from the concrete surface. For any surface against which additional concrete or other material is to be bonded, unless it is proven that the curing compound will not prevent bond, positive measures shall be taken to remove it completely from areas to receive bonded applications.
- (C) Moisture loss from surfaces placed against wooden forms or metal forms exposed to heating by the sun shall be minimized by keeping the forms wet until they can be safely removed. After form removal apply curing compound in accordance with the recommendations of the manufacturer. For any surface against which additional concrete or other material is to be bonded, unless it is proven that the curing compound will not prevent bond, positive measures shall be taken to remove it completely from areas to receive bonded applications.
- (D) Temperature, Wind, and Humidity
 - (1) Cold weather - When the mean daily outdoor temperature is less than 40° F., the temperature of the concrete shall be maintained between 50° and 70° F. for 7 days. When necessary, arrangements for heating, covering, insulating, or housing the concrete work shall be made in advance of placement and shall be adequate to maintain the required temperature without injury due to concentration of heat. Combustion heaters shall not be used during the first 24 hours unless precautions are taken to prevent exposure of the concrete to exhaust gases which contain carbon dioxide.
 - (2) Hot weather - When necessary, provisions for windbreaks, shading, fog spraying, sprinkling, ponding, or wet covering with a light colored material shall be made in advance of placement, and such protective measures shall be taken as quickly as concrete hardening and finishing operations will allow.

- (3) Rate of temperature change - Changes in temperature of the air immediately adjacent to the concrete during and immediately following the curing period shall be kept as uniform as possible and shall not exceed 5° F. in any 1 hour or 50° F. in any 24-hour period.
- (E) Protection from mechanical injury - 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.

21. EVALUATION AND ACCEPTANCE OF CONCRETE

- (A) Test results for standard molded and standard cured test cylinders shall be evaluated separately for each specified concrete mix design. Such evaluation shall be valid only if tests have been conducted in accordance with the specifications.
- (B) For evaluation, each specified mix design shall be represented by at least five sets of tests.
- (C) The strength level of the concrete will be considered satisfactory so long as the averages of all sets of three consecutive strength test results equal or exceed the specified strength, f'c, and no individual strength test result falls below the specified strength, f'c, by more than 500 psi. Should cylinder tests fail to meet these requirements or if deficient construction is suspected by the Owner's Representative, core tests may be required, and the cost of such tests shall be paid by the Contractor.
- (D) Testing by impact hammer, sonoscope, or other nondestructive device may be used to determine relative strengths at various locations in the structure as an aid for selecting areas to be cored. Such tests shall not be used as a basis for acceptance or rejection.
- (E) Where core tests are required, cores at least 2 in. in diameter shall be obtained and tested in accordance with "Methods of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete" (ASTM C42). The cores shall be air dried (temperature 60° to 80° F, relative humidity less than 60 percent) for 7 days before test and shall be tested dry.
- (F) At least three representative cores shall be taken from each member or area of concrete in place that is considered potentially deficient. The location of cores shall be determined by the Owner's Representative so as to least impair the strength of the structure. If, before testing, one or more of the cores shows evidence of having been damaged subsequent to or during removal from the structure, it shall be replaced.
- (G) Concrete in the area represented by a core test will be considered adequate if the average strength of the cores is equal to at least 85 percent of and if no single core is less than 75 percent of the specified strength, f'c.
- (H) Core holes shall be filled with low slump concrete or mortar.

22. ACCEPTANCE OF STRUCTURE

- (A) Completed concrete work which meets all applicable requirements will be accepted without qualification.
- (B) Completed concrete work which fails to meet one or more requirements, but which has been repaired to bring it into compliance will be accepted without qualification.
- (C) Completed concrete work which fails to meet one or more requirements, and which cannot be brought into compliance may be accepted or rejected by the Owner's Representative. In this event, modifications may be required to assure that remaining work complies with the requirements.
- (D) The cost of any additional tests or analysis, including additional architectural and engineering services, performed to prove the adequacy of the concrete work, shall be borne by the Contractor.

END OF SECTION

DIVISION 4 - MASONRY

PART 1: GENERAL

1. RELATED DOCUMENTS

- (A) The provisions of Division 1 apply to the work specified in this Section.
- (B) Unless otherwise shown or specified, the work shall conform to the most current version of ACI 530.1, "Specification for Concrete Masonry Structures".

2. SCOPE OF WORK

- (A) Furnish all labor, materials, tools, equipment and scaffolding required for completing masonry work, and related items indicated on the Drawings and specified herein.

3. RELATED WORK SPECIFIED ELSEWHERE

- (A) Sealants in masonry construction joints are specified in Section 07901 "Joint Sealants".
- (B) Steel lintels and miscellaneous steel frames are specified in Section 05500 "Miscellaneous Metals".
- (C) Wood nailers and blocking built into unit masonry are specified in Section 06100 "Carpentry".
- (D) Hollow metal frame anchors are specified in Section 08101 "Hollow Metal Work".
- (E) Water Repellent is specified in Section 09900 "Painting".
- (F) Dampproofing of concrete masonry units is specified in Section 07115 "Bituminous Dampproofing".

4. SUBMITTALS

- (A) Concrete Block Strength Certification: Submit manufacturer's certification, that all concrete block to be used for this project will be normal weight, complies with the requirements of ASTM C90, and has a minimum net area compressive strength of 1900 psi when tested in accordance with ASTM C140.
- (B) Standard Brick Strength Certification: Submit manufacturer's certification that all standard brick for this project complies with the requirements of ASTM C216, latest edition, Grade SW, type FBX or better.
 - (1) Unit Compressive Strength: 3,000 psi minimum average compressive strength.
- (2) Initial Rate of Absorption: Less than 20G/30 square inches per minute when tested per ASTM C67.
- (3) Efflorescence: Provide brick that has been tested according to ASTM C67 and is rated "not efflorescenced".
 - (A) Maximum saturated coefficient 0.78.
 - (B) Minimum IRA 7g/30 sq. in. Maximum IRA 30g/30 sq. in.±.
 - (C) Submit product data for custom and standard concrete masonry units, standard brick, premolded joint filler, joint reinforcement, grout, and other accessories, for approval.
 - (D) Review of submittals will cover general design only. In no case shall this review relieve the Contractor of the responsibility for general or detailed dimension, quality or quantity of materials, or any other conditions, functions, performance or guarantees required.
 - (E) Submit samples of standard and custom concrete masonry units, standard face brick, precast sill materials and mortar colors to Owner for approval.

- (F) Construct a sample wall 4' x 4' minimum for review by the Owner, of unit masonry, mortar color and finish as specified. Provide with an expansion joint and colored sealant, if requested. Approved sample wall is to remain intact until all masonry work on project is accepted. Brace wall to avoid falling.
- (G) Submit masonry grout mix design.

5. REFERENCE STANDARDS

- (A) Unless otherwise indicated or specified, the work shall conform to the following Standards:
 - (1) American Concrete Institute (ACI)
 - (a) The most current version of ACI 530.1, "Specification for Concrete Masonry Structures".
 - (2) American Society for Testing and Materials (ASTM) (current version)
 - (a) ASTM A36, Standard Specification for Structural Steel.
 - (b) ASTM A82, Standard Specifications for Cold-Drawn Steel Wire for Concrete Reinforcement.
 - (c) ASTM A153, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - (d) ASTM A167, Standard Specification for Stainless and Heat-Resisting Plates, Sheet and Strip.
 - (e) ASTM A307, Standard Specification for Low-Carbon Steel Externally and Internally Threaded Standard Fasteners.
 - (f) ASTM A366, Standard Specification for Steel, Carbon, Cold-Rolled Sheet, Commercial Quality.
 - (g) ASTM A615, Standard Specification for Deformed Billet-Steel Bars for Concrete Reinforcement.
 - (h) ASTM A641, Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
 - (i) ASTM C90, Standard Specification for Hollow Load-Bearing Concrete Masonry Units.
 - (j) ASTM C140, Standard Methods of Sampling and Testing Concrete Masonry Units.
 - (k) ASTM C270, Standard Specifications for Mortar for Unit Masonry.
 - (l) ASTM C476, Standard Specifications for Grout for Reinforced Masonry.
 - (m) ASTM D2240, Standard Test Methods for Rubber Properties - Durometer Hardness.
 - (n) ASTM E447, Methods of Test for Compressive Strength of Masonry Prisms.
 - (3) National Concrete Masonry Association (NCMA)
 - (a) Technical Note No. 6, Estimating the Fire Resistance of Concrete Masonry.
 - (b) Technical Note No. 35, Fire Safety with Concrete Masonry.

PART 2: PRODUCTS

6. CONCRETE MASONRY UNITS

- (A) Size: Manufacturer's standard sized split-face units with nominal face dimensions of 16" long by 4" or 8" high (15-5/8" by 11 5/8", 7 5/8", 5 5/8" or 3 5/8" actual), unless otherwise noted on the drawings. Thickness, finish and color to be as indicated on drawings.
- (B) Obtain masonry units from one manufacturer, of uniform texture, size and color for each kind required, for each continuous area and visually related areas.
- (C) Provide special shapes where shown and where required for lintels, corners, jambs, sash, control joints, headers, bonding and other special conditions.
- (D) Masonry Units exposed to the exterior shall have integral water repellent (Dryblock or Master Builder color cure XB, or approved equal). Wall systems employing standard gray masonry units as back-up to brick veneer, natural stone veneer or thinset stone panels or concrete masonry units which are to be painted shall not have integral waterproofing. Veneer systems with an air space shall have bituminous dampproofing applied to the surface of the concrete masonry back-up in the air space.
- (E) Wherever a fire-resistance classification is shown or scheduled for unit masonry construction (4 hour, 3 hour and similar designations) comply with the requirements for materials and installation established by the National Concrete Masonry Association Tech #6 and #35 and other governing authorities for the construction shown.

7. CUSTOM UNITS (If indicated on the drawings)

- (A) Refer to drawings for color and location of integrally colored units (i.e., white, brown, gray, beige, etc.).
- (B) Refer to drawings for type and location of architectural or customized units (i.e., smooth, split-face, fluted, scored, rubbed, etc.).
- (C) Refer to the drawings for size, color, and location of precast concrete sills to match color of concrete masonry units. Precast units shall have uniform color and uniform fine aggregate surface texture. Provide sample to Owner for approval.
- (D) Minimum length to be 48". Color shall be white unless noted otherwise on the drawings. Sill bed joint mortar color to match precast sills.

8. STANDARD BRICK: ASTM C216 - if indicated on drawings

- (A) Obtain masonry units from one manufacturer; Manufacturer as noted on the drawings, or as otherwise approved by Owner's Representative. Brick shall be of uniform texture, size and color for each kind required, for each continuous area and visually related area.
- (B) Size: Manufactured to the following dimensions:
 - (1) Modular: 3-1/2" to 3-5/8" wide by 2-1/4" to 2-3/8" high by 7-1/2" to 7-5/8" long with standard voids. Solid brick shall be of same size without voids.
- (C) Surface Coloring: Brick shall withstand 50 cycles of freezing and thawing per ASTM C67 with no observable difference in the applied finish when viewed from 10 feet.
- (D) Products: Submit to compliance with requirements, provided products as manufactured by company as indicated on the drawings or herein.
- (E) Special Shapes: Where shown on the drawings; manufacturer shall provide shop drawings for CASCO approval prior to manufacturing special shapes.

- (F) Bond: Shall be running bond with tooled joints unless otherwise shown on the drawings. Tooling shall conform to the guidelines provided in BIA Technical Notes 7B, revised.
 - (G) Mortar: Conventional mortar shall conform to ASTM C-270 under guidelines provided in BIA Technical Notes Series 8.
9. NATURAL AND CULTURED STONE VENEER – if indicated on the drawings
- (A) Obtain natural and cultured stone from one manufacturer; Manufacturer as noted on the drawings.
 - (B) Size: As noted on the drawings.
 - (C) Color and Texture: As noted on the drawings.
 - (D) Bond/Pattern: As noted on the drawings. Tooling shall conform to the guidelines provided in BIA Technical Notes 7B, revised.
 - (E) Mortar: Conventional mortar shall conform to ASTM C-270 under guidelines provided in BIA Technical Notes Series 8.
10. MORTAR MATERIALS
- (A) Mortar shall conform to ASTM C270, Type S, Portland Cement-Lime. Minimum 28-day compressive strength shall be 1,800 psi.
 - (1) Aggregate: Sand ASTM C144, Color White unless noted otherwise on the drawings.
 - (B) For job site pigmented mortar use mineral pigments and, with exception of carbon black, limit to 10 percent of cement content, and carbon black to 1-1/2 percent of cement content. Color pigments shall be comparable in quality to material manufactured by Frank D. Davis Co., Beltsville, Maryland.
 - (C) Premixed colored masonry mortar shall match adjacent masonry units unless noted otherwise on the drawings.
 - (D) Mortar in masonry construction exposed to the exterior shall have a water repellent additive within mortar, including at concrete masonry units, natural stone veneer, brick veneer, cast stone, and precast concrete. Concrete masonry units which are to be painted, coated with bituminous dampproofing, or clad with thinset stone panels shall not have a water repellent additive in the mortar.
11. GROUT
- (A) Grout shall conform to ASTM C476. Minimum 28-day compressive strength shall be 1,800 psi.
12. REINFORCING BARS
- (A) Reinforcing bars shall conform to ASTM A615, Grade 60, unless noted otherwise.
13. JOINT REINFORCING
- (A) Continuous wire reinforcing (joint reinforcing) shall be truss type fabricated units (**no substitutions**) with a single pair of 9 gage side rods and 9 gage cross rods fabricated from cold-drawn steel wire complying with ASTM A82, and galvanized to conform to ASTM A153, Class B-2.
 - (B) Manufacturers offering products to comply with requirements for joint reinforcing include the following:
 - Hohmann & Barnard

Dur-O-Wall Company
Wire-Bond
AA Wire Products Company

14. ANCHORS, TIES, AND METAL ACCESSORIES

- (A) Anchors, ties, and metal accessories shall conform to the following requirements where applicable:
- Sheet Steel: ASTM A366, 16 gauge minimum, galvanized to conform to ASTM A153.
- Structural Steel: ASTM A36 galvanized to conform to ASTM A153.
- Anchor Bolts: ASTM A307 galvanized to conform to ASTM A153.
- Stainless Steel: ASTM A167, Type 304.
- (B) Adjustable Anchor System for Stone Veneer shall be fabricated from cold-drawn steel wire complying with ASTM A82, and hot dip galvanized to conform to ASTM A153, Class B-2 Hohmann & Barnard Tie-HVR-195V Anchor System – Truss Type with 9-gauge side and cross wire, 3/8" vertical J-hooks and 3/16" diameter ties, or equal as provided by the other listed anchor manufacturers **(NO SUBSTITUTIONS)**.
- (C) Stone or Brick Veneer Ties shall be fabricated from cold-drawn steel wire complying with ASTM A82, and hot dip galvanized to conform to ASTM A153, Class B-2 Hohmann & Barnard DW-10 with 12-gauge anchor, or equal as provided by the other listed anchor manufacturers **(NO SUBSTITUTIONS)**. Fasteners for attachment to concrete masonry shall be either Hilti Kwik-Con II+ Torx Head Masonry Screws or Powers Zamac Nailin Nail Anchor of appropriate length and diameter.
- (D) Manufacturers offering products to comply with requirements for anchors include the following:
- Hohmann & Barnard
Dur-O-Wall Company
Wire-Bond
AA Wire Products Company

15. MASONRY ACCESSORIES, FINISHES, AND RELATED ITEMS

- (A) Masonry Cleaner: "Sure Klean Vanatrol" as manufactured by The Process Solvent Company.
- (B) Premolded Joint Filler: Premolded neoprene filler strip to comply with ASTM D 1056, RE41, compressible up to 35% thickness and width to suit joint in which used, minus depth necessary for caulking work. Joint filler must be compatible with sealant.
- (C) Control Joints: Provide PVC control joints as manufactured by Hohmann & Barnard or Dur-O-Wall **(NO SUBSTITUTIONS)**. Construct by using sash block units with preformed gaskets and continuous sealant on each side. Gasket shall be wide flange type, cross-shaped in section and designed to fit the full width of sash block less depth required for continuous caulk sealant on each side.
- (1) For 8" block use Hohmann & Barnard VS-8 PVC or Dur-O-Wal DA2006 PVC, **NO SUBSTITUTIONS**.
- (2) For 12" block use Hohmann & Barnard VS-12 PVC or Dur-O-Wal DA2007 PVC, **NO SUBSTITUTIONS**.
- (D) Make building wall control joints and expansion joints weather tight on both the interior and exterior side of the wall joints.
- (E) Control Joint Spacing: If location of control joints is not shown, place vertical joints spaced not to exceed 24'-0" o.c. for concrete masonry wythe. Locate control joints at points of natural weakness in the masonry work and/or as shown on the drawings.

- (F) Concealed Masonry Flashing (thru-wall or spandrel beam flashing): Minimum of 40 mil membrane consisting of 32 mils of pliable, highly adhesive rubberized asphalt, integrally bonded to 8 mils high density, cross laminated polyethylene film. Adhere to stainless steel drip edge at exposed edges for door and window openings and foundation flashing.
 - (G) Exterior Weep Holes: provide the following:
 - (1) Round plastic tubing: minimum density polyethylene, 3/8" outside diameter by 4" long.
 - (H) Rebar Positioners: Provide Type RB Rebar Positioners as manufactured by Hohmann & Barnard (NO SUBSTITUTIONS).
16. GLASS BLOCK UNITS - if indicated on drawings
- (A) Standard units shall be nominal 4" x 8", 6" x 6", 8" x 8" or 12" x 12" x 4" width as indicated, SEVES Glass Block or Quality Glass Block. Refer to drawings for pattern. **NO SUBSTITUTIONS.**
 - (1) Accessories: White Mortar, ASTM C270, Type N; expansion strips, reinforcing, anchors, sealants, etc. as indicated or required for a complete installation.
17. WALL DRAINAGE SYSTEMS
- (A) Manufacturer: Mortar Net USA, Ltd. **NO SUBSTITUTIONS**
 - (1) Contact: 326 Melton Road, Burns Harbor, IN 46304; Telephone: (880) 664-6638, (219) 939-3870; Fax: (219) 787-5088, E-mail: info@mortar.net Website: www.mortarnet.com
 - (2) Masonry Veneer over CMU
 - (a) Mortar Net MN 10-1: 10" (254mm) high x 1" (25.4 mm) thick material.
 - (b) Mortar Net MN 10-4: 10" (254mm) high x 0.4" (10.2 mm) thick material.
 - (c) Mortar Net MN 10-2: 10" (254mm) high x 2" (51 mm) thick material.
 - (3) Single Wythe CMU
 - (a) Blok-Flash pans and cross bed webs (size to correspond with block size) with 7"x 16" mesh Drainage Matte at all non-grouted cores.

PART 3: EXECUTION

17. PRODUCT DELIVERY, STORAGE AND HANDLING
- (A) Masonry units shall be sound and free of chips and major cracks which would impair the strength of permanence of the construction.
 - (B) Masonry units shall be kept dry during delivery and while stored at the site. Protect units with waterproof coverings to minimize moisture absorption.
 - (C) Store masonry units on level platforms permitting air to circulate under stack.
18. PREPARATION
- (A) Make layout in accordance with project drawings.
 - (B) Remove laitance, loose aggregate, and anything that may prevent mortar from bonding to foundation.
 - (C) Do not proceed with masonry construction, until permitted, when the following foundation tolerances are not met:

Horizontal alignment (Variation from plan dimension)	+1/4 in. in 10 ft. 1/2 in. max. variation
Vertical alignment (Variation from level)	+1/4 in. in 10 ft. 1/2 in. max. variation

- (D) Mortar (cold weather) - Use acceptable cold weather precautions when temperature is less than 40°F.
- (E) Mortar (hot weather) - Use acceptable hot weather precautions in placing and curing of the mortar when air temperature exceeds 100°F and when there is a drying wind at temperatures above 90°F.

19. PLACING MASONRY UNITS

- (A) Construct CMU and brick masonry with experienced personnel, using manufactured masonry units and materials necessary to hold units in desired position. There shall be an experienced foreman on the job at all times.
- (B) Thickness: Build walls and other masonry construction to the full thickness shown, except, build single-wythe walls to actual thickness of the masonry units, using units of nominal thickness shown or specified. Use concrete units that are sound, dry, clean and free from ice and frost when placed.
- (C) Cut masonry units with motor-driven saw designed to cut masonry with clean, sharp, unchipped edges. Cut units as required to provide pattern shown and to fit adjoining work neatly. Use full units without cutting wherever possible.
- (D) Dampening of concrete units before or during construction shall not be permitted unless made necessary by unusual conditions and approved by CASCO.
- (E) Adjust each unit to final position in wall while mortar is still soft and plastic. Remove any unit disturbed after mortar has stiffened and re-lay with fresh mortar.
- (F) Align vertical cells to be filled with grout to provide a continuous unobstructed opening not less than 3" x 4".
- (G) Pattern Bond: Lay all block in the bond pattern shown or if not shown or specified in a running bond pattern with vertical joint in each course centered on units in courses above and below. Bond and interlock each course of each wythe at corners, unless otherwise shown. Do not use units with less than 4" horizontal face dimensions at corners or jambs.
- (H) Layout walls in advance for accurate spacing of surface bond patterns with uniform joint widths and to properly locate openings, movement- type joints, returns and offsets. Avoid the use of less-than-half- size units at corners, jambs and wherever possible at other locations.
- (I) Lay-up walls plumb and true and with courses level, accurately spaced and coordinated with other work.
- (J) Stopping and Resuming Work: Rack back 1/2 masonry unit length in each course; do not tooth. Clean exposed surfaces of set masonry units and mortar prior to laying fresh masonry.
- (K) Built-in Work:
 - (1) As the work progresses, build-in items specified under this and other Sections of these Specifications. Fill in solidly with masonry around built-in items.
 - (2) Fill space between hollow metal frames and masonry solidly with mortar.
 - (3) Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath in the joint below and rod mortar or grout into core.
 - (4) Non-bearing Interior Partition Walls: Build full height of story to underside of structure above, unless otherwise shown.

- (L) Bracing and shoring: Exterior masonry walls have been designed to span vertically as simple spans from floor to roof and are dependent upon the completed roof structure, metal roof deck, and completion of all masonry walls for stability and for resistance to wind and seismic forces. The Contractor is solely responsible for providing all necessary bracing as required for construction loads, for stability, and for resistance to wind and seismic forces until the entire structure is complete. The shoring shall not rely on any moment resistance capacity of the footings.
- (1) Interior brick on cmu masonry wall shall be reinforced as shown on the drawings and shall comply with all seismic and wind loads per governing Codes.

20. REINFORCEMENT

(A) Preparation

- (1) Place all reinforcement for masonry in accordance with project documents.
- (2) Use metal reinforcement at time of placement which is free of mud, oil, or other coatings that adversely affect bonding capacity.
- (3) Metal reinforcement with rust, mill scale, or a combination of both may be used provided the minimum dimensions, including height of deformations, and weight of wire brushed specimens are not less than required by applicable ASTM specification.
- (4) Do not use metal reinforcement with kinks or unrequired bends. Do not straighten nor repair bars in a manner that will damage the bar or adjacent construction.

(B) Fabrication

- (1) Fabricate bars without damaging the materials.
- (2) Bending of bars
- (a) Perform bending on unheated bars, unless otherwise acceptable.
- (b) Bars larger than #5 shall not be field bent unless acceptable to CASCO Project Manager.
- (c) The diameter of bend measured on the inside of the bar, other than for stirrups, shall not be less than the values listed below except that for Grade 40 bars in sizes #3 to #11 inclusive, with turns not exceeding 180°, the minimum diameter shall be five bar diameters.

MINIMUM DIAMETERS OF BEND

Bar Size	Minimum Diameter
#3 through #8	6 bar diameters
#9, #10, and #11	8 bar diameters

- (d) Inside diameter of bend for stirrups shall not be less than four bar diameters.
- (3) Standard hooks - Use one of following:
- (a) A 180° turn plus extension of at least four bar diameters but not less than 2-1/2 in. at free end of bar.
- (b) A 90° turn plus extension of at least 12 bar diameters at free end of bar.
- (c) For stirrup anchorage only, either a 90° or a 135° turn plus an extension of at least six bar diameters but not less than 2-1/2 in. at free end of bar.
- (4) Welding - Welding of reinforcing bars is not permitted.

- (5) Joint reinforcement
 - (a) Reinforcement of two or more deformed longitudinal wires weld connected with cross wires, forming a truss design.
 - (b) Make out-to-out spacing of longitudinal wires 2 in. less than the nominal width of the wall or wythe.
 - (c) Space welded contacts or cross wires with each longitudinal wire not more than 16 in.
 - (d) Provide joint reinforcement in flat sections 10 to 20 ft. long, except that factory pre-fabricated corner reinforcements and other special shapes may be shorter.
- (6) Anchors and ties - Fabricate anchors and ties in one of the following ways:
 - (a) Wire mesh ties shall be No. 16 gage minimum 1/2 in. mesh steel wire, 12 in. minimum length and 1-1/2 in. less than the nominal width of wall.
 - (b) Rigid steel anchors at intersecting walls shall be 1-1/2 x 1/4 x 24 in. minimum with ends turned up 2 in. minimum and shall conform to ASTM A36.
 - (c) Dovetail anchors shall be sheet steel 0.06 in. minimum thickness, 1 in. wide, and turned up 1/4 in. at outer end.
 - (d) Corrugated or crimped metal ties shall be sheet 0.03 in. minimum thickness, 7/8 in. wide, 6 in. long.
- (C) Placing reinforcing bars
 - (1) Embed bars in grout and provide a minimum masonry cover not less than the following:
 - (a) Minimum 2" where exposed to earth or weather.
 - (b) Minimum 1-1/2" where not exposed to earth or weather.
 - (2) Make splices in bars as shown on project drawings unless otherwise acceptable to CASCO Project Manager.
 - (3) Provide clear distance between horizontal bars in layer not less than the diameter of the bars, nor 1", except that they may be bundled in pairs.
 - (4) Provide clear distance between vertical bars not less than one and one-half times the bar diameter, nor 1-1/2", except that they may be bundled in pairs.
 - (5) Provide clear distance between vertical bars not less than one and one-half times the bar diameter, nor 1-1/2", except that they may be bundled in pairs.
 - (6) Lay horizontal bars as work progresses.
 - (7) Hold vertical bars in hollow unit masonry in place at 200 bar diameters or 10 ft. maximum on center whichever is lesser.
- (D) Placing Joint Reinforcement
 - (1) Place masonry joint reinforcement so that longitudinal wires are located over face-shell mortar beds and are embedded in mortar or grout for their entire length with minimum cover of 5/8" when exposed to weather or earth and 1/2" at other locations.
 - (2) Joint reinforcement sections for corners and other wall intersections, are to be factory prefabricated for placement at these locations.

- (3) Unless noted otherwise, joint reinforcement shall not be continuous through a control joint or an expansion joint.
 - (4) Lap the ends of joint reinforcement 6" for deformed wire and 12" for plain wire when spliced.
 - (4) Space continuous horizontal reinforcing as follows:
 - (a) For multi-wythe walls (solid or cavity) where continuous horizontal reinforcing also acts as structural bond or tie between wythes, space reinforcing as required by Code but not more than 16" o.c. vertically.
 - (b) For single-wythe walls, space reinforcing at 16" o.c. vertically, unless otherwise shown.
 - (6) Reinforce masonry openings greater than 1'-0" wide, with horizontal joint reinforcing place in 2 horizontal joints approximately 8" apart, both immediately above the lintel and immediately below the sill. Extend reinforcing a minimum of 2'-0" beyond jambs of the opening, bridging control joints where provided.
- (E) Placing anchors, ties, and metal accessories:
- (1) Install required anchors, ties, and metal accessories as the masonry construction progresses.
 - (2) Set bolts and inserts vertically in the top of the walls, pilasters, beams or columns 3" minimum from any face in masonry 7" or more in thickness, and at the center line in thinner masonry sections.
 - (3) Adjust shelf angles as required to keep the masonry level and at required elevation. Provide anchorage as detailed in the project documents.
 - (4) Hold all metal accessories to masonry by firmly embedding anchorage into grout or mortar 3" minimum.

21. MORTAR

- (A) Mixing mortar - Mix all cementitious materials and aggregate in mechanical mixers for a minimum period of 5 minutes, after all materials are placed in the mixer, with the amount of water required to produce the desired workability.
- (B) Make workability or consistency of mortar on the board such that it can be worked with the trowel. Water for tempering shall be available on scaffold at all times.
- (C) Do not permit mortar to stand more than 1 hr. without remixing.
- (D) Discard mortar which has begun to set or is not used within 2-1/2 hr. after initial mixing. Retemper mortar which has stiffened due to evaporation to restore its workability.

22. MORTAR BEDDING AND JOINTS

- (A) Place hollow units with full mortar bedment in all courses of piers, columns, pilaster, in starting courses on footings and solid foundation walls, and where adjacent to cells or cavities to be reinforced or filled with grout or concrete. In other cases, provide cross web bedding when required. Split-face block shall be used for starter course on footings and above, to ensure that no smooth-face block is exposed.
- (B) Place hollow units with head joints tightly mortar bedded for a minimum depth from each face equal to the masonry unit face shell thickness.
- (C) Make horizontal and vertical face joints 3/8" thick unless otherwise required. Shove vertical mortar joints tight, to provide full head joints.
- (D) Tool mortar joints in exposed exterior surfaces when thumbprint hard with a round

jointer unless otherwise required. Point joints tight in unparged masonry below grade.

- (E) Remove mortar protrusions extending more than 1/2" into cells or cavities to be grouted.
- (F) Fill horizontal joints between top of masonry partitions and underside of slabs or beams with mortar unless otherwise acceptable to CASCO Project Manager.
- (G) Provide joint sealant to depth of 1/4" unless otherwise required on both the exterior and interior surfaces at control joints and at other locations where sealed joints are indicated. Rake joints and tool sealant smooth and uniform.
- (H) In temperatures exceeding 100°F, do not lay out mortar beds ahead of placing of units. Use a very light fog spray, not sufficient to penetrate the masonry, on vertical surface of masonry to aid in mortar curing during first 24 hr. after placing units.
- (I) Do not insert through wall flashing or other elements which stop bond in masonry joints between mortar and masonry units, unless otherwise acceptable to CASCO.
- (J) Remove masonry units disturbed after laying; clean and relay in fresh mortar. Do not pound corners at jambs to fit stretcher units which have been set in position. If adjustments are required, remove units, clean off mortar, and reset in fresh mortar.
- (K) Clean mortar spatters and drips from adjacent block work immediately.

23. ADJOINING CONSTRUCTION

- (A) Anchor or bond masonry and walls and partitions at points where they meet or intersect by one of the following methods:
 - (1) Lay 50 percent of units at the intersection in masonry bond with alternate units having a bearing of not less than 3" on the unit below.
 - (2) Anchor the intersection by metal ties, joint reinforcement, or anchors as acceptable to CASCO.
 - (3) Anchor interior non-load-bearing walls at intersection, at vertical intervals of not more than 2' on centers, with metal ties embedded at least 4" into the masonry, or as acceptable to CASCO.
 - (4) Where courses of meeting or intersecting walls are carried up separately, use acceptable method of bonding or keeping separate at the intersection.
- (B) Anchor masonry to structural members where masonry abuts or faces such members to comply with the following or as shown on the drawings.
 - (1) Provide an open space not less than 1/2" in width between masonry and structural member, unless otherwise shown. Keep open space free of mortar or other rigid materials.
 - (2) Anchor masonry to structural steel members with metal ties embedded in masonry joints and attached to structure. Provide anchors with flexible tie sections, unless otherwise shown. Space anchors as shown, but not more than 16" o.c. vertically and 32" o.c. horizontally.
- (C) Anchor masonry facing to backing with anchors or ties by embedment at least 1-1/2" into facing and backing. Space ties not farther apart than 24" vertically, nor 36" horizontally.

24. BOND BEAMS

- (A) Construct bond beams of one or more courses of load-bearing units filled with concrete or grout and reinforced. Use continuous reinforcement unless otherwise indicated.
- (B) Provide custom unit bond beams to match adjacent block texture, if required, where shown on the drawings.

25. GROUT FOR MASONRY

- (A) General: (reference Part 2, paragraph 9 for grout strength)
- (1) Set reinforcing steel and anchors in required position and secure against displacement before grouting is started.
 - (2) Mix all cementitious materials and aggregates for a minimum period of 5 min. after all materials are placed in the mixer with the amount of water required to produce the desired consistency. Place in cores and/or collar joints while fluid and before initial set has taken place. Puddle or vibrate grout into place. Place grout in such a way as to prevent segregation of materials. Pour grout fluid enough to flow into all crevices of grout spaces leaving no voids.
 - (3) Grout beams over openings in one continuous operation.
 - (4) Grout vertical cores in maximum of 5' lifts. Stop grout pours 1- 1/2" below a mortar joint, except at top of wall. Where bond beams are used stop grout pour 1/2" below top.
 - (5) Use metal lath, mortar, or special units to confine grout to area required. Do not use materials which may inhibit bond or are combustible.
 - (6) Use acceptable cold weather precautions in placing and curing of grout when temperature is less than 40°F.
- (B) Low-lift grouting: In hollow unit masonry construction, limit low-lift grouting to maximum wall height of 5' per lift. Vertical cores to be grouted shall have minimum clear dimensions of 3" x 4".
- (C) High-lift grouting:
- (1) Grout hollow unit masonry in accordance with this section when erected to height in excess of 5' before grouting. Vertical cores to be grouted shall have minimum clear dimension of 3" and clear area of 10 sq. in.
 - (2) Provide cleanout openings at 12 sq. in. minimum area opposite each vertical bar at bottom course or in foundation wall.
 - (3) Clean cores and collar joints of mortar droppings and foreign material, position reinforcement, and close cleanout openings before grouting.
 - (4) Place vertical barriers consisting of masonry units and mortar in bond beam type hollow units and in collar joints to be grouted at 30' maximum to limit horizontal flow of grout.
 - (5) Pour grout in 5' lifts maximum allowing minimum of 30 minutes and maximum of 1 hr. before pouring next lift. Grout shall be consolidated by puddling or vibrating at time of pouring and then reconsolidated before plasticity is lost. Reconsolidation may occur as next lift is poured.
 - (6) Do not erect masonry to a height more than 80 times, minimum clear grout space before grouting with a maximum of 30' unless otherwise acceptable to CASCO.
- (D) Construction protection :
- (1) Do not use high-lift grouting method until masonry units have been in place 3 days minimum.
 - (2) Do not permit water or foreign material to fall in grout space while grout is being placed and curing.
- (E) Cleanup: Remove misplaced grout immediately and clean affected areas.

26. LINTELS

- (A) Install galvanized steel lintels as manufactured by Powers Steel and Wire Products over masonry openings of more than 1'-0" as per schedule on Structural drawings.
- (B) Install loose lintels of steel and other materials where shown.
- (C) Provide masonry lintels where shown. Formed-in-place masonry lintels are to be temporarily supported.
- (D) Unless otherwise shown, provide one reinforcing bar for each 4" of wall thickness and of a size number not less than the number of feet of opening width.
- (E) For hollow masonry unit walls, use specially formed "U"-shaped lintel units with reinforcing bars placed as shown and filled with concrete grout.
- (F) Provide minimum bearing of loose steel and formed –in-place masonry lintels of 8" at each jamb.

27. FLASHING OF CONCRETE MASONRY WORK

- (A) Wall Flashing
 - (1) Install flashing and weep holes in masonry at shelf angles, lintels, edges, cavity bases and other obstructions to downward flow of water in wall, and where indicated.
 - (2) Surfaces to receive flashing shall be smooth, dry and free from projections.
 - (3) Install flashings in walls where and as shown on drawings. Apply the material in one layer and fully adhere to substrate. Laps shall be not less 6". Where anchors, ties, or other materials penetrate flashings, seal penetrations in flashing with adhesive, sealant or tape as recommended by flashing manufacturer.
 - (4) Provide rubberized-asphalt flashing: Manufacturer's standard composite flashing product consisting of a pliable and highly rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film to produce an overall thickness of 0.040 inch (1.0 mm). Adhere to stainless steel at exposed drip edge.
- (B) Install reglets and nailers for flashing and other related work shown to be built into masonry work.

28. MORTAR NET INSTALLATION

- (A) Site Verification of Conditions: Verify substrate conditions, which have been previously installed under other sections are acceptable for product installation in accordance with manufacturer's instructions.
 - (1) Match product cavity size. Cavity should be no more than ¼" (6.4 mm) wider than 1" (25.4 mm) thick material and 2" (51 mm) thick material, and 04" (10.2 mm) thick material should touch both the outer wythe and the inner wall. For cavities larger than 2" (51 mm) place rigid insulation of sufficient height to extend at least 6" (152 mm) pabove the top of the Mortar Net against the outside of the inner wythe and of appropriate thickness to reduce the cavity to the appropriate size.
 - (2) Inspect for and repair holes in flashing immediately prior to installing Mortar Net.
- (B) Clean flashing and weep holes so they are free of mortar droppings and debris immediately prior to installing Mortar Net. Washing flashing a with water or chemicals prior to installation is not necessary.
- (C) Install the Mortar Net product after flashing has been installed, the first 1 or 2 courses of brick have been laid, and weep holes have been created. Install product before third or higher courses of brick have been laid. Lay the first 1 or 2 courses of brick at flashing level,

then install the Mortar Net continuously by placing it against the inside of the openings. No fasteners or adhesives are required, and mortar need not have set.

- (D) For most wall, install 1 continuous row of the Mortar Net at base of wall and over all wall openings directly on flashing.
- (E) To prevent mortar bridging between the outer wythe and inner wall, install flashing extending from the bottom of the Mortar to at least 6" (152 mm) above the top of the Mortar Net.
- (F) Multiple thicknesses of the Mortar Net may be installed to match cavity widths and if excessive dropping are expected. Inspection, preparation and installation procedure for multiple thicknesses is the same as for single thickness. When installing multiple thicknesses, align the dovetail sections with each other.
- (G) To match cavity width with product thickness without using multiple thicknesses of the Mortar Net, place rigid insulation of appropriate thickness against outside face of inner wall.
- (H) The Mortar Net shall not come in contact with wall ties standard wall tile installations, but if it does, it may be cut or torn to accommodate wall ties. Conduit, plumbing or other materials that bridge or intrude into cavity between inner and outer walls.
- (I) Compress the Mortar Net horizontally so it can be forced into cavities slightly smaller than its nominal thickness without affecting Mortar Net or wall performance.
 - (1) When forcing the Mortar Net into a cavity, be sure mortar has set sufficiently to resist outward pressure from product.

29. REPAIR, POINTING, AND CLEANING

- (A) Remove and replace masonry units which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in fresh mortar or grout, pointed to eliminate evidence of replacement.
- (B) Pointing: During the tooling of joints, enlarge any voids or holes, except weep holes, and completely fill with mortar. Point-up joints at corner, openings and adjacent work to provide a neat, uniform appearance properly prepared for application of caulking or sealant compounds. Cut at defective joints and repoint.
- (C) Clean exposed masonry by dry brushing at the end of each day's work and after final pointing to remove mortar spots and droppings. Clean wall surfaces with prepared masonry cleaner in accordance with the manufacturer's instructions.
- (D) Remove mortar splatters and drips from adjacent block work immediately.
- (E) After completion of all work, the Contractor shall remove all scaffolding and surplus masonry supplies from construction site.

30. CONSTRUCTION PROTECTION

- (A) Step back unfinished work for joining new work. Before laying new work, remove loose mortar and clean exposed joint.
- (B) Protect sills, ledges, and offsets from mortar drippings and other damage during construction.
- (C) Remove misplaced mortar and grout immediately and clean affected areas.
- (D) Protect face materials from staining.
- (E) Keep masonry units dry. Keep the top of masonry construction covered with a water-proof covering when work is not in progress.

- (F) Temporarily brace masonry against horizontal loads until cured and permanently braced.

31. WARRANTY

- (A) Contractor shall, upon completion of work contained herein, issue a written warranty to the Owner covering workmanship and material. Said warranty shall become effective upon completion and acceptance of work under this Section by Owner's representative and shall cover workmanship for one year and include material manufacturer's warranty for a period of one year against failure due to product which did not conform to formula or meet manufacturer's quality control standards at time of its production.

32. ACCEPTANCE OF MASONRY CONSTRUCTION

- (A) Completed masonry work which meets all applicable requirements shall be accepted without qualifications.
- (B) Completed masonry work which fails to meet one or more requirements must be brought into compliance in an approved manner or may be rejected or accepted by the Owner.
- (C) The masonry work shall be clean and show a quality of workmanship and finish that is acceptable to the Owner.
- (D) Joints shall be tooled and tight, showing no separation between mortar and units.

- END OF SECTION –

DIVISION 5 - METALS

PART 1: GENERAL

1. RELATED DOCUMENTS

- (A) The provisions of Division 1 apply to the work specified in this Section.
- (B) Unless otherwise shown or specified, this work shall conform to the following standards:
 - AISC Code of Standard Practice for Steel Buildings and Bridges (2005) except as modified herein.

Paragraph 1.5.1 of the above code is hereby modified as follows: "When the Owner's designated Representative for Design provides the design, Design Drawings and Specifications, the Fabricator and Erector are not responsible for the suitability, adequacy, or building code conformance of the design except as noted herein; The Fabricator shall be responsible for the design of all structural steel connections and the suitability, adequacy, conformance with Owner-established performance criteria, and building-code conformance thereof"..
 - AISC Specification for the Design, Fabrication and Erection of Structural Steel for Buildings (2005).
 - AISC Specification for Structural Joints using ASTM A325 or A490 Bolts (2004).
 - AWS (D1.1) Structural Welding Code - Steel (2004).

2. SCOPE OF WORK

- (A) Include all labor, materials and appliances, and perform all operations in connection with the installation of all Structural Steel and all related work, complete, in strict accordance with the drawings, and as specified herein. Structural steel work includes:
 - (1) Design of structural steel connections.
 - (2) All structural steel including columns, beams, girders, column base and cap plates, joist and beam bearing plates, angles and channels.
 - (3) Connection angles, bolts and electrodes for welding work.
 - (4) Shop painting.
 - (5) Shop drawings.
 - (6) Furnishing of anchor bolts (installation of anchor bolts shall be by the concrete contractor).
 - (7) Framing for all openings in metal deck.
 - (8) Framing and supports for roof top units.
 - (9) Connections for steel joist girders and steel joists to structural steel.
 - (10) All other items required to make the work of this section complete.
 - (11) Painting of field welds.

3. SUBMITTALS

- (A) Shall be submitted for review only when required by and in accordance with the procedure set forth in these specifications.
- (B) Shop Drawings:
 - (1) Submit shop drawings to CASCO for review prior to fabrication.
 - (2) Items requiring field measuring shall have all dimensions verified in the field before fabrication.

- (3) Prepare in accordance with applicable standards and specifications listed in this Section.
 - (4) All structural steel shall be detailed, fabricated and erected in accordance with the AISC Code of Standard Practice, except as modified herein.
 - (5) Submit shop drawings including complete details and schedules for fabrication and assembly of structural steel members, procedures and diagrams. Include details of cuts, connections, camber, holes and other pertinent data. Indicate welds by standard AWS symbols and show size, length and type of each weld. Furnish erection drawings referencing erection marks to shop detail drawing numbers. Provide setting drawings, templates and directions for installation of anchor bolts and other anchorages to be installed by others. Type of fasteners shall be clearly shown for all members.
 - (6) Fabricator's erection drawings and shop details shall clearly show the design loads of the connections designed by the Fabricator.
 - (7) **Unless noted otherwise, the fabricator's engineer shall be responsible for the design, adequacy and safety of all connections. All shop drawings shall be signed and sealed by the fabricator's engineer with the registered engineer's seal for the state where the structure is located. Engineer's seal may be qualified "For Design of Connections Only".**
- (C) Connection Design Certification: Submit connection design certification stating that all structural steel connections have been designed in accordance with the drawings, project specifications and AISC specifications. Connection design certification shall be signed and sealed by the fabricator's engineer with the registered engineer's seal for the state where the structure is located.
- (D) Connection Design Calculations: Design calculations for all connections designed by the fabricator's engineer shall be submitted only when requested by the Owner's Representative for submittal to the building official or for information. Connection design calculations will not be reviewed by CASCO. All design calculations shall be signed and sealed by the fabricator's engineer with the registered engineer's seal for the state where the structure is located.
- (E) Review of submittals is only for review of general conformance with the design concept, including verification of the design loads shown on the shop drawings. In no case shall this review relieve the contractor of the responsibility for design, adequacy and safety of all connections, correctness of fit, general or detailed dimensions, quality or quantity of materials, or any other conditions, functions, performance or guarantees required.

4. QUALITY ASSURANCE

- (A) General
- (1) The Owner will employ and pay for the services of an independent testing agency to provide testing and inspection of structural steel erection. The testing agency shall be licensed in the state where the structure is located and shall meet the requirements of "Recommended Practices for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials as Used in Construction" (ASTM E329). All testing and inspections shall be performed under the supervision of an engineer registered in the state where the structure is located.
 - (2) Structural steel materials and operations shall be tested and inspected as the work progresses. Failure to detect any defective work or material shall not in any way prevent later rejection when such defect is discovered, nor shall it obligate the Owner's Representative for final acceptance.
 - (3) The testing agency shall report all test and inspection results to CASCO, Owner, and General Contractor immediately after they are performed. All test and inspection reports shall include the exact location of the work represented by the test.
 - (4) The testing agency and its representatives are not authorized to revoke, alter, relax, enlarge or release any requirement of the contract documents, approve or accept any portion of the work, perform any duties of the Contractor, or be a party to scheduling of work.

- (5) The General Contractor shall notify the testing agency a minimum of 24 hours in advance of all structural steel operations and all reasonable facilities shall be made available for technicians.
 - (6) Records of inspection shall be kept available to the building official during progress of work for two years after completion of the project. Records shall be preserved by the independent testing agency.
 - (7) At the completion of all structural steel work the testing agency shall submit a letter of certification signed and sealed by an engineer registered in the state where the structure is located, stating that all structural steel work has been constructed in accordance with the contract documents and all applicable code requirements.
- (B) The testing agency shall conduct inspections as necessary to determine that:
- (1) All structural steel has been erected in accordance with the contract documents.
 - (2) Weld quality is acceptable based on visual inspection of all welds.
 - (3) Bolts have been installed to the snug tight condition in accordance with AISC Specifications.

PART 2: PRODUCTS

5. MATERIALS

- (A) Wide Flange Shapes: ASTM A992, $F_y = 50$ KSI
- (B) Structural Shapes and Plates: ASTM A36 Typical, unless noted.
- (C) Structural Tubing: ASTM A500, Grade B, $F_y = 46$ KSI.
- (D) Steel Pipe: ASTM A53, Grade B, $F_y = 35$ KSI.
- (E) Bolts: ASTM A325.
- (F) Welding Electrodes for Arc Welding: Series E70.
- (G) Anchor Bolts: ASTM A307 Typical, unless noted.
- (H) Paint (Shop Coat): PPG Paints Fast Dry 4190 /Devguard 4190 gray shop coat primer for all structural steel except canopy framing.
- (I) **Primer (canopy framing and exposed exterior steel, entire member): PPG Paints Fast Dry/Devguard 4190 Whiteshop coat.**

PART 3: EXECUTION

6. DESIGN OF CONNECTIONS

- (A) Unless otherwise shown or called for on the drawings, all shop connections may be either bolted or welded and all field connections shall be bolted. The fabricator is responsible for the design of all connections. Connections shown on the structural drawings are schematic and are only intended to show the relationship of members connected. Connection details indicated on the drawings shall be incorporated into the fabricator's connection design.
- (B) Unless noted otherwise, connections shall be designed to support half of the allowable load on the beam, defined in the AISC Beam Tables (1989) as $W_c/2L$, or the reaction shown on the drawings, whichever is greater. For connections not covered above, notify Engineer of need for additional information.
- (C) Unless noted otherwise, connections shall be designed as "simple framing" connections (unrestrained, free-ended) with the ends of beams and girders connected for shear only, and free to rotate with some inelastic, but self-limiting, deformation of connection parts, under gravity load.

- (D) Unless otherwise noted, bolted connections shall be designed as bearing type connections using the values for a bearing type connection with threads included in the shear plane. A minimum of two bolts per connection must be used.
- (E) Single plate connections may be used only if the connections are designed in accordance with the design procedure given in "Engineering for Steel Construction" published by the AISC.
- (F) The fabricator is responsible for verifying the tension capacity of axially loaded members after a section is reduced for bolt holes. Member size may be increased, or connection plates added as required.

7. FABRICATION

- (A) Shop Fabrication and Assembly: Fabricate and assemble structural assemblies in shop to greatest extent possible. Fabricate items of structural steel in accordance with AISC Specifications and as indicated on final shop drawings. Provide camber in structural members where indicated.
- (B) Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence which will expedite erection and minimize field handling of materials.
- (C) Structural steel fabricator must coordinate details, provide connections and punch holes for other trades as shown on structural, architectural, electrical and mechanical drawings.
- (D) Shop splicing of material will not be permitted unless each individual splice is shown on the shop drawings and is subsequently approved by CASCO.
- (E) Painting
 - (1) All surfaces of steel to be painted shall be cleaned and primed according to Steel Structures Painting Council Specification SSPC-SP-3-63 and as hereinafter modified.
 - (a) All structural steel shall be shop primed in an inverted position to cause all paint drippings to be on top of steel members.
 - (2) Paint all structural steel items except canopy framing with one shop coat applied at a rate to produce a minimum dry film thickness of 2.0 to 2.5 mil.
 - (3) Prime canopy framing and exposed exterior steel with one shop coat applied at a rate to produce a minimum dry film thickness of 2.0 to 2.5 mils.
- (F) Inspection: All fabrication work shall be subject to inspection by the Owner's Representative and/or an independent testing laboratory. All reasonable facilities shall be made available for the inspectors at all times. Contractor shall bear costs of testing work performed by his field and shop forces necessary to ensure performance of contract.
- (G) Substitutions
 - (1) In cases where material shown or specified is not readily available, proposed substitutions must be submitted for review by the Contractor.
 - (2) All substituted material must be of equivalent section to that specified and any additional cost due to increased weight is to be borne by the Contractor.
 - (3) Substitutions must not interfere with Architectural, Plumbing, Mechanical, Electrical, etc. requirements.
- (H) Steel shall be delivered as required in accordance with a schedule approved by the Owner's Representative.

8. ERECTION

- (A) The steel structure is a non-self-supporting steel frame and is dependent upon diaphragm action of the metal roof deck and attachment to the masonry walls for stability and for resistance to wind and seismic forces. Provide all temporary supports required for stability and for resistance to wind and seismic forces until these elements are complete and are capable of providing this support.

- (B) Furnish to concrete contractor and mason all required joist seats, weld plates, anchor bolts and other incidental items of structural steel required to be built into concrete or masonry. Furnish templates and location plans for installing these items.
- (C) Thoroughly examine and check the placement of anchor bolts and any supports on which the structural steel work is in any way dependent and notify the Owner's Representative in writing of any defects which would affect the satisfactory completion of this work. The starting of structural steel erection shall imply acceptance of the underlying surfaces.
- (D) Set and shim all base plates to the elevations shown on the contract drawings.
- (E) All work shall be carefully and accurately assembled to carry out the design as shown particularly in the visual alignment of joists and joist bridging due to structure being open and visible. Erect the steel in order of sequence and schedule as previously arranged with the Owner's Representative.
- (F) Use care in handling and erection to ensure that steel shall not be twisted, bent or otherwise damaged, and should any difficulty be encountered, it shall immediately be reported to the Owner's Representative. No cutting of structural shapes will be done in the field without the consent of the Owner's Representative.
- (G) Furnish all erection equipment, power, planking, bracing, guys, bolts, shims, etc., necessary in executing this part of the work.
- (H) Welders shall be certified by an independent testing and inspection service. Tests for uncertified welders shall be at the expense of the Contractor.
- (I) Misfits, due to shop or drafting errors, will be corrected or replaced in field at the fabricator's expense. Patch unsightly deck weld blow thru holes at direction of Owner's Representative.
- (J) All metal cuts shall be made by metal cutting saw only. No torch cuts or jagged edges are acceptable.
- (K) All steel shall be erected square, plumb and true to lines and levels. Any measures required to correct out of plumb steel columns, etc., will be at the contractor's expense.
- (L) Field touch up painting shall be done with the same type of paint as the shop coat. Touch up shall include erection damage, cleaning and painting of field connections or welds, bolts, nuts, and areas adjacent to welds not primed.
- (M) Structural steel columns are exposed and receive an architectural paint finish (by others). Contractor is responsible for drips and defects in paint primer finish. Use care in handling and erection to ensure that paint primer finish is not marred or damaged. The Contractor is responsible for cost to sand, fill and work needed to correct.

- END OF SECTION -

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DIVISION 5 - METALS

PART 1: GENERAL

1. RELATED DOCUMENTS

- (A) The provisions of Division 1 apply to the work specified in this Section.
- (B) Unless otherwise shown or specified, this work shall conform to the following standards adopted by the Steel Joist Institute:
 - Standard Specifications for Open Web Steel Joists, K-Series (1994).
 - Recommended Code of Standard Practice for Steel Joists and Joist Girders (1994).
 - Standard Load Table - Open Web Steel Joists, K-Series (1994).

2. SCOPE OF WORK

- (A) The work required under this section consists of all standard open web joists, accessories and related items necessary to complete the work indicated on the drawings and as specified.

3. SUBMITTALS

- (A) Shall be submitted for review only when required by and in accordance with the procedure set forth in these specifications.
- (B) Shop Drawings:
 - (1) Submit shop drawings to CASCO for review prior to fabrication.
 - (2) Items requiring field measuring shall have all dimensions verified in the field before fabrication.
 - (3) Furnish detailed drawings and lists showing the mark, number, type, location, and spacings of all joists. Show bridging type, mark, method of attachment to the joists and anchorage at the ends. Show type of paint and all accessories and details as may be required for proper installation of joists.
 - (4) Show design loads on each joist.
 - (5) **All shop drawings shall be signed and sealed by the manufacturer's engineer with the registered engineer's seal for the state where the structure is located.**
- (C) Manufacturer's Certification: Submit manufacturer's certification stating that all steel joists used on this project have been designed and manufactured in accordance with the drawings, project specifications and SJI specifications. Manufacturer's certification shall be signed and sealed by the manufacturer's engineer with the registered engineer's seal for the state where the structure is located.
- (D) Steel Joist Institute Certification: Submit certification from the Steel Joist Institute that the manufacturer's design of K Series Steel Joists have been checked by the Steel Joist Institute and found to conform to its standard specifications and load tables.
- (E) Design Calculations: Design calculations for all joists used on this project shall be submitted only when requested by the Owner's Representative for submittal to the building official or for information. Design calculations will not be reviewed by CASCO. All design calculations shall be signed and sealed by the manufacturer's engineer with the registered engineer's seal for the state where the structure is located.
- (F) Review of submittals is only for review of general conformance with the design concept including verification of the design loads shown on the shop drawings. In no case shall this review relieve the contractor of the responsibility for design, general or detailed dimensions, quality or quantity of materials, or any other conditions, functions, performance or guarantees required.

4. QUALITY ASSURANCE

(A) General

- (1) The Owner will employ and pay for the services of an independent testing agency to provide testing and inspection of steel joist work. The testing agency shall be licensed in the state where the structure is located and shall meet the requirements of "Recommended Practices for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials as Used in Construction" (ASTM E329). All testing and inspections shall be performed under the supervision of an engineer registered in the state where the structure is located. Independent Testing Consultant and Rooms To Go shall approve metal joist installation and all required corrections prior to installation of any metal decking.
- (2) Steel joist materials and operations shall be tested and inspected as the work progresses. Failure to detect any defective work or material shall not in any way prevent later rejection when such defect is not discovered, nor shall it obligate the Owner's Representative for final acceptance.
- (3) The testing agency shall report all test and inspection results to CASCO, Owner, and General Contractor immediately after they are performed. All test and inspection reports shall include the exact location in the work represented by the test.
- (4) The testing agency and its representatives are not authorized to revoke, alter, relax, enlarge or release any requirement of the contract documents, approve or accept any portion of the work, perform any duties of the Contractor, or be a party to scheduling of work.
- (5) The General Contractor shall notify the testing agency a minimum of 24 hours in advance of all steel joist work and all reasonable facilities shall be made available for technicians.
- (6) Records of inspection shall be kept available to the building official during progress of work for two years after completion of the project. Records shall be preserved by the independent testing agency.

(B) The testing agency shall conduct inspections as necessary to determine that:

- (1) Steel joists have been erected in accordance with the contract documents.
- (2) Damaged joists have not been installed in the work.

PART 2: PRODUCTS

5. MATERIALS

- (A) Steel: Comply with SJI Specifications.
- (B) Bridging: Comply with SJI Specifications.
- (C) Shop Paint: Rustguard 4140-6120 gray, low VOC shop coat primer, Devoe Coatings, by ICI and shall conform to the Steel Structures Painting Council Specifications 15-68T, Type 1.

PART 3: EXECUTION

6. DESIGN

- (A) Steel joists shall be designed by the manufacturer. The manufacturer's engineer shall be responsible for the design, adequacy and safety of all steel joists. All shop drawings shall be signed and sealed by the manufacturer's engineer with the engineer's seal for the state where the structure is located. Design shall be in accordance with the Standard Specifications for Open Web Steel Joists, K-Series.
- (B) Unless otherwise noted, steel joists shall be designed as simply supported, uniformly loaded trusses with the top chord braced against lateral buckling. The uniform design load shall be the total safe uniformly distributed load as shown in the SJI Standard Load Table.
- (C) When net uplift forces due to wind are shown on the drawings, the manufacturer shall design the joists, bridging and connections of the joists to the supporting structure for the net uplift. A single line of bottom chord bridging must be provided near the first bottom chord panel points whenever uplift due to wind forces is shown on the design drawings.

- (D) When nonuniform or concentrated loads are shown on the drawings, the manufacturer shall design the joists in accordance with Paragraph 4.1 of the Standard Specification for Open Web Steel Joists, K-Series.

7. FABRICATION

- (A) Steel joists shall be fabricated in accordance with the Standard Specifications for Open Web Steel Joists, K-Series.
- (B) Provide extended ends, special depth ends, etc., where indicated on the drawings and, as job conditions require.
- (C) Before application of shop coat, clean steel free of all foreign substances. Give all steel items one (1) shop coat per SSPC-Paint 15, Type 1. All steel bar joists shall be shop primed in an inverted position, so drips are visible on the top side of joists.
- (D) Camber all steel joists for roofs in accordance with the Standard Specifications for Open Web Steel Joists, K-Series.

8. ERECTION

- (A) Steel joists shall be erected in accordance with the Standard Specifications for Open Web Steel Joists, K-Series.
- (B) Thoroughly examine the structural steel and other supports on which the steel joist work is in any way dependent and notify the Owner's Representative in writing of any defects which would affect the satisfactory completion of this work. The starting of work in connection with open web steel joists shall imply acceptance of the underlying surfaces.
- (C) During the construction period, the Contractor shall provide means for the adequate distribution of concentrated loads so that the carrying capacity of any joist is not exceeded.
- (D) All bridging and bridging anchors shall be placed and joist ends fixed prior to the application of any loads.
- (E) Roof structure is exposed and shall be painted. During on site storage keep joists clean and protected from the elements stored, and covered, to minimize rust. Field touch up painting shall be done with the same type of paint as the shop coat. Touch up shall include bare, abraded, welded and rusted areas.
- (F) Repair or replace all damaged joists. CASCO shall be the sole judge as to whether a joist can be repaired or must be replaced.

- END SECTION -

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DIVISION 5 - METALS

PART 1: GENERAL

1. RELATED DOCUMENTS

- (A) The provisions of Division 1 apply to the work specified in this Section.
- (B) Unless otherwise shown or specified, this work shall conform to the following standards adopted by the Steel Joist Institute:
 - Standard Specifications for Joist Girders (1994)
 - Recommended Code of Standard Practice for Steel Joists and Joist Girders (1994)

2. SCOPE OF WORK

- (A) The work required under this Section consists of all steel joist girders, accessories and related items necessary to complete the work indicated on the drawings and as specified.

3. SUBMITTALS

- (A) Shall be submitted for review only when required by and in accordance with the procedure set forth in these specifications.
- (B) Shop Drawings:
 - (1) Submit shop drawings to CASCO for review prior to fabrication.
 - (2) Items requiring field measuring shall have all dimensions verified in the field before fabrication.
 - (3) Furnish detailed drawings and lists showing the mark, number, and location of all joist girders. Show type of paint and all accessories and details as may be required for proper installation of joist girders.
 - (4) Show design loads and location of loads on each joist girder.
 - (5) **All shop drawings shall be signed and sealed by the manufacturer's engineer with the registered engineer's seal for the state where the structure is located.**
- (C) Manufacturer's Certification: Submit manufacturer's certification stating that all steel joist girders used on this project have been designed and manufactured in accordance with the drawings, project specifications and SJI specifications. Manufacturer's certification shall be signed and sealed by the manufacturer's engineer with the registered engineer's seal for the state where the structure is located.
- (D) Steel Joist Institute Certification: Submit Certification from the Steel Joist Institute that the manufacturer's design of joist girders have been checked by the Steel Joist Institute and found to conform to its standard specifications and load tables.
- (E) Design Calculations: Design calculations for all joist girders used on this project shall be submitted only when requested by the Owner's Representative for submittal to the building official or for information. Design calculations will not be reviewed by CASCO. All design calculations shall be signed and sealed by the manufacturer's engineer with the registered engineer's seal for the state where the structure is located.
- (F) Review of submittals is only for review of general conformance with the design concept including verification of the design loads shown on the shop drawings. In no case shall this review relieve the Contractor of the responsibility for design, general or detailed dimensions, quality or quantity of materials, or any other conditions, functions, performance or guarantees required.

4. QUALITY ASSURANCE

- (A) General

- (1) The Owner will employ and pay for the services of an independent testing agency to provide testing and inspection of steel joist girder work. The testing agency shall be licensed in the state where the structure is located and shall meet the requirements of "Recommended Practices for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials as Used in Construction" (ASTM E329). All testing and inspections shall be performed under the supervision of an engineer registered in the state where the structure is located. Independent Testing Consultant and Rooms To Go shall approve metal decking installation and all required corrections prior to installation of any insulation or roofing.
 - (2) Steel joist girder materials and operations shall be tested and inspected as the work progresses. Failure to detect any defective work or material shall not in any way prevent later rejection when such defect is discovered, nor shall it obligate the Owner's Representative for final acceptance.
 - (3) The testing agency shall report all test and inspection results to CASCO, Owner and General Contractor immediately after they are performed. All test and inspection reports shall include the exact location in the work represented by the test.
 - (4) The testing agency and its representatives are not authorized to revoke, alter, relax, enlarge or release any requirement of the contract documents, approve or accept any portion of the work, perform any duties of the Contractor, or be a party to scheduling of work.
 - (5) The General Contractor shall notify the testing agency a minimum of 24 hours in advance of all steel joist girder work and all reasonable facilities shall be made available for technicians.
 - (6) Records of inspection shall be kept available to the building official during progress of work for two years after completion of the project. Records shall be preserved by the independent testing agency.
- (B) The testing agency shall conduct inspections as necessary to determine that:
- (1) Steel joist girders have been erected in accordance with the contract documents.
 - (2) Damaged joist girders have not been installed in the work.

PART 2: PRODUCTS

5. MATERIALS

- (A) Steel for Joist Girders: Comply with SJI Specifications.
- (B) Shop paint: Rustguard 4150 – 6120 grey, low VOC shop coat primer, Devco Coatings by ICI and shall conform to the Steel Structures Painting Council Specification 15-68T, Type 1.

PART 3: EXECUTION

6. DESIGN

- (A) Steel joist girders shall be designed by the manufacturer. The manufacturer's engineer shall be responsible for the design, adequacy and safety of all steel joist girders. All shop drawings shall be signed and sealed by the manufacturer's engineer with the engineer's seal for the state where the structure is located. Design shall be in accordance with the Standard Specifications for Joist Girders.
- (B) Unless otherwise noted, steel joist girders shall be designed as simply supported primary members with all loads equal in magnitude and evenly spaced along joist girder top chord.
- (C) Additional design loads from roof top equipment or other concentrated loads shown on the drawings shall be considered as collateral loads. These loads shall be considered in the design of the joist girders. Refer to the architectural and mechanical drawings for locations and weights of equipment. Where such loads do not occur at the panel points of the joist girder, auxiliary framing shall be added to the joist girder or the top chord shall be designed for the effects of the load.

- (D) Joist girders shall be designed to support the design loads without exceeding a deflection of L/240.
- (E) When net uplift forces due to wind are shown on the drawings, the manufacturer shall design the joist girders and connections of the joist girders to the supporting structure for the net uplift.

7. FABRICATION

- (A) Steel joist girders shall be fabricated in accordance with the Standard Specifications for Joist Girders.
- (B) Provide strutted ends of the bottom chord of sufficient strength and rigidity to restrain the lateral movement of the bottom chord.
- (C) Before application of shop coat, clean steel free of all foreign substances. Give all items one (1) shop coat per SSPC-Paint 15, Type 1. All steel joist girders shall be shop coated in an inverted position so that drips are visible only on top side of joists girders.
- (D) Camber all joist girders in accordance with the Standard Specifications for Joist Girders.

8. ERECTION

- (A) Steel joist girders shall be erected in accordance with the Standard Specifications for Joist Girders.
- (B) Thoroughly examine the structural steel and other supports on which the steel joist girder work is in any way dependent and notify the Owner's Representative in writing of any defects which would affect the satisfactory completion of this work. The starting of work in connection with steel joist girders shall imply acceptance of the underlying surfaces.
- (C) During the construction period, the Contractor shall provide means for the adequate distribution of concentrated loads so that the carrying capacity of any joist girder is not exceeded.
- (D) No other loads shall be placed on the joist girder until the steel joists bearing on the girder are in place and attached thereto.
- (E) Roof structure is exposed and shall be painted. During on site storage keep joist girders clean and protect from the elements stored and covered to minimize dirt, mud and rust. Field touch up painting shall be done with the same type of paint as the shop coat. Touch up shall include bare, abraded, welded and rusted areas.
- (F) Repair or replace all damaged joist girders. CASCO shall be the sole judge as to whether a joist girder can be repaired or must be replaced.

- END OF SECTION -

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DIVISION 5 - METALS

PART 1: GENERAL

1. RELATED DOCUMENTS

- (A) The provisions of Division 1 apply to the work specified in this Section.
- (B) Unless otherwise shown or specified, this work shall conform to the following standards.
 - SDI Specifications and Commentary for Steel Roof Deck (1992).
 - SDI Diaphragm Design Manual 2nd Edition (1987).
 - AWS (D1.3) Structural Welding Code - Sheet Steel (1981).

2. SCOPE OF WORK

- (A) Include all labor, material and equipment to furnish and install metal roof decking in accordance with the drawings and as specified.
- (B) Furnish and install all perimeter filler strips, closures and accessories as required, to complete the metal deck work and make it ready to receive roofing.

3. SUBMITTALS

- (A) Shall be submitted for review only when required by and in accordance with the procedure set forth in these specifications.
- (B) Shop Drawings
 - (1) Submit shop drawings to CASCO for review prior to fabrication.
 - (2) Items requiring field measuring shall have all dimensions verified in the field before fabrication.
 - (3) Furnish detailed drawings and lists showing the mark, number, type, and location of all metal roof deck. Show method of attachment to the supporting structure. Show all openings for hatches, stacks, etc. Show type of finishes and all accessories and details as may be required for proper installation of metal roof deck.
- (C) Manufacturer's Certification: Submit manufacturer's certification that all metal roof deck used on this project has been manufactured in accordance with the drawings, project specifications and SDI specifications.
- (D) Review of submittals is only for review of general conformance with the design concept. In no case shall this review relieve the contractor of the responsibility for general or detailed dimensions, quality or quantity of materials, or any other conditions, functions, performance or guarantees required.

4. QUALITY ASSURANCE

- (A) General
 - (1) The Owner will employ and pay for the services of an independent testing agency to provide testing and inspections of metal roof deck work. The testing agency shall be licensed in the state where the structure is located and shall meet the requirements of "Recommended Practices for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials as Used in Construction" (ASTM E329). All testing and inspections shall be performed under the supervision of an engineer registered in the state where the structure is located. Independent Testing Consultant and Rooms To Go shall approve metal decking installation and all required corrections prior to installation of any insulation or roofing.
 - (2) Metal roof deck materials and operations shall be tested and inspected as the work progresses. Failure to detect any defective work or material shall not in any way prevent later rejection when such defect is discovered, nor shall it obligate the Owner's Representative for final acceptance.

- (3) The testing agency shall report all test and inspection results to CASCO, Owner, and General Contractor immediately after they are performed. All test and inspection reports shall include the exact location in the work represented by the test.
 - (4) The testing agency and its representatives are not authorized to revoke, alter, relax, enlarge or release any requirement of the contract documents, approve or accept any portion of the work, perform any duties of the Contractor, or be a party to scheduling of work.
 - (5) The General Contractor shall notify the testing agency a minimum of 24 hours in advance of all metal roof deck operations and all reasonable facilities shall be made available for technicians.
 - (6) Records of inspection shall be kept available to the building official during progress of work for two years after completion of the project. Records shall be preserved by the independent testing agency.
- (B) The testing agency shall conduct inspections as necessary to determine that:
- (1) Metal roof deck work has been erected in accordance with the contract documents.
 - (2) Weld quality is acceptable based on visual inspection of all welds.

PART 2: PRODUCTS

5. MATERIALS

- (A) Steel: Comply with SDI Specifications. Yield strength, 80 ksi.
- (B) Accessories: Manufacturer's Standard
- (C) Shop Finish: Deck manufacturer's shop applied primer typical unless noted otherwise; All metal deck exposed to the exterior shall be G60 galvanized with deck manufacturer's shop applied primer.

6. FABRICATION

- (A) Metal roof deck shall receive finishes specified in Part 2.5.C above.
- (B) Top and bottom faces and edges of deck materials where cuts have been made including all deck welds shall have prime coating touched-up with a heavy coat of the same type of paint as the shop coat.
- (C) Do not hang or support any loads from metal roof deck.
- (D) When stored on site, keep deck covered, clean, and protected against dirt, mud and rust. All deck damaged, dented, chipped, punctured or otherwise deformed (including weld blow holes in deck from welding) during shipping, storage or erection to render it unusable or unsightly shall be replaced at no additional cost to the Owner. The Owner Representative shall be the sole judge as to whether metal roof deck must be replaced.
- (E) Repair: Wire brush and clean rust spots, welds, and abraded areas on both surfaces of deck immediately after installation and apply same repair finish.

PART 3: EXECUTION

7. INSTALLATION

- (A) Metal roof deck shall be erected and fastened in accordance with the SDI Specifications and the manufacturer's specifications and erection layouts. Metal roof deck shall be continuous over at least three spans. Cutting openings through the deck which are less than 16 square feet in area and all skew cutting shall be performed in the field. All cutting of metal roof deck shall be by metal cutting saw only. No torch cuts or jagged edges are acceptable.

END OF SECTION

DIVISION 5 - METALS

PART 1: GENERAL

1. RELATED DOCUMENTS:

- (A) The provisions of Division 1 apply to the work specified in this Section.
- (B) Unless otherwise shown or specified, this work shall conform to the following standards:
 - AISI Specification for the Design of Cold-Formed Steel Structural Members (1986).
 - AWS (D1.3) Structural Welding Code - Sheet Steel (1981).
 - ASTM A-653 Steel Sheet, Zinc-Coated (Galvanized or Zinc Iron Alloy Coated (Galvannealed) by the Hot-Dip Process.
 - ASTM A-924 Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
 - ASTM A-955 Standard Specification for Load Bearing (Traverse and Axial) Steel studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Board on Metal Plaster Bases.
 - ASTM C-645 Non-Load (Axial) Bearing Steel Studs, Runners (Track), and Rigid Furring Channels for Screw Application for Gypsum Board.
 - ASTM C-754 Installation of Steel Framing Members to Receive Screw-Attached Gypsum.
 - ASTM C-1007 Standard Specification for Installation of Load Bearing (Traverse and Axial) Steel Studs and Related Accessories.

2. SCOPE OF WORK

- (A) Include all labor, materials and equipment to furnish and install all cold rolled structural metal sections as shown on the drawings and herein specified. All framing shall be complete with fasteners, clips, plates and accessory parts, customarily furnished for this type work.
- (B) The work of this section includes, but is not limited to: (Note: Refer to drawings for items applicable to the project).
 - (1) Structural light gage framing where indicated.

3. WORK SPECIFIED UNDER OTHER SECTIONS (As required by Job Conditions)

- (A) Structural Steel - Section 05120
- (B) Steel Joist - Section 05210
- (C) Steel Joist Girders - Section 05211
- (D) Metal Roof Deck - Section 05311
- (E) Miscellaneous Metals - Section 05500

4. SUBMITTALS

- (A) Shop Drawings:
 - (1) Submit shop drawings for special components and installations not fully dimensioned or details in manufacturer's product data; otherwise provide Product Data only.
 - (2) Verify job conditions before beginning fabrication.
 - (3) The drawings shall show sizes, method of assembly and anchorages.

- (B) Manufacturer's data and certification:
 - (1) Submit manufacturer's data for all cold rolled structural metals used in this project.
 - (2) Submit manufacturer's certification that the physical and structural properties of all cold rolled structural metal framing members, connections, and accessories meet or exceed the physical and structural properties listed in the latest edition of the Steel Framing Industry (SFIA) Technical Guide for Cold-Formed Steel Framing Products or Steel Stud Manufacturers Association (SSMA) Product Technical Information manual.
- (C) Review of submittals is only for review of general conformance with the design concept. In no case shall this review relieve the Contractor of the responsibility for general or detailed dimensions, quality or quantity of materials, or any other conditions, functions, performance or guarantees required.

PART 2: PRODUCTS

5. MATERIALS

- (A) All cold rolled structural metal framing members, connections and accessories shall be of the type, size and gage shown on the plans. The physical and structural properties listed by Unimast Incorporated shall be considered the minimum permitted for all framing members, connections and accessories.
- (B) All cold rolled structural metal framing members shall be formed from corrosion-resistant steel, corresponding to the requirements of ASTM A653, with a minimum yield strength of the greater of 33 ksi and 50 ksi as listed in the section properties table of the latest edition of the Steel Stud Manufacturers Association (SSMA) Product Technical Information manual for the respective specified member.

PART 3: EXECUTION

6. FABRICATION:

- (A) Framing components may be preassembled into panels prior to erecting. Prefabricated panels shall be square with components attached in a manner as to prevent racking.
- (B) All framing components shall be cut squarely for attachment to perpendicular members, or as required for an angular fit against abutting members. All cuts shall be by metal cutting saw only. No torch cuts or jagged edges are acceptable. Members shall be held positively in place until properly fastened.

7. ERECTION:

- (A) Prior to commencement of work under this Section, carefully inspect the work of other trades and verify that all such work is complete to a point where this installation may properly commence.
- (B) Use means necessary to protect the work under this Section before, during and after installation and to protect the installed work and materials of all other trades.
- (C) Handling and lifting of prefabricated panels shall be done in a manner which will not cause distortion of the members.
- (D) Temporary bracing shall be provided until erection is completed.
- (E) Splices in studs shall not be permitted.
- (F) When stored on site, keep cold rolled structural steel shapes covered, clean and protected against dirt, mud and rust. All cold rolled structural steel shapes damaged, dented, bent or otherwise determined during fabrication, shipping, storage or erection to be rendered unusable or unsightly shall be replaced at no additional cost to the Owner. The Owner's Representative shall be the sole judge as to whether steel shall be replaced.

– END OF SECTION –

DIVISION 5 - METALS

PART 1: GENERAL

1. RELATED DOCUMENTS

- (A) The provisions of Division 1 apply to the work specified in this Section.
- (B) Unless otherwise shown or specified, this work shall conform to the following standards:
 - AISC Specification for the Design, Fabrication and Erection of Structural Steel for Buildings (1978).
 - ASIS Specification for the Design of Cold-Formed Steel Structural Members (1986).
 - AWS (D1.1) Structural Welding Code - Steel (1985).
 - AWS (D1.3) Structural Welding Code - Sheet Steel (1981).

2. SCOPE OF WORK

- (A) Include labor, materials, and equipment to furnish and install all miscellaneous metal work shown or required by the drawings and herein specified.
- (B) Miscellaneous metal work includes all items of miscellaneous metal not covered in other sections. All items shall be complete with minor sundry and accessory parts, anchors, fittings, etc., customarily furnished for the general type and kind of items shown or required.
- (C) Work of this Section includes, but is not limited to, the following items of work. (Note: Refer to drawings for items applicable to the project.)
 - (1) Rough Hardware, inserts, bolts, screws, nuts, etc.
 - (2) Ladders
 - (3) Bollards
 - (4) Frames for wall, roof, pits, etc.
 - (5) Partition angle supports
 - (6) Lintels
 - (7) Leader (Downspout) guards
 - (8) Other miscellaneous metal items indicated on drawings, otherwise specified or required for the completion of other work, including freestanding partition angle supports.

3. WORK SPECIFIED UNDER OTHER SECTIONS (As Required by Job Conditions)

- (A) Structural Steel - Section 05120
- (B) Steel Joists - Section 05210
- (C) Steel Joist Girders - Section 05211
- (D) Metal Roof Deck - Section 05311
- (E) Cold Rolled Structural Metals - Section 05400
- (F) Decorative Metals - Section 10999

4. SUBMITTALS

- (A) Shop Drawings
 - (1) Submit shop drawings to CASCO for review prior to fabrication.
 - (2) Shop drawings shall be in accordance with the contract drawings and shall show sizes of metal items, method of assembly, hardware anchorage and connection to other work for each item of miscellaneous metal.
 - (3) The location of all items must be given either by note or by an erection drawing.
 - (4) Shop drawings shall also indicate by manufacturer and part number all fastening to be used.
 - (5) When necessary, measurements given on the contract drawings must be verified at the building on surrounding work to avoid any discrepancies.
 - (6) Detail metal work for ample size, strength and stiffness and as directed. Detail items subject to live loads to support such loads as required by applicable Codes and governing agencies, unless otherwise noted.
 - (7) Detail metal work to receive hardware and show proper clearances or bevels.
- (B) Review of submittals is only for review of general conformance with the design concepts. In no case shall this review relieve the contractor of the responsibility for general or detailed dimensions, quality or quantity of materials, or any other conditions, functions, performance or guarantees required.

PART 2: PRODUCTS

5. MATERIALS

- (A) Structural Shapes, Plates and Bars: ASTM A36.
- (B) Structural Tubing: ASTM A500, Grade B, Fy = 46 KSI.
- (C) Steel Pipe: ASTM A53, Type S, Grade B, Fy = 35 KSI.
- (D) Cast Iron: Gray iron conforming to ASTM A48, Class 30, unless otherwise noted.
- (E) High strength bolts: ASTM A325.
- (F) Bolts: ASTM A307.
- (G) Welding Electrodes for Arc Welding: Series E70.

6. FABRICATION

- (A) Schedule fabrication and delivery of miscellaneous metals and furnish to trades concerned all items to be built into other work.
- (B) Verify job dimensions before beginning fabrication.
- (C) Drill or punch and countersink holes for bolts and screws. Shearing, drilling or punching shall leave clean, true lines and surfaces.
- (D) At the proper time furnish necessary templates, patterns and items of miscellaneous metal, such as sleeves, inserts and similar items to be built into adjoining work.
- (E) Unless otherwise shown, all corners shall be square and all members shall be true to length and straight. Fabricate metal work with sharp lines and angles with smooth true surfaces and clean edges. Form exposed joints to exclude water.

- (F) All parts exposed to view shall be thoroughly finished, presenting a neat and workmanlike appearance with surfaces ground and dressed, free from flake, rust, pitting, weld marks and other noticeable fabrication marks. There shall be no twists, bends or open joints in finished members, nor any projecting edges or corners at connections. Sharp exposed edges shall be eased.
- (G) All parts shall be properly reinforced, braced and made thoroughly rigid and substantial.
- (H) Conceal fastenings where possible. Where screws or bolts are used, heads shall be countersunk, screwed up tight and threads nicked to prevent loosening.
- (I) Fabricate nonferrous members with fastenings of same material.
- (J) All built-up sections shall be shop fabricated and realigned after welding to true, straight section.
- (K) Welds shall be shop welded insofar as is practicable. Where problems of shipment, handling and installation require fabrication in sections, provide for field fitting and welding.
- (L) Modification of details for ease of fabrication may be made only upon written approval of CASCO.
- (M) Any member requiring a weather seal shall have continuous welds.
- (N) Rough Hardware, Inserts, Bolts, Screws and Nuts, etc.:
 - (1) Unless otherwise specified, provide all bolts, screws, nuts, etc., shown or required to secure this work in place.
 - (2) Unless otherwise specified, provide steel inserts where required in concrete to receive bolts or other fastenings.
 - (3) Use expansion bolts when necessary for attachment to masonry.
 - (4) Unless otherwise specified, provide all angles, plates, bolts, sleeves and other items to be embedded in concrete as shown or required. Bolts shall not extend more than 1/8" beyond exposed nuts.
 - (5) All fastenings shall be subject to the approval of the Owner's Representative.
- (O) Ladders
 - (1) Ladders shall be with indicated, of all welded construction. Fabricate ladder with hot rolled steel rails and round steel rungs extending through the rails with connections welded and ground smooth. Space rungs 12" o.c. Anchor ladder at bottoms and tops and at intermediate points indicated, with brackets of same size as side rails and of such length as to hold ladder 7" away from walls, unless otherwise detailed. Extend rails 42" above top rung and return rails to wall or structure unless other secure handholds are provided. If the adjacent structure does not extend above the top rung, goose-neck the extended rails back to the structure to provide secure ladder access.
 - (2) Fabricate ladders for the locations shown, with dimensions, spacings, details and anchorages as indicated. Comply with the requirements of ANSI A14.3, except as otherwise indicated.
- (P) Pipe Bollards (Exterior):
 - (1) Provide and install pipe guard bollards where shown on drawings. Bollards shall be standard weight pipe buried in concrete below grade. Fill pipe with concrete and mold cap round and smooth. Embed pipe in concrete 18" round (6" cover on pipe) and extend below grade as shown in details. Paint pipe OSHA yellow.

- (Q) Pipe Bollards (Interior):
- (1) Provide and install concrete-filled pipe bollards where shown. Bollards shall be standard weight pipe of the size shown set in pipe sleeves sized to accommodate bollard by plus or minus one inch. Sleeve shall be 12" deep with capped end embedded in concrete floor slab. Set bollard full depth into sleeve and provide wedges to center and plumb. Insert foam backer rod to 1-1/2" below finish floor between pipe and sleeve. Fill with Por Rok grout to finish floor.
- (R) Premanufactured Lintels: As manufactured by Powers Steel & Wire Products, 4118 E. Elwood Street, Phoenix, AZ 85040; Phone: (602) 437-1160; Phone: (888) 525-0108.
- (1) Shall be of sizes shown on the lintel schedule, or as required for the particular location.
 - (2) Lintels are required for openings at ducts, louvers, grilles, convectors, etc. All lintels shall have 8" of bearing at each end, unless otherwise noted.
 - (3) Galvanize all steel lintels to be installed in exterior walls.
- (S) Downspouts Guards:
- (1) Provide and install bent plate downspout guards with brackets as shown at rear of building. Expansion bolt guards with minimum 3/8" diameter x 5" long expansion shields into concrete foundation wall below the level of the first floor and into solidly grouted concrete block above first floor, where anchors occur.
- (T) Steel Frames
- (1) Provide steel frames for openings, knock-out panels, frames for glass block partitions, frames, pits and other openings in floors, walls and roofs as indicated.
 - (2) Construct frames to profile, sizes, and lengths as shown on the drawings.
 - (3) Fabricate miscellaneous units to sizes, shapes and profiles shown, or if not shown, or required dimensions to receive adjacent other work to be retained by framing. Except as otherwise shown, fabricate from steel shapes and plates and steel bars, of welded construction using butt joints for field connection. Cut, drill and tap units to receive hardware and similar items.
 - (4) Weld securely to structural steel where indicated.
- (U) Interior Partition Support Angles: Provide and install partition angle supports and attachments including core drilling of concrete slab for concrete footings.
- (V) Miscellaneous Steel Trim:
- (1) Provide shapes and sizes for profiles shown. Except as otherwise indicated, fabricate units from steel shapes and plates and steel bars, with continuously welded joints and smooth exposed edges. Use concealed field splices wherever possible. Provide cutouts, fittings and anchorages as required for coordination of assembly and installation with other work.

7. FINISHES

- (A) Galvanizing:
- (1) All items to be galvanized shall be cleaned and heat prepared and given one good heavy coating of galvanizing by immersing same full into the vat, allowing same to coat well all joints and surfaces before removing.
 - (2) Galvanizing applied on product fabricated from rolled, pressed and forged steel shapes, plates, bars and strips shall comply with ASTM A123.
 - (3) Galvanizing on assembled steel products shall comply with ASTM A123.

- (4) Galvanizing on iron and steel hardware shall comply with ASTM A153.
 - (5) Galvanized surfaces for which a shop coat of paint is specified shall be chemically treated to provide a bond for the paint.
 - (6) Except for bolts, nuts, etc., all galvanizing shall be done after fabrication.
 - (7) Galvanizing Repair Paint: High zinc dust content paint for regalvanizing welds in galvanized steel, complying with Military Specifications MIL-P-21035 (Ships).
- (B) Shop Painting:
- (1) Unless otherwise specified, all steel, cast or wrought iron, except galvanized parts and parts embedded in concrete shall be prepared and painted as follows before leaving the shop.
 - (a) All items of miscellaneous iron and steel, except galvanized items, shall be given one shop coat of gray metal primer, or an approved equal, applied to a minimum dry film thickness of 2.0 mils.
 - (b) Steel in contact with earth, concrete or masonry shall be given a heavy coat of black asphaltic paint over the prime coat.
 - (2) All paint shall be uniformly applied to produce a smooth surface free from runs, laps, streaks, spatter, brush marks, discontinuances, etc., and surfaces shall be evenly covered to the minimum thickness specified. Paint shall be well worked into all joints and open places. Contact and inaccessible surfaces shall be given one coat before assembling.
 - (3) No paint shall be applied when the materials are wet, or when the ambient temperature is below 40 degrees F., or temperature of materials is below the dew point of the atmosphere.
 - (4) All paint shall be delivered to the shop in original, sealed containers, marked with the manufacturer's name, brand identification and paint number.
 - (5) After erection, spot paint, in a neat and workmanlike manner, all connections, field welds, bolts and abrasions with the same prime paint used originally.

PART 3: EXECUTION

8. PREPARATION

- (A) Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as concrete inserts, sleeves, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.

9. INSTALLATION

- (A) General
- (B) Fastening to In-Place Construction: Provide anchorage devised and fasteners where necessary for securing miscellaneous metal fabricators to in-place construction; including threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws and other connectors as required.
- (C) Cutting, Fitting and Placement: Perform cutting, drilling and fitting required for installation of miscellaneous metal fabrications. All cuts shall be made by metal cutting saw. No torch cuts or jagged edges are acceptable. Set work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items which are to be built into concrete, masonry or similar construction.

- (D) Fit exposed connections accurately together to form tight hairline joints. Weld connections which are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Grind exposed joints smooth and touch-up shop paint coat. Do not weld, cut or abrade the surfaces of exterior units which have been hot-dipped galvanized after fabrication, and are intended for bolted or screwed field connections.
- (E) Field Welding: comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding work.
- (F) Touch-Up Painting: Cleaning and touch-up painting of field welds, bolted connections and abraded areas of the shop paint on miscellaneous metal is specified in Division 9 of these specifications.
- (G) For galvanized surfaces: Clean field welds, bolted connections and abraded areas and apply 2 coats of galvanized repair paint.

END OF SECTION

DIVISION 6 - CARPENTRY

PART 1: GENERAL

1. RELATED DOCUMENTS

(A) The general provisions of Division 1 apply to the work specified in this Section.

2. SCOPE OF WORK

(A) Furnish all labor, materials, equipment, tools and services necessary to complete the carpentry and related work in addition to layout of this work and installation of listed items of other sections of the specifications. Examine the drawings to determine the extent of the work and review the following criteria.

(B) General Requirements

- (1) Furnish and install all rough woodwork, centering for masonry, rough bucks, grounds, screeds, nailing strips, etc.
- (2) Furnish and install all required rough hardware, such as nails, bolts, washers, anchors, etc., except as otherwise specified.
- (3) Take charge of and distribute hardware at the building and provide and arrange temporary shelving for the storage of all hardware.
- (4) Lay out work described and assigned to this section of the specifications in accordance with the drawings. Carefully check dimensions.
- (5) Erect temporary protection for all completed or partially completed work where required to protect materials, surfaces, finishes, and equipment; this includes temporary doors until hollow metal doors are delivered.
- (6) Examine the conditions including existing dimensions under which the work is to be performed and notify the Contractor in writing of any unsatisfactory conditions. Do not proceed with work until unsatisfactory conditions have been corrected.
- (7) Coordinate work and cooperate with all other trades furnishing built in items to avoid delays in any work.

(C) Items of work included but are not limited to the following list. Examine the drawings and this specification section for the extent of work.

- (1) Wood grounds, blocking, and other carpentry items as shown, for supporting and fastening millwork, carpentry, toilet partitions, urinal screens, grab bars, railing, decorative items, and the work of the various other Sections.
- (2) All rough hardware including bolts, nails, screws, spikes, hangers, etc., required in connection with the installation of all materials under this Section.
- (3) Wood framing including wall studs, plates, joists, etc.; plywood, rough wood blocking, blocking for roof curbs, and other roof wood members.
- (4) Laminated plastic covered plywood sills, countertops, cabinets and vanities as indicated.
- (5) Plywood and fiberglass faced gypsum sheathing.
- (6) Plywood backboard for device installation.
- (7) Solid core wood doors.
- (8) All miscellaneous work including shelving, shown on drawings but not furnished or installed by other trades.
- (9) Decorative Items.

- (10) Shelf Brackets.
- (11) Installation and finishing of Owner-supplied items.
- (12) Wood trim.
- (13) Plexiglass
- (14) Decorative Column Wraps.
- (15) Access Panels
- (16) Vapor Barrier

3. SUBMITTALS:

- (A) Shop Drawings: Submit shop drawings showing location of each item, dimensioned plans and elevations, large scale details, attachment devices and other components. Show location of blocking and supports that are to be built into wall substrates.
 - (1) Submit the following shop drawings.
 - (a) Laminated plastic sills and countertops (if requested).
 - (2) Submit the following samples:
 - (a) Plastic laminate, 3" x 5" for each type, color, pattern and surface finish (if requested).
 - (3) Submit shop drawings and wood trim material samples (stained finish per Section 09900).

4. TEMPORARY PROTECTION

- (A) Construct temporary doors, stairs, ladders, runways, barricades and railings required in and about the building.
- (B) The building shall be closed with temporary doors and windows as the work progresses, and during periods of inclement weather. All unglazed windows shall be closed with 4 mil polyethylene film in rough frames or old sash, plywood, or other suitable means. Temporary doors shall be storm tight with locks; do not fasten to finished frame of permanent door.
- (C) Protect well and in the proper manner with nonstaining sheathing paper, all materials in construction likely to be damaged by other trades or affected by the weather. The use of nails, wire, or metal likely to rust or cause discoloration, will not be permitted. All protection must be placed immediately after materials or work is set in place, and when directed by the various trades or Owner's Representative.
- (D) Guard rails shall be constructed around all shafts, wells, large duct openings, etc., occurring in the floor and roof constructions. Rails shall be of height specified by Code and of substantial construction and shall remain in place until the enclosing walls or partitions are erected and roof openings closed, at which time the guard shall be removed.
- (E) Comply with current OSHA regulations and standards.

PART 2: PRODUCTS

5. LUMBER, GENERAL

- (A) Standard: For each use, comply with the "American Softwood Lumber Standard" PS 20 by the U.S. Department of Commerce. Nominal sizes are shown or specified; provide actual sizes complying with the minimum size requirements of PS 20 for the moisture content specified for each use.

- (B) Provide dressed lumber, S4S, unless otherwise shown or specified.
 - (C) Provide seasoned lumber with 19% maximum moisture content at time of dressing and complying with dry size requirements of PS 20, unless otherwise specified.
6. FRAMING LUMBER
- (A) General: Where wood framing from 2" to 5" (but not including 5") in nominal thickness, and 2" or more in nominal width is shown or scheduled; provide lumber complying with grading rules which conform to the requirements of the "National Grading Rule for Dimension Lumber" of the American Lumber Standards Committee established under PS 20.
 - (B) For light framing (2" to 4" thick and 2" to 4" wide), provide construction grade.
7. STRUCTURAL FRAMING
- (A) Structural Framing (6" and wider and from 2" to 4" thick), provide No. 2 grade lumber of any species of specified grade meeting or exceeding the following values:
 - (1) "Fb" (minimum extreme fiber stress in bending) 1250 pounds per square inch.
 - (2) "E" (minimum modulus of elasticity) 1,700,000 pounds per square inch.
 - (B) General: Where lumber less than 2" in nominal thickness and 2" or more in nominal width is shown or specified, provide boards complying with dry size requirements of PS 20.
8. BOARDS
- (A) Concealed boards: Where boards will be concealed by other work, provide the following:
 - (1) Moisture content : 15% maximum.
 - (2) Species and grade: Southern Pine (SPIB) No. 2 boards or WWPA (any species) "Construction" boards.
9. PLYWOOD
- (A) Standard: For each use, comply with the requirements for "Softwood Plywood/Construction and Industrial" PS1 by the U.S. Department of Commerce, and for products not manufactured under PS1 provisions with American Plywood Association (APA).
 - (B) Plywood: Provide plywood as specified for the type of exposure and finish shown or scheduled, as follows:
 - (1) For backing panels for electrical or telephone equipment, provide fire-retardant treated plywood with grade designation, APA B-D, exposure 1 with exterior glue.
 - (2) For paint grade plywood: Provide smooth, sanded plywood in thickness specified on drawings, APA A-D Interior Type: Grade D on concealed face; Grade A Finish and Grade 1 wood on exposed face.
 - (3) For stain grade veneer plywood: Provide smooth, sanded plywood in thickness specified on drawings, APA A-D Interior Type: Grade D on concealed face, Grade A finish and Grade 1 wood, birch or maple veneer, on exposed face. Provide specific species veneer when noted on drawings or offer a substitute in advance.
 - (4) For interior plywood on the sales floor with exposed edges: Laminate edges with wood veneer of the same species as the exposed face.
 - (C) Exterior plywood shall be APA rated sheathing, PS1 C–D (plugged) Exposure 1 (CDX) with exterior glue. Where plywood is concealed by built-up roofing provide exterior type. (Make fire-treated as required by local codes.)

- (D) Mezzanine Flooring: Provide 3/4" tongue and groove "Pine", APA rated Sturd-i-Floor, exposure 1.

10. ANCHORAGE AND FASTENING MATERIALS

- (A) For each use, select proper type, size, material and finish complying with the applicable Federal Specification.
- (1) Fasteners for plywood roof sheathing, flooring sheathing and behind electric panel in utility room shall be flush with face of plywood.
 - (2) Fasteners of all "Deco" items shall be counter sunk.

11. MISCELLANEOUS ITEMS

- (A) Plastic laminate: Plastic laminate shall be of the thickness specified herein and shall be of the "high-pressure" type. Laminate thickness shall be as follows, of color and texture as specified on the drawings:

Post Formed Countertops,
Showroom Sills - Wilsonart, .036" thick

Dutch Door,
Sales Center Cabinets/Countertops
and Breakroom Cabinets/Countertops - Wilsonart, .045" thick

NO SUBSTITUTIONS for plastic laminate.

- (1) All plastic laminate sills shall be laminated in place. No factory laminated pieces allowed. Install per manufacturer's recommendations. Provide 12' long sheets wherever possible to minimize the number of seams/joints.

12. FIRE-RETARDANT TREATMENT

- (A) Where used in contact with or in composition of rated walls or as shown or scheduled, comply with AWPI Specification C-208 for pressure impregnation with fire-retardant chemicals to achieve a flame-spread rating of not more than 25 when tested in accordance with UL Test 723, ASTM E84 or NFPA Test 355.
- (B) Where treated items are indicated to receive a transparent or paint finish use a fire-retardant treatment which will not bleed through or adversely affect bond or finish.
- (C) Complete fabrication of treated items prior to treatment, wherever possible. If cut after treatment, coat cut surfaces with heavy brush coat of same fire-retardant chemical used for treatment. Inspect each piece of lumber or plywood after drying and discard damaged or defective pieces.

13. WOOD PRESERVATIVE TREATMENT

- (A) The following items of rough framing or finish woodwork shall be treated with "Woodlife" or equal wood preservative process:
- (1) Framing lumber in contact with concrete slab or grade.
 - (2) Framing lumber and roof sheathing in conjunction with roofing.

14. GYPSON SHEATHING

- (A) Glass-Fiber-Surfaced Gypsum Sheathing Board: Gypsum sheathing board consisting of non-combustible gypsum core incorporating a water-resistant material, surfaced on face and back with inorganic glass fiber mats and alkali-resistant coating, and with unsurfaced square edges; comply with ASTM C1177, and requirements indicated below:
- (1) Type: Regular (not Type X).
 - (2) Thickness: As indicated on drawings.

- (3) Size: As required.
- (4) Equal to "Dens-Glass Gold", Georgia-Pacific Corp.

15. WOOD DOORS

- (A) Comply with applicable portions of the following standards for wood doors:
 - (1) Architectural Woodwork Institute (AWI) "Quality Standards and Guide Specifications".
 - (2) National Wood Window and Door Association (NWWDA). NWWDA Industry Standards I.S.1 Series.
- (B) Solid Core Wood Doors:
 - (1) Components shall be as noted below:
 - (a) Core: Bonded mat formed particleboard meeting requirements of ANSI A208.1 Grade #1-L-1.
 - (b) Wood face shall be closed-grain hardwood.
 - (c) Bottom Rail: Minimum 2-1/4-inch width mill-option softwood.
 - (d) Lock Blocks: Not required.

16. SHELF BRACKETS

- (A) 1/8" steel countertop supports as noted:
 - (1) 29" x 24" for 30" wide counter tops.
 - (2) 18" x 24" for 24" wide counter tops.
 - (3) Color to be as indicated on drawings.
 - (4) Provide number as indicated on drawings manufactured by A&M Hardware, Inc., Mount Joy, PA (888) 647-0200 www.AandMhardware.com. **NO SUBSTITUTIONS**

17. OWNER-SUPPLIED ITEMS

- (A) Items supplied by Owner are to be stored, installed and finished by Contractor.
 - (1) Provide for space and storage of items supplied by Owner, per manufacturer's directions.
 - (2) Provide wood ground, clips, blocking, adhesives, fasteners, sawing, shoring, etc. to allow for secure installation of items provided by Owner.
 - (3) Provide sanding, priming, taping, puttying, painting, caulking or other finishing for desired appearance of items provided by Owner.

18. WOOD TRIM

- (A) Wood Trim: Poplar or maple, Grade 'C' or better unless otherwise indicated on drawings:
 - (1) Wood Base, as indicated on drawings.
 - (2) Base Shoe Molding (required at tile floor): 1/2 by 3/4-inch (13 by 19 mm).
 - (3) Other trim as indicated on drawings.

19. ACCESS PANELS

- (A) Milcor **NO SUBSTITUTIONS**
815 Kimberly Drive
Carol Stream, IL 60188
Tel: (800) 624-8642
Fax: (866) 466-9335
www.milcorinc.com
- (1) **NO SUSTITUTION** for access panels
- (2) Milcor Type M with cam lock release mechanism, unless Type DWR is called for on the drawings.
- (3) Milcor Type DWR with cam lock release mechanism, when called for on the drawings.

20. VAPOR BARRIER

- (A) DuPont Tyvek Commercial Wrap or approved equal.
- (1) Seam tape, sealant and fasteners as recommend by vapor barrier manufacturer.

PART 3: EXECUTION

21. WOOD FRAMING, GENERAL

- (A) Set wood framing accurately to required lines and levels. Provide framing members of sizes and on spacings shown, and frame openings as shown, or if not shown, comply with the recommendations of the "Manual for House Framing" of the National Forest Products Association. Cut, join and tightly fit framing around other work. Do not splice structural members between supports unless otherwise detailed.
- (B) Anchor and nail as shown, or if not shown, to comply with the "Recommended Nailing Schedule - Table 1" of the "Manual for House Framing" and other recommendations of the NFPA.
- (C) Securely attach carpentry work to substrates by anchoring and fastening as shown and as required by recognized standards. Countersink nail heads on exposed carpentry work and fill holes. Fasteners to be flush with surfaces except in "Deco" work to be countersunk.
- (D) Set carpentry work accurately to required levels and lines, with members plumb and true and accurately cut and fitted.
- (E) Anchor sill plates to concrete floors with expansion bolts, one near each end and at 4' intermediate spacing. Anchor other wood members into concrete, masonry and steel with appropriate fasteners and unless otherwise indicated, space fasteners at 4-ft. centers with a minimum of two fasteners per piece. Anchor bolts shall be a minimum 3/8-in. round. Stagger end joints of wood members overlaying one and other 2- ft. and lap members at corners.
- (F) Trim shall be installed with lengths as long as practicable and closely fitted joints. Blind nail to the extent practicable; set and stop face nailing with non-staining putty to match finish. Use screws for fastening to metal; set and stop as done for nails. Stagger and conceal joints. Cap molded work at returns and interior angles and miter at exterior corners. Shoulder flat work to reduce warping.
- (G) For exterior canopy, fascia/soffit and other construction attached to and projecting from the building, provide fire-retardant treated blocking, framing lumber and plywood as indicated or as required by all applicable codes, regulations, ordinances and by authorities having jurisdiction. Fire-treated lumber and plywood shall be as specified in this Section above.

22. ATTACHMENT AND ANCHORAGE

- (A) Use common wire nails, except as otherwise shown or specified. Use finishing nails for finish work. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting of wood; predrill as required.

23. WOOD GROUNDS, NAILERS, BLOCKING AND SLEEPERS

- (A) Provide wherever shown and where required for screeding or attachment of other work. Form to shapes as shown and cut as required for true line and level of work to be attached. Set true to line and level, plumb, with intersections true as required angle. Coordinate location with other work involved.
- (B) Attach to substrates securely with anchor bolts and other attachment devices as shown and as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise shown. Build into masonry; anchor to form-work before concrete placement.

24. WOOD FURRING

- (A) Install plumb and level with closure strips at all edges and openings. Shim with wood blocking or incombustible materials, accurately fitted to close furred spaces.
- (B) Furring to receive gypsum drywall: Unless otherwise shown, provide 1" x 2" furring at 16" o.c. vertically.

25. PLYWOOD

- (A) Comply with recommendations of the American Plywood Association (APA).

26. GYPSUM SHEATHING

- (A) Install gypsum sheathing to metal framing with specified fasteners in strict accordance with sheathing manufacturer's published recommendations in local codes and as indicated on the drawings.
- (B) Install in as large sizes as are practical for application indicated to minimize joints and provide a smooth, flat surface to receive the finish indicated.

27. WOOD TRIM

- (A) Provide specified length material for finished wood trim on interior walls and partitions. Interior partitions up to 16 feet in length should be done with one piece of material without joints. Interior perimeter walls should be made up of trim lengths of no less than 14 feet and require the fewest joints possible.
- (B) Joints in trim are to be miter cut at corners and angle cut to lap in trim runs, versus a standard butt joint. Review available trim and choose material by color, grain pattern and grain density for least noticeable transitions at joints in trim runs. Flip trim or turn trim over to compare all options of material at joints.
- (C) Wood base is to be scribed when concrete floor is proven uneven.
- (D) Allow a minimum of 7 days for interior wood trim to acclimate in the conditioned/humidity-controlled building prior to installation.

28. PLEXIGLASS

- (A) Refer to drawings for product color, thickness, finish, and manufacturer. If matte finish on one side is indicated, that side shall face the showroom.

29. ACCESS PANELS

- (A) Examination
 - (1) Verify conditions are ideal for suitable installation.

- (B) Preparation
 - (1) Advise installers of work relating to access panel installation including rough opening dimensions, locations of supports, and anchoring methods. Coordinate delivery with other work to avoid delay.
 - (C) Installation
 - (1) Follow manufacturer's instructions for installing access panels.
 - (2) Set frames to proper alignment with the wall or ceiling.
 - (3) Position access panels for proper access to concealed equipment requiring access.
 - (4) Provide and install weather-stripping to backside of access panel to prevent light leakage.
 - (D) Adjust and Clean
 - (1) Adjust panel after installation for proper operation. Remove drywall mud and/or dust from hinge and rabbet.
 - (2) Remove and replace panels or frames that are warped, bowed, or damaged.
30. VAPOR BARRIER
- (A) Verify substrate and surface conditions are in accordance with vapor barrier manufacturer recommended tolerances prior to installation of weather barrier and accessories.
 - (B) Install weather barrier over exterior face of exterior wall substrate in accordance with manufacturer recommendations.
 - (C) Start vapor barrier installation at a building corner, leaving 6 – 12 inches of vapor barrier extended beyond corner to overlap.
 - (D) Install vapor barrier in horizontal manner starting at the lower portion of the wall surface with subsequent layers installed in a shingling manner to overlap lower layers. Maintain vapor barrier plumb level.
 - (E) Overlap vapor barrier
 - (1) Exterior corners: minimum 12 inches.
 - (2) Seams: minimum 6 inches.
 - (F) Attach vapor barrier to substrate per manufacturer's recommendations.
 - (G) Apply flashing to vapor barrier membrane to installing cladding anchors.
 - (H) Seal seams of vapor barrier with seam tap at all vertical and horizontal overlapping seams.
 - (I) Seal any tears or cuts as recommended by vapor barrier manufacturer.

- END OF SECTION

DIVISION 6 - CARPENTRY

PART 1: GENERAL**1. SECTION INCLUDES**

- (A) Quartz agglomerate surfacing countertops.
- (B) Quartz agglomerate backsplashes.
- (C) Quartz agglomerate endsplashes.
- (D) Adhesives and sealants.

2. RELATED REQUIREMENTS

- (A) Section 01021 – Submittals
- (B) Section 01021 – Closeout Submittals.
- (C) Section 06100 – Rough Carpentry.
- (D) Section 07901 – Joint Sealants

3. REFERENCES

- (A) Reference Standards:
 - 1. ASTM C 97: Standard Test Methods for Absorption and Bulk Specific Gravity of Dimension Stone.
 - 2. ASTM C 170: Standard Test Method for Compressive Strength of Dimension Stone.
 - 3. ASTM C 501: Standard Test Method for Relative Resistance to Wear of Unglazed Ceramic tile by the Taber Abraser.
 - 4. ASTM C 834: Standard Specification for Latex Sealants.
 - 5. ASTM C 920: Standard Specification for Elastomeric Joint Sealants.
 - 6. ASTM D 790: Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
 - 7. ASTM E 84: Standard Test Method for Surface Burning Characteristics of Building Materials
 - 8. ISO: International Organization for Standardization.
 - 9. ISO 9001: Quality Management Systems.
 - 10. SCAQMD Rule 1168: Adhesive and Sealant Applications.

4. SUBMITTALS:

- (A) Submit under provisions of Section 01021 - Submittals.
- (B) Product Data:

1. Submit product data for each specified product. Include manufacturer's technical data sheets and published instruction instructions.
 2. Submit Safety Data Sheets (SDS) for adhesives and sealants.
- (C) Shop Drawings:
1. Submit fully dimensioned shop drawings showing countertop layouts, backsplashes, endsplashes, joinery, edge conditions, terminations, substrate construction, cutouts and holes. Show plumbing installation provisions. Include elevations, section details, and large scale details.
- (D) Samples:
1. Submit selection and verification samples for each color and pattern required.
- (E) Quality Assurance Submittals:
1. Test Reports: Submit certified test reports showing compliance with specified performance characteristics and physical properties, if required.
 2. Warranty: Specimen copy of specified warranty.
- (F) Closeout Submittals:
1. Maintenance Data: Submit manufacturer's published Care & Maintenance manual with closeout submittals.
5. **REGULATORY REQUIREMENTS**
- (A) Accessibility Requirements: Comply with the U.S. Architectural & Transportation Barriers Compliance Board ADA-ABA Accessibility Guidelines for Buildings and Facilities.
6. **QUALITY ASSURANCE**
- (A) Qualifications:
1. Manufacturing Facility Qualifications: Quartz surfacing materials produced in an ISO 9001 certified facility.
 2. Fabricator Qualifications: Minimum of five years documented experience in fabricating quartz surfacing countertops similar in scope and complexity to this Project, using water-cooled cutting tools. Currently certified by the manufacturer as an acceptable fabricator.
 3. Installer Qualifications: Minimum of five years documented installation experience for projects similar in scope and complexity to this Project, and currently certified by the manufacturer as an acceptable installer.

7. DELIVERY, STORAGE AND HANDLING

- (A) Delivery and Handling: Comply with manufacturer's recommendations for shipping and handling quartz surfacing materials to preclude breakage or damage. Brace quartz surfacing units as necessary during shipment, transporting in near-vertical position with finished face towards finished face. Do not allow finished surfaces to rub during shipping and handling.
- (B) Storage and Protection: Store materials protected from exposure to harmful weather conditions, at temperature and humidity conditions recommended by manufacturer. Store quartz surfacing sheet materials on racks in near-vertical position to preclude damage. Store with finished face turned towards finished face. Prevent warpage and breakage.

8. PROJECT CONDITIONS

- (A) Field Measurements: Verify actual measurements and openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.
- (B) Adhesive: Acclimate adhesives to occupancy room temperatures with maximum temperature not to exceed 75 deg F.

9. WARRANTY

- (A) Manufacturer's Limited Warranty: Provide manufacturer's standard 10 Year Commercial Limited Warranty against defects in quartz surfacing sheet materials.

10. MANUFACTURER

- (A) Wilsonart (**NO SUBSTITUTIONS**)
- (B) Composition: Up to 93 percent quartz aggregate combined with polyester resin binders and proprietary pigments that are fabricated into slabs using vacuum vibrocompaction technology.
- (C) Material Thickness: 3/4" nominal.
- (D) Material Weight: 10 lbs./ft².
- (E) Countertop Dimensions: (indicated on drawings).
- (F) Conformance Standards:
 - 1. NSF/ANSI Standard 51.
- (G) Physical Characteristics:
 - 1. Flexural Strength: Greater than 4,500 psi; ASTM D 790.

2. Flexural Strain: Less than 0.375 percent; ASTM D 790.
 3. Flexural Modulus: Greater than 3.75 MPsi; ASTM D 790.
 4. Stain Resistance (24 Hour): No effect to moderate effect; NEMA LD-3.
 5. Abrasion Resistance: Greater than 100 in.-lbs.; ASTM C 501.
 6. Density: Greater than 2.1 g/cm³; ASTM C 97.
 7. Compressive Strength (One Axis - Dry): Greater than 20,000 psi; ASTM C 170.
 8. Moisture Absorption: Maximum 0.022 percent; ASTM C 97.
- (H) Quartz Finish: Polished finish with Glossometer reading greater than 45.
- (I) Color and Pattern: Indicated on Drawings.
- (J) Edge Detail: Indicated on Drawings.

PART 2: PRODUCTS

11. ACCESSORY MATERIALS

- (A) Joint Adhesive: Methacrylate-based adhesive for chemically bonding quartz surfacing seams. Color complementary to quartz surfacing sheet material. UL 2818 GREENGUARD Gold certified and complies with SCAQMD Rule 1168.
1. Basis of Design: "Wilsonart Hard Surface Adhesive."
 2. Other Acceptable Products: Pigmented knife grade adhesives suitable for use with quartz surfacing are also acceptable.
- (B) Elastomeric Sealant: Mildew-resistant silicone sealant for filling gaps between countertops and terminating substrates in wet environment applications. Complies with ASTM C 920, Type S (single component), Grade NS (nonsag).
1. Product: Acceptable to countertop manufacturer.
 2. Color: Complementary to quartz surfacing color.
- (C) Siliconized Acrylic Sealant: Siliconized acrylic latex sealant. For general applications to fill gaps between countertops and at terminating substrates. Complies with ASTM C 834, Type OP, Grade NF, and SCAQMD Rule 1168.
1. Product: "Wilsonart Color Matched Caulk".
 2. Color: Complementary to quartz surfacing color.
- (D) Construction Adhesive: Countertop manufacturer's recommended silicone-based construction adhesive for backsplashes, endsplashes, and other applications according to manufacturer's published fabrication instructions.

12. FABRICATION

- (A) Fabricate components in shop, to greatest extent practicable, in sizes and shapes indicated according to approved shop drawings and Wilsonart Quartz Fabrication Manual.

- (B) Form joint seams between quartz surfacing components with specified seam adhesive. Completed joints inconspicuous in appearance and without voids. Provide joint reinforced if required by manufacturer for particular installation conditions.
- (C) Provide holes and cutouts for plumbing fixtures and accessories indicated on approved shop drawings. Rout cutouts and finish edges smooth.

PART 3 – EXECUTION

13. EXAMINATION

- (A) Examine substrates and conditions that could adversely affect the work of this Section.
- (B) Substrates must be sound, flat, smooth, and free from dust or other surface contaminants.
- (C) Commencement of work will constitute acceptance of substrates and conditions to receive the work.

14. COUNTERTOP INSTALLATION

- (A) Install quartz surfacing components plumb, level, and true according to approved shop drawings and manufacturer's published installation instructions. Use woodworking and specialized fabrication tools acceptable to manufacturer.
 - 1. Fasten quartz surfacing components to base cabinets or other supporting substrates with suitable adhesives acceptable to manufacturer.
- (B) Form joint seams with specified seam adhesive. Seams to be inconspicuous in completed work. Seams in locations shown on approved shop drawings and acceptable to manufacturer. Promptly remove excess adhesive.
 - 1. Clamp or brace quartz surfaces in position until adhesive sets.
- (C) Fill gaps between countertop and terminating substrates with specified silicone sealant.
- (D) Install backsplashes and endsplashes where indicated on Drawings. Adhere to countertops with specified construction adhesive.

15. REPAIRS

- (A) If permissible to Architect, minor surface marring for quartz surfacing components may be repaired according to manufacturer's published installation instructions.
- (B) Remove and replace quartz surfacing components that are damaged and cannot be satisfactorily repaired.

16. CLEANING AND PROTECTION

- (A) Clean quartz surfacing components according to manufacturer's published maintenance

instructions. Completely remove excess adhesives and sealants from finished surfaces.

- (B) Protect completed work from damage during remainder of construction period.

END OF SECTION

DIVISION 7 - MOISTURE CONTROL

PART 1: GENERAL

1. RELATED DOCUMENTS

- (A) Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

2. SCOPE OF WORK

- (A) This Section includes cold-applied emulsified-asphalt dampproofing applied to the following surfaces:
- (1) Exterior face of inner wythe of exterior masonry cavity walls.

3. SUBMITTALS

- (A) Product Data: For each type of product indicated. Include recommendations for method of application, primer, number of coats, coverage or thickness and protection course.

4. QUALITY ASSURANCE

- (A) Source Limitations: Obtain primary dampproofing materials and primers through one source from a single manufacturer. Provide secondary materials recommend by manufacturer of primary materials.

5. PRODUCT CONDITIONS

- (A) Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit asphalt dampproofing to be performed according to manufacturers' written instructions.

PART 2: PRODUCTS

6. MANUFACTURERS

- (A) Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- (1) Cold-Applied, Emulsified-Asphalt Dampproofing:
- (a) Euclid Chemical Company (The).
 - (b) Gardner Asphalt Corporation
 - (c) Henry Company
 - (d) Karnak Corporation
 - (e) Koppers Industries, Inc.
 - (f) Marlarkey Roofing Company
 - (g) Meadows, W.R., Inc.
 - (h) Sonneborn, Div of ShemRex, Inc.
 - (i) Tamms Industries

7. BITUMINOUS DAMPPROOFING

- (A) Cold-Applied, emulsified Asphalt Dampproofing:
- (1) Brush and Spray Coats: ASTM D 1227, Type III, Class 1.

8. MISCELLANEOUS MATERIALS

- (A) Emulsified-Asphalt Primer: ASTM D 1227, Type II, Class 1, except diluted with water as recommend by manufacturer.

PART 3: EXECUTION

9. EXAMINATION

- (A) Examine substrates, with Applicator present, for compliance with requirements for surface smoothness and other conditions affecting performance of work.
 - (1) Begin dampproofing application only after substrate construction and penetrating work have been completed and unsatisfactory conditions have been corrected.

10. PREPARATION

- (A) Protection of Other Work: Mask or otherwise protect adjoining exposed surfaces from being stained, spotted, or coated with dampproofing. Prevent dampproofing materials from entering and clogging weep holes and drains.
- (B) Clean substrates of projections and substances detrimental to work; fill voids, seal joints, and apply bond breakers if any, as recommended by prime material manufacturer.

11. APPLICATION, GENERAL

- (A) Comply with manufacturer's written recommendations unless more stringent requirements are indicated or required by Project conditions to ensure satisfactory performance of dampproofing.
 - (1) Apply additional coats if recommended by manufacturer or required to achieve coverages indicated.

- END OF SECTION -

DIVISION 7 - MOISTURE CONTROL

PART 1: GENERAL

1. RELATED DOCUMENTS

(A) The general provisions of Division 1 apply to the work specified in this Section.

2. SCOPE OF WORK

(A) Extent of insulation work is shown on drawings and specified herein.

(B) General requirements include:

(1) Batt insulation.

(2) Rigid insulation (between Z-furring channels).

(C) Z-furring channels specified in Section 09261.

(D) Perimeter underslab insulation for interior face of foundation wall vertical installation.

3. QUALITY ASSURANCE

(A) Thermal Conductivity: Thicknesses indicate are for thermal conductivity (k-value at 75° F or 24° C) specified for each material. Provide adjusted thicknesses as directed for equivalent use of material having a different thermal conductivity. Where insulation is identified by "R" value, provide thickness required to achieve indicated value.

(B) Fire and Insurance Ratings: Comply with fire-resistance, flammability and insurance ratings indicated, and comply with regulations as interpreted by governing authorities.

(C) Federal Specifications: Where compliance with FS standard is indicated, specified requirements for marking individual boards, batts, blankets are waived, provided packages of units are labeled to show compliances.

(D) Maximum Allowable Asbestos Content of Inorganic Insulations: Provide insulations composed of material fibers or mineral ores which contain less than 0.25% by weight of asbestos of any type or mixture of types occurring naturally as impurities as determined by polarized light microscopy test per Appendix A of 40 CFR 763.

4. PRODUCT HANDLING

(A) General Protections: Protect insulation from physical damage and from becoming wet, soiled, or covered with ice or snow. Comply with manufacturer's recommendations for handling, storage and protection during installation.

5. SUBMITTALS

(A) Manufacturer's Data, Building Insulation: Submit copies of manufacturer's specifications, recommendations and installation instructions for each type of insulation required. Include manufacturer's published data, or certified test laboratory report indicating that each material complies with the requirements and is intended generally for the applications shown.

PART 2: PRODUCTS

6. MATERIALS

(A) Batt Insulation: Owens/Corning Fiberglass Unfaced Thermal Batt Insulation or approved equal. Units conforming to ASTM C665, Type 1 with the following characteristics:

(1) Thickness: Indicated on drawings.

(2) R-value: 3-1/2" thick, R 11.0; 6-1/4" thick, R 19.0; 9-1/2" thick, R 30.0.

(B) Rigid Insulation Board: DOW Tuff-R or Dow Thermax insulating sheathing complying with ASTM C1289, Type I, Class 2, or approved equal. Insulation shall be 1" and 1-1/2" thick and have long term thermal resistance (R-value) of 6.5 and 9.0, respectively.

- (C) Perimeter underslab Insulation (if required): ASTM C578 type IV, Standard Specification for Preformed, Block-Type Rigid Polystyrene Thermal Insulation for installation vertically against inner face of foundation wall.
- (D) Auxiliary Insulating Materials:
 - (1) Mechanical Anchors: Type and size as recommended by insulation manufacturer for type of application and condition of substrate.

PART 3: EXECUTION

7. INSPECTION AND PREPARATION

- (A) Installer must examine substrates and conditions under which insulation work is to be performed and must notify Contractor in writing of unsatisfactory conditions. Do not proceed with insulation work until unsatisfactory conditions have been corrected in manner acceptable to Installer.
- (B) Clean substrates of substances harmful to insulations or vapor barriers, including removal of projections which might puncture vapor barriers.
- (C) **PROVIDE OWNER'S REPRESENTATIVE WITH PHOTOGRAPHIC DOCUMENTATION OF IN-PLACE WORK (I.E. PIPING, ELECTRICAL CONDUITS, ETC), PRIOR TO CONCEALMENT.**

8. INSTALLATION

- (A) Comply with manufacturer's instructions for particular conditions of installation in each case. If printed instructions are not available or do not apply to project conditions, consult manufacturer's technical representative for specific recommendations before proceeding with work.
- (B) Extend insulation full thickness as shown over entire area to be insulated. Cut and fit tightly around obstructions, and fill voids with insulation. Remove projections which interfere with placement.
- (C) Apply a single layer of insulation of required thickness, unless otherwise shown or required to make up total thickness.
- (D) General Building Insulation:
 - (1) Apply insulation units to substrate by method indicated, complying with manufacturer's recommendations. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
 - (2) Install rigid board perimeter insulation vertically against inside face of foundation wall.

9. PROTECTION

- (A) General: Protect installed insulation from harmful weather exposures and from possible physical abuses, where possible by non-delayed installation of concealing work or, where that is not possible, by temporary covering or enclosure. Installer shall advise Contractor of exposure hazards, including possible sources of deterioration and fire hazards.

END OF SECTION

DIVISION 7 - MOISTURE CONTROL

PART 1: GENERAL

1. RELATED DOCUMENTS

- (A) Provisions of Division 1 apply to the work specified in this Section.
- (B) Other related Documents:
 - (1) Section 05400 – Cold Rolled Structural Metals
 - (2) Section 06100 – Carpentry
 - (3) Section 07901 – Joint Sealant

2. SUMMARY

- (A) System in this section refers to Class PB exterior insulation and finish systems consisting of an inner layer of thermal insulation board and an outer layer forming the protective finish coating. Installed over the EIFS manufacturer's water resistive barrier coating. Supporting substrates are specified in other sections.
 - (1) Class PB is the designation developed by the Exterior Insulation Manufacturers Association (EIMA).
- (B) Fiberglass faced gypsum sheathing ASTM C1177 (DensGlass Gold) and silicone treated gypsum core surfaced with inorganic fiberglass mats coated with alkali-resistant coatings, specified in Section 06100, "Carpentry".

3. QUALITY ASSURANCE

- (A) Contractor Qualifications:
 - (1) Contractor Requirements: Shall be knowledgeable in the proper installation of the E.I.F.S. System and demonstrate experience and competency in the proper installation of E.I.F.S. System. Shall have minimum five (5) years experience. Contractor shall submit in writing E.I.F.S. Manufacturer's document stating that E.I.F.S. Manufacturer clearly accepts the Contractors ability to install the products and systems specified and will enter into the warranty required as part of this specification. Contractor shall submit a detailed list of completed projects of the E.I.F.S. System Manufacturer intended for use stating project, name, location, contact and completion date.
- (B) Code Recognition and E.I.M.A. Member: The E.I.F.S. System Manufacturer shall be recognized for the intended use by the applicable Building Code(s). Shall be a current member of E.I.M.A.
- (C) Details:
 - (1) Shall conform with system manufacturer's current published typical details and specifications.
 - (2) Shall conform with applicable Building Code(s) Research & Evaluation Report for the E.I.F.S. System specified.
- (D) The sections and details shown on the architectural drawings are intended only to show the general profile and appearance desired of the finished Exterior Insulation and Finish Systems (EIFS) system. The EIFS system supplied shall be engineered by the Manufacturer and installed by the Contractor complete with all membranes, details and accessories necessary to provide a warranted watertight enclosure to the building in the areas applied. In the case of a conflict between any details on the architectural drawings and the manufacturer's details and requirements, the Architect will be notified in writing of such conflict. Shop drawings, if provided to the Architect, will be reviewed for conformance to the intended appearance and profile of the exterior cladding only, and shall not relieve the Manufacturer, Supplier or Contractor of their responsibilities herein.

- (E) Contractor must fully comply with the requirements of ASTM C1397 - 09 - "Standard Practice for Application of Class PB Exterior Insulation and Finish Systems (EIFS) and EIFS with Drainage" and all other requirements contained herein. The Contractor shall verify and implement all of the Manufacturer's requirements for a warranted installation as well as any codes governing products and process implementation. Contractor shall include exclusive use of certified and trained installers, on-site inspections or observations of product application, protection of unfinished construction, redundant moisture barriers at edges of substrate and of application surface, redundant moisture barriers at penetrations, drainage systems, and a tightly caulked envelope.
- (F) Manufacturer's specified practices, details and techniques, if not properly designed and executed could result in failure of the EIFS system, and will be considered entirely the responsibility of the Contractor, who shall indemnify and defend the Owner, Architect and Engineer against any and all claims, damages, suits, actions, legal costs and expenses directly and/or indirectly related to EIFS system

4. SUBMITTALS

- (A) Submittals: Submit the following:
- (1) Product Data
 - (2) E.I.F.S. System Manufacturer samples of protective finish coating, color(s) and texture (to Owner's representative).
 - (3) Contractor pre-qualification document signed by system manufacturer.
 - (4) Applicable Building Code Research & Evaluation Reports and current E.I.M.A. membership certificate.
 - (5) Mock-up (if requested) prepared by Contractor shall be 5'-0" x 4'-0" demonstrating proposed range of color, texture and workmanship. Mock-up will include rustications, accents, control joints and various thicknesses simulating wall surface on jobsite.
 - (6) Manufacturer's standard 5-year limited warranty for materials.
 - (7) Submit documentation (if requested) which verifies that the E.I.F.S system has been approved for use by local authorities having jurisdiction and complies with all applicable state or federal codes or regulations.

PART 2: PRODUCTS

5. MANUFACTURERS

- (A) Acceptable Manufacturers and Systems: Subject to compliance with requirements, provide systems and products of one of the following:
- (1) Dryvit Systems, Inc. – Outsulation Plus MD System
 - (2) Parex USA, Inc. – Standard WaterMaster EIFS
 - (3) STO Corporation – STO Therm ci Essence

6. MATERIALS

- (A) Expanded Polystyrene EPS Board Insulation: ASTM C578, Type I; 1 pound/cf density, thickness as indicated on drawings (minimum 3/4") and complying with system manufacturer's requirements for material qualities.
- (B) Standard Reinforcing Fabric: Balanced, alkaline-resistant open-weave glass-fiber fabric approved by system manufacturer and complying with ASTM D578 and weighing not less than 4.2 oz. per sq. yd.
- (C) Hi-Impact Reinforcing Fabric (for areas 8'-0" A.F.F. and below and other areas if locally required): Balanced, alkaline - resistant open weave fiberglass fabric approved by the E.I.F.S. System Manufacturer and complying with ASTM D579 and weighing not less than 20 oz. per sq. yd.
- (D) Air and Water Resistive Membrane: System manufacturer's factory mixed liquid applied

flexible water-based polymer material.

- (E) Adhesive for Application of Insulation: System manufacturer's standard formulation complying with the following requirements:
 - (1) Factory-mixed formulation designed for adhesive attachment of insulation to substrates of type indicated.
- (F) Base Coat: System manufacturer's standard formulation complying with the following requirements:
 - (1) Factory mixed formulation (no cement) performs as the base to embed the reinforcing fabric and receive the finish coat.
- (G) Finish Coat Materials: System manufacturer's standard mixture complying with the following requirements:
 - (1) Factory-mixed formulation of polymer emulsion admixture, colorfast mineral pigments, sound stone particles, and fillers. Shall be dirt pick-up resistant according to ASTM G 26.
- (H) Provide colors and texture of protective coating as indicated on drawings and as approved by the Owner's Representative selected by Owner from manufacturer's full range of standard colors and textures.
- (I) Water: Clean and potable.
- (J) Trim Accessories: Type and depth required to suit conditions indicated; manufactured from zinc alloy; coordinate depth of accessories with thickness of base and finish coats required.
- (K) Silicone Sealants: Chemically curing, silicone sealant as listed and recommended by system manufacturer for use indicated, compatible with joint fillers, joint substrates, and other related materials, and complying with requirements of Division 7 Section "Joint Sealers" exterior one-component sealants.
 - (1) Dow Corning: Sealant #790, 791, or #795. Primer – 1200 prime coat when required.
 - (2) Pecora Corporation: Sealant – 890 Silicone. Primer – P64.
 - (3) Tremco, Inc. : Sealant – Spectrum 3. Primer - #23.

NO SUBSTITUTIONS

- (L) Deviations from the specified materials will be considered, where tested systems or specific materials are solely required to be used in order to comply with the Building Code. Evidence of need for this deviation shall be submitted to the Owner and Architect for approval.

PART 3: EXECUTION

7. INSTALLATION

- (A) General: Comply with system manufacturer's current published instructions for installation of system as applicable to each type of substrate indicated.
- (B) Preparation for Installation:
 - (1) Protect adjoining surfaces including landscaping and sidewalks, from drips and spills. Mask off areas that are not to receive EIFS finish. Cover area below work with drop clothes or visqueen. Clean EIFS products from adjoining surfaces immediately after spillage. Comply with manufacturer's recommendation for cleaning.
 - (2) Install the EIFS manufacturer's water resistive barrier coating per the manufacturer's installation instructions.
- (B) Adhesively attach insulation to substrates as follows:

- (1) Apply adhesive to insulation by notched trowel method to coat entire surface of sheathing.
 - (2) Apply boards over dry substrates in courses.
 - (3) Stagger joints to produce running bond pattern.
 - (a) Offset joints of insulation from joints in sheathing.
 - (4) Interlock ends at internal and external corners.
 - (5) Abut boards tightly at joints.
 - (6) Rasp or sand flush entire surface to remove irregularities projecting more than 1/32 inch from surface of insulation; do not create depressions deeper than 1/16 inch.
 - (7) Cut insulation to fit openings, corners, and projections and to produce edges and shapes conforming to details indicated.
 - (8) Cut grooves, rabbets, and other features in outside face of insulation with high-speed router and bit. Do not reduce insulation thickness at features to less than 3/4 inch.
 - (9) Interrupt insulation at expansion joints in substrates.
 - (10) Form joints for sealant application.
 - (11) Treat exposed edges of insulation board by encapsulating with base coat, reinforcing fabric, and finish coat.
 - (12) Wrap edges with base coat and reinforcing fabric at through joints transitions to other materials or other "hidden" edges. Apply finish coat 1/4" minimum past point of intended coverage with sealant or other material.
- (C) Apply base coat to exposed surfaces of insulation in thickness specified by system manufacturer.
- (D) Fully embed reinforcing fabric in wet base coat.
- (E) In areas designated for high impact EIFS, install heavy reinforcing mesh and then standard mesh in accordance with the EIFS manufacturer's installation instructions.
- (F) Apply finish coat over dry base coat in thickness required by system manufacturer to produce a finish of uniform texture and color maintaining a wet edge at all times to obtain a uniform appearance without interruptions, cold joints, or scaffold lines. Finish coating thickness shall be 1/8" minimum.
- (G) Prepare joints to receive sealants, at locations indicated, to comply with applicable requirements of Division 7 Section "Joint Sealers" and with "EIMA Joint Sealant Specification for Exterior Insulation and Finish Systems."

8. INSPECTION

- (A) Inspection of the E.I.F.S. installation shall be performed by a representative of the Manufacturer. A report of the field visit shall be developed describing the materials and workmanship to be in compliance with Manufacturer's recommendations, or to describe any deficiencies, with associated corrections identified during the site visit. Report shall be on E.I.F.S. manufacturer's company letterhead. A copy of the report shall be sent to the Owner, Contractor, and Professional of Record. If deficiencies occur, the Contractor shall immediately perform corrections recommended by E.I.F.S. manufacturer. The intent of the specifications is to ensure the system is installed in a manner that will be guaranteed by the E.I.F.S. manufacturer and insurable by property loss underwriters.

END OF SECTION

DIVISION 7 - MOISTURE CONTROL

PART 1: GENERAL

1. SUMMARY

- (A) Section includes: Grace Ice & Water Shield® self-adhering membrane as a sloped roof underlayment.
- (B) Related Sections:
 - (1) The general provisions of Division 1 apply to the work specified in this Section.
 - (2) Section 06100- Rough Carpentry.
 - (3) Section 07401 – Metal Roofing
 - (4) Section 07600 – Flashing and Sheet Metal

2. REFERENCES

- (A) American Society of Testing and Materials (ASTM)
 - (1) D412 – Standard Test Methods for Vulcanized Rubber and Elastomeric Tension.
 - (2) D461 – Standard Test Methods for Felt.
 - (3) D903 – Test Methods for Peel or Stripping Strength of Adhesive Bonds.
 - (4) D1970 – Standard Specification for Self- Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
 - (5) D3767 – Standard Practice for Rubber – Measurement of Dimensions.
 - (6) E96 – Standard Test Methods for Water Vapor Transmission of Materials.

3. SUBMITTALS

- (A) Manufacturer’s product data sheet and product sample.

4. QUALITY ASSURANCE

- (A) Manufacturer Qualifications: Self-adhesive membrane roofing underlayment shall be manufactured and marketed by W.R. Grace & Co., - Conn., Grace Construction Products, Cambridge, MA or a firm with a minimum of 25 years experience in the production and sales of self-adhered membrane roofing underlayments.

5. DELIVERY, STORAGE AND HANDLING

- (A) The membrane and accessory products must be handled properly. Read all product labels and Material Safety Data Sheets (MSDS’s) for proper handling and disposal. Deliver all material in manufacturer’s unopened packages and store all materials under cover. Do not double stack palletized material.

PART 2: PRODUCTS

6. MANUFACTURERS AND PRODUCTS

- (A) Acceptable Products and Manufacturers: Grace Ice & Water Shield manufactured by W.R. Grace & Co., - Conn, Grace Construction Products, Cambridge, MA. **NO SUBSTITUTIONS**

7. MATERIALS

- (A) Grace Ice & Water Shield is a cold-applied membrane composed of a high density, cross laminated polyethylene film coated on one side with a layer of rubberized asphalt adhesive. An embossed, slip resistant surface is provided on the polyethylene Grace Ice & Water Shield is interwound with a disposable silicone-coated release sheet. Membrane shall confirm to the following physical properties:

Property	Value	Test Method
Color	Gray-Black	
Thickness, Membrane	1.02 mm (40 mil)	ASTM D3767 Procedure A Section 9.1)
Tensile Strength, Membrane	1720 kN/m ² (250 psi)	ASTM D12 (Die C Modified, ½ in./ minute)
Elongation, Membrane	2.50%	ASTM D412 (Die C Modified, ½ in./ minute)
Low Temperature Flexibility	Unaffected @ -29°C (-20°F)	ASTM D1970
Adhesion to Plywood	525 N/m (3.0 lb/in. width)	ASTM D903
Permeance (Max)	2.9 ng/m ² s (0.05 Perms)	ASTM E96
Material Weight Installed (Max)	1.3 kg/m ² (0.3 lb/ft ²)	ASTM D461

8. ACCESSORIES

- (A) Accessory Products: Perm-A-Barrier® WB Primer.

PART 3: EXECUTION

9. PREPARATION

- (A) Install the membrane directly on a clean, dry, continuous structural deck. Some suitable deck materials include plywood, wood composition, wood plank, metal concrete, or gypsum sheathing. Remove dust, dirt loose nails, and old roofing materials. Protrusions from the deck area must be removed. decks shall have no voids, damaged, or unsupported areas. Repair deck areas before installing the membrane.
- (B) Prime concrete, masonry surfaces and Dens-Glass Gold® with Perm-A-Barrier WB primer at a rate of 6-8m²/L (250-350 ft²/gal). Prime wood composition and gypsum sheathing with Per-A Barrier WB Primer if adhesion is found to be marginal. Apply at same rate.
- (C) Priming is not required for other suitable surfaces provided that they are clean and dry.

10. INSTALLATION

- (A) Install in strict accordance with manufacturer's printed application procedures, precautions, and limitations.

- END OF SECTION -

DIVISION 7 - MOISTURE CONTROL

PART 1: GENERAL

1. RELATED DOCUMENTS

- (A) The general provisions of Division 1 apply to the work specified in this Section.
- (B) Other related Sections:
 - (1) Preservative treated nailers and blocking specified in Section 06100, Carpentry.
 - (2) Flashing and Sheet Metal specified in Section 07600.
 - (3) Roof accessories specified in Section 07701.
 - (4) Metal siding specified in Section 07402.
 - (5) Joint sealants specified in Section 07901.

2. SCOPE OF WORK

- (A) Furnish all labor, materials, tools, equipment and scaffolding required for completing single-ply TPO roofing, roof insulation, membrane flashing work and related items indicated on the drawings and specified herein.
- (B) Coordinate this work with other trades involved to avoid delays and to ensure a satisfactory and watertight installation.
- (C) Examine surfaces on or against which roofing is to be applied, check levels of roof for dips or hollows. Notify Owner's Representative in writing of any defects which, in the opinion of Roofer, would be detrimental to installation of his work. Do not proceed with any work until unsatisfactory conditions have been corrected in a manner acceptable to the Roofing Contractor. Laying of materials will be considered as acceptance of deck by Roofer.
- (D) Proceed with roofing work only after substrate construction and penetrating work have been completed and accepted by the Owner's independent testing and inspection agency.
- (E) Weather Conditions: Proceed with roofing work only when weather conditions are in compliance with manufacturer's recommended limitations, and when conditions will permit the work to proceed in accordance with the manufacturer's requirements and recommendations.

3. QUALITY ASSURANCE

- (A) The roofing and associated work shall be accomplished by a single qualified firm that is approved, authorized or licensed by the roofing system manufacturer to install manufacturer's product, meeting the highest quality rating available with the roofing system manufacturer and is eligible to receive manufacturer's warranty and has installed the approved system for at least five years on projects comparable to the work of this contract; and, upon written request of Owner, shall furnish the name and location of such roof installations.
- (B) Pre-Roofing Conference: Before the roofing work is scheduled to commence, after submittals have been reviewed by CASCO and Owner, and before any materials are ordered, a conference shall be called at the jobsite for the purpose of reviewing the drawings and specifications, the intent of which is to resolve roofing related questions before the work is started. The conference shall be attended by the General Contractor, Roofing Contractor and his foreman, the testing/inspection agency as well as Owner's Representative.
- (C) Source Limitations: obtain all roofing system components from a single roof system manufacturer.
- (D) Fire-Test-Response Characteristics: Provide membrane roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test

method below, by UL, FMG, or another testing and inspecting agency acceptable to authorities having jurisdiction. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.

- (1) Exterior Fire-Test Exposure: Class A; ASTM E 108, for application and roof slopes indicated.
- (2) UL Listing: Roofing system shall meet requirements for U-L Class "A" fire hazard classification ratings.
- (3) FM Listing: Roofing system application shall be in accordance with minimum the following, unless otherwise required by Code or the Authority having jurisdiction.
 - (a) Unless a higher wind speed is identified on the structural drawings a minimum wind speed of 90 mph shall be used for the roof system design.
 - (b) The FM Wind Uplift Rating shall be indicated on the drawings. Where no FM Wind Uplift Rating is specified on the drawings, the rating shall be calculated by the Contractor using the RoofNav Rating Calculator found on the FM website at <https://roofnav.fmglobal.com>.
 - (c) The Wind Uplift Rating calculated for this project's roof system design shall only apply to the roofing system (i.e.: membrane, insulation, etc.) and not supporting structural building components (i.e.: roof deck, roof joists, etc.).

4. SUBMITTALS

- (A) Product's Data, Roofing: Submit copies of Product Data, specifications and installation instructions from the manufacturer for each major roofing product or system required. The material shall not be ordered until the submittals have been approved. One (1) copy shall be kept at the jobsite at all times for use during construction.
 - (1) Any submittal that does not include the proposed Manufacturer's roofing system specification number will be rejected.
- (B) Shop Drawings: For roofing system; include plans, elevations, sections, details, and attachments to adjacent work.
 - (1) Base flashings and membrane terminations.
 - (2) Tapered insulation, including slopes.
 - (3) Insulation fastening patterns.
- (C) Installer Certificates: Signed by roofing system manufacturer certifying that Roofing Contractor is approved, authorized, or licensed by Manufacturer to install the roofing system.
- (D) Maintenance Data: For roofing system; include in maintenance manuals.
- (E) Warranties: Special warranties specified in this Section.
- (F) Inspection Reports: Copy of roofing system manufacturer's inspection reports of interim and completed roofing installation.

5. ROOFING SYSTEM GUARANTEE

- (A) Submit, in duplicate, a twenty (20) year no dollar limit guarantee on roofing and associated work specified in this Section, agreeing to repair or replace work that leaks water, deteriorates excessively or otherwise fails to perform as roofing due to failures of materials, installation or workmanship. Coverage of the guarantee shall include all materials and workmanship for the full time specified. Guarantee shall be issued and backed solely by the Roofing Materials Manufacturer.
- (B) General Contractor to submit to the Owners Representative copies of all Manufacturer's field inspection reports, including interim and final inspection reports, as well as the twenty (20) year guarantee as provided by Manufacturer.

- (C) The Roofing Contractor shall issue a “full system” warranty for a period of two (2) years from date of Certificate of Occupancy. Under this warranty, the Contractor shall remedy any defects resulting from workmanship in the roofing system. Repairs shall be made by the Roofing Contractor and the General Contractor at their own cost and expense, as may be necessary to maintain warranty and to keep roof in a watertight condition. The roofing system is defined as including all components from the roof deck up, including insulation, fasteners, membrane, flashings, adhesives, sealants, and any miscellaneous items required for a complete installation. The cost of repairs are the responsibility of the Roofing Contractor and the General Contractor.
- (D) When unit skylights are called for on the drawings, and an acceptable roofing manufacturer can provide a comparable product, the unit skylight may be submitted for consideration. If the roofing manufacturer’s unit skylight is approved, it shall be included in a unitary full system warranty with the roofing system.

6. DELIVERY, HANDLING, PROTECTION AND STORAGE

- (A) All materials provided by the Roofing System Manufacturer shall be delivered with appropriate packaging labels indicating appropriate warnings, storage conditions, lot numbers, and usage instructions.
- (B) All roofing materials shall be delivered dry in manufacturer’s original, unopened package and be properly stored in a dry place, off the ground on raised pallets, minimum 4” high and off the roof. Membrane may be stored in standard packaging. Completely cover all material with canvas tarpaulins, inside or in closed vans, protected from Sun and weather and the intrusion of water. Plastic covers will not be acceptable.
- (C) Deliver roofing materials to Project site in unopened original containers with seals unbroken and labeled with Manufacturer’s name, product brand name and type, appropriate packaging labels, indicating appropriate warnings, storage conditions, lot numbers, usage instruction, date of manufacture, and directions for storing and mixing with other components.
- (D) Stand all roll goods on end and store on clean floor to keep ends of rolls free from foreign matter.
- (E) Store all cartons and insulation on raised, level platforms in a dry clean location and protect them from the weather with waterproof canvas tarpaulins.
 - (1) Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Comply with insulation manufacturer’s written instructions for handling, storing, and protecting during installation.
- (F) Store solvents and coatings in a cool dry area.
- (G) Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by Roofing System Manufacturer. Protect stored liquid material from direct sunlight.
 - (1) Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- (H) Keep lids tightly sealed on all cut back adhesives, and flashing cements to keep volatiles from escaping.
- (I) Unload and handle all roofing materials insulation and accessories with care. Dropping membrane rolls, roof insulation, and roofing accessories can damage these components sufficiently to cause unsatisfactory application and performance.
- (J) Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of roof deck.
- (K) Plastic covers and shrink-wrap shall not be used for job storage, nor shall any other cover be used in which moisture can condense within or on the material stored therein.
- (L) Keep temperature of all roll materials above 40 degrees F for 24 hours prior to application. Coated rolls shall be given special care in proper temperature protection.

- (M) Cover all roofing materials remaining on the roof deck at the end of each work day.
- (N) PROJECT CONDITIONS:
 - (1) Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to Manufacturer's written instructions and warranty requirements.
- (O) WARRANTY:
 - (1) Special Warranty: Manufacturer's standard form, without monetary limitation, in which Manufacturer agrees to repair or replace all components of membrane roofing system that fail in materials, application or workmanship within specified warranty period. Failure includes roof leaks.
 - (a) Special warranty includes roofing membrane, base flashings, roofing membrane accessories, roof insulation, fasteners and other components of membrane roofing system.
 - (b) Warranty Period: 20 years minimum from date of Certificate of Occupancy.

7. WORK SEQUENCE

- (A) Schedule and execute work to prevent leaks and excessive traffic on completed roof sections. Care should be exercised to provide protection for the interior of the building and to ensure water does not flow beneath any completed sections of the membrane system.
- (B) Do not disrupt activities in occupied spaces.
- (C) Provide preservative treated wood at perimeters to match insulation thickness as required by drawings and roofing system manufacturer.

8. PRECAUTIONS

- (A) Adhesives, primer and caulks as indicated are extremely flammable and/or toxic. Follow precautions indicated on container labels.
- (B) Surface to be bonded shall be dry, clean and free of debris. Suitable surfaces shall be smooth, solid masonry, wood and metal and insulation board fastened according to the specific manufacturer's recommendations for receiving adhered roofing membranes and accepted by the Roofing System Manufacturer for adhered applications of the membrane.
- (C) All fasteners shall be installed with a depth-sensing screw gun to prevent over-driving or under driving. Adapter tools shall be used for the installation of specialized fasteners.
- (D) Verify, coordinate and control the block off or shut down of positive pressure building ventilation systems of roofing materials to prevent sheets from billowing during applications.
 - (1) For stores, which are subject to positive pressurization from wind or from air handling systems below the deck during construction, consult Roofing System Manufacturer for suitability of application or required design enhancements.
- (E) Excessive patching as a result of damage to the membrane, or caused by faulty installation, may require total recover in those areas.
- (F) Job preparation shall include insuring positive drainage of the roofing system.

PART 2: PRODUCTS

9. ACCEPTABLE SINGLE PLY TPO ROOFING MANUFACTURERS AND ROOFING SYSTEMS

- (A) Roof system manufacturers acceptable for use on the project: (ISO 9002 certified)
 - (1) Elevate, Ultra Ply TPO
 - (2) GAF Materials Corporation EverGuard TPO.

- (3) Carlisle Syntec Incorporated. Sure-Weld TPO.
- (4) Johns Manville, JM TPO 60 ST6RM-S.
- (B) In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:
 - (1) Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products specified.
 - (2) Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, and are limited to, the manufacturers specified.

10. ROOFING INSULATION

- (A) Provide preformed, double layer roof insulation boards that comply with requirements and reference standards selected from Manufactures standard sized and in combined thicknesses attaining a "R" value of 26.0 minimum at the thinnest point and aged in accord with RIC/TIMA procedures. Place tapered insulation at bottom.
 - (1) Polyisocyanurate Board Insulation: ASTM C 1289, Type II, glass-fiber mat facer on both major surfaces.
 - (a) Closed cell polyisocyanurate foam with black glass reinforced mat laminated to faces, complying with ASTM C 1289 Type II-Class 1, UL class A rating and Factory Mutual (FM) class 1 approval, with the following additional characteristics:
 - (1) Thickness: As required to attain "R" = 26.00 minimum or greater.
 - (2) Size: 48 inches by 96 inches, nominal. 1.5 inch thickness minimum.
 - (3) Compressive Strength: 20 psi when tested in accordance with ASTM C 1289.
 - (4) Ozone Depletion Potential: Zero; made without CFC or HCFC blowing agents.
 - (5) Recycled Content: 19 percent post-consumer and 15 percent post-industrial, average.
 - (6) Insulation Fasteners: Type and size as required by Roof Membrane Manufacturer for roofing system and warranty to be provided; use only fasteners acceptable to the Roof Membrane Manufacturer.
 - (b) Provide rigid insulation of proper thickness (1" minimum) at all preformed curbs without factory installed insulation.
- (B) Double Layer:
 - (1) Bottom Layer: Isocyanurate roof insulation with Non-Asphaltic Glass Fiber Facers, complying with Federal Specification HH-I-1972/2 and approved for use with guaranteed roofing assemblies.
 - (2) Top Layer: Isocyanurate roof insulation with Non-Asphaltic Glass Fiber Facers, complying with Federal Specification HH-I-1972/2 and approved for use with guaranteed roofing assemblies with stagger joints each way.
- (C) Tapered Insulation: For cricket construction and where otherwise indicated, polyisocyanurate roof insulation meeting Federal specifications HH-1-1972/2 Class 1 and Factory Mutual (FM) Class 1 approval shall be used. Tapered insulation shall provide twice the slope of the roof system (1/4" per foot minimum) for slope on roof crickets on roof plan. Slope to drain as indicated on the drawings.
- (D) Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

11. SINGLE PLY TPO MEMBRANE ROOFING SYSTEM

(A) MECHANICALLY FASTENED THERMOPLASTIC POLYOLEFIN ROOFING MEMBRANE

- (1) Fabric-Reinforced Thermoplastic Polyolefin Sheet: Uniform, Single-ply, white, .060-inch-thick (min.), mechanically fastened per manufacturer recommendations, flexible sheet formed from a thermoplastic polyolefin internally fabric or scrim reinforced with fabric and scrim over manufactures approved insulation and metal deck. Sheets shall conform to ASTM D6878.
 - (a) Provide energy compliant high reflectance and high emissivity roofing with initial reflectance of at least .65- and 3-year aged reflectance of at least .5 when tested in accordance with ASTM E903.
 - (b) Thickness of thermoplastic polyolefin over scrim shall be 21 mil minimum when tested in accordance with ASTM D7635.
- (2) Install roofing membrane over area to receive roofing according to roofing system manufacturer's written instructions. Unroll roofing membrane and allow to relax before installing.
- (3) Mechanically and adhesively fasten roofing membrane securely at terminations, penetrations, and perimeter of roofing.
- (4) Seams: Clean seam areas, overlap roofing membrane, and hot-air weld side and end laps of roofing membrane according to manufacturer's written instructions to ensure a watertight seam installation.
 - (a) Repair tears, voids and lapped seams in roofing membrane that does not meet requirements.
- (5) Through-Membrane Attachment: Secure roofing membrane using fastening plates or metal battens and mechanically fasten roofing membrane to roof deck. Cover battens and fasteners with a continuous cover strip.
- (6) Physical Properties:
 - (a) Breaking Strength: 250 lbf (1108N); ASTM D 751, grab method.
 - (b) Elongation at Break: 15 percent; ASTM D 751.
 - (c) Tearing Strength: 55 lbf (245 N) minimum; ASTM D 751, Procedure B.
 - (d) Brittleness Point: Minus 40 deg F (-40 deg C). ASTM 2137.
 - (e) Ozone Resistance: No cracks after sample, wrapped around a 3-inch-(75 mm-) diameter mandrel, is exposed for 166 hours to a temperature of 104 deg F (40 deg C) and an ozone level of 100 pphm (100 mPa); ASTM D 1149.
 - (f) Resistance to Heat Aging: (White membrane); 90 percent minimum retention of breaking strength, elongation at break, and tearing strength after 32 weeks minimum at 240 deg F (116 deg C); ASTM D 573.
 - (g) Water Absorption: Less than 4 percent mass change after 166 hours immersion at 158 deg F (70 deg C); ASTM D 471.
 - (h) Linear Dimension Change: Plus or minus 2 percent; ASTM D 1204.
- (7) Sheet Seaming System: Manufacturer's standard materials for sealing lapped joints, including edge sealer to cover exposed spliced edges, as recommended by Roofing System Manufacturer.
- (8) Flashing Accessories: Types recommended by Roofing System Manufacturer, including adhesive tapes, flashing cements, and sealants.
- (9) Flashing Material: Manufacturer's standard system compatible with single-ply membrane.

- (10) Membrane Adhesive: As recommended by Roofing System Manufacturer for particular substrate and project conditions, formulated to withstand minimum uplift force per FM requirements.
 - (a) Provide adhesives that comply with local requirements limiting amounts of volatile organic compounds.
 - (b) All-Purpose Sealant: Provide-as a water cut-off mastic, a pitch-box sealer, and as a caulk to seal membrane to metal.
 - (c) Seam Caulk: Provide seam Caulk (white), solvent-based caulk to seal exposed cut edges of reinforced membrane.
 - (d) Seam Cleaner: Prior to heat welding seams, clean all seams and immediate areas with Seam Cleaner surface cleaner.
 - (7) Provide a reinforced or non-reinforced fire-retardant sheet as recommended by manufacturer to achieve UL and FM listing.
 - (8) At masonry roof parapets provide single-ply fully adhered flashing as indicated on drawings.
- (B) AUXILIARY MATERIALS
- (1) General: Auxiliary materials recommended by Roofing System Manufacturer for intended use and compatible with membrane roofing.
 - (a) Liquid-type auxiliary materials shall meet VOC limits of authorities having jurisdiction.
 - (2) Sheet Flashing: Manufacturer's standard white, unreinforced thermoplastic polyolefin sheet flashing, 55 mils (1.4 mm) minimum thickness.
 - (3) Bonding Adhesive: Manufacturer's standard water-based bonding adhesive for membrane, and solvent-based bonding adhesive for base flashings. Bonding adhesives not acceptable in seams.
 - (4) Slip Sheet: Manufacturer's recommended slip sheet.
 - (5) Metal Termination Bars: Manufacturer's standard predrilled stainless-steel or aluminum bars, approximately 1 inch wide by 1/8 inch (25 by 3 mm) thick; with appropriate anchors.
 - (6) Metal Battens: Manufacturer's standard aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1 inch (25 mm) wide by 0.05 inch (1.3 mm) thick, pre-punched and fastened 8" o.c.
 - (7) Metal Accessories:
 - (a) Metal Roof Edging and Fascia: Factory formed continuous metal edge member serving as termination of roof membrane and retainer for metal fascia; watertight with no exposed fasteners; mounted to roof/parapet edge with nails.
 - (b) Wind Performance:
 - (1) Membrane Pull-Off Resistance: 100 lbs/ft, minimum, when tested in accordance with ANSI/SPRI ES-1 Test Method RE-2, current edition.
 - (2) Fascia Pull-Off Resistance: At least the minimum required when tested in accordance with ANSI/SPRI ES-1 Test Method RE-2, current edition.
 - (3) Provide product listed in current Factory Mutual Research Corporation Approval Guide, providing a rating satisfying the local requirements, but with minimum of FM 1-90 rating.

- (c) Description: Two-piece; 45 degree sloped galvanized steel sheet edge member securing top and bottom edges of formed metal fascia.
 - (d) Fascia Face Height: 5 inches.
 - (e) Edge Member Height Above Nailer: 1-1/4 inches.
 - (f) Length: 144 inches.
 - (g) Functional Characteristics: Fascia retainer supports shall allow free thermal cycling of fascia.
 - (h) Aluminum Bar: Continuous 6063-T6 alloy aluminum extrusion with pre-punched slotted holes; miters welded; injection molded splices to allow thermal expansion.
 - (i) Anchor Bar Cleat: 20-gauge, 0.036-inch G90 coated commercial type galvanized steel with pre-punched holes.
 - (j) Curved Applications: Factory modified.
 - (k) Special Shaped Components: Provide factory-fabricated pieces as required for complete installation, including miters, scuppers, and end caps with minimum 14-inch-long legs on corner pieces.
 - (l) Scuppers: Weld watertight.
 - (m) Accessories: Provide matching wall cap, downspout, extenders, and other special fabrications as shown on the drawings.
- (8) Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, termination reglets, cover strips, and other accessories. Unreinforced Ethylene Propylene-based membrane shall be supplied for field fabricated vent stacks, pipes, drains and corners.
- (E) INSULATION ACCESSORIES
- (1) General: Roof insulation accessories shall be as recommended by insulation manufacturer for intended use and compatible with membrane roofing.
 - (2) Fasteners: Factory-coated steel fasteners and metal plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roof insulation to substrate, and acceptable to Roofing System Manufacturer.
 - (3) Cold Fluid-Applied Adhesive: Manufacturer's standard cold fluid-applied adhesive formulated to adhere roof insulation to substrate.
- (F) WALKWAYS
- (1) Flexible Walkways: Factory-formed as provided by the membrane roofing system manufacturer. Color White. Refer to Roof Plan.

PART 3: EXECUTION

12. REFERENCE

- (A) The most current application guide published by the Manufacturer of the selected roofing system shall be considered part of this specification and shall be referred to for more specific application procedures regarding roofing insulation, membrane and base flashing.
- (B) Where this written specification differs from the Manufacturer's application guide, the more stringent specification shall be used.

13. SUBSTRATE PREPARATION

- (A) The General Contractor shall be responsible for providing clean, rust primed, adequate, with deck welds painted, surfaces to receive insulation, roofing and flashing. Prior to the

onset of work, the Roofing System Installer shall inspect the entire area to be roofed with the Owner's Independent Roof Inspector. Defects and improper conditions affecting roof installation shall be brought immediately to the attention of the General Contractor, in writing, for correction. All roof decking, walls, nailers, projections including curbs, pipes, etc. shall be in place prior to commencement of roofing.

- (B) The General Contractor shall provide documentation to the TPO Roofing System Installer and the owner that the deck and all related roof structures have been inspected and accepted by the Independent Roof Inspector prior to requesting the Roofing System Installer to begin work.
- (C) Ponded water shall be removed from the roof surface.
- (D) The Roofing System Installer shall coordinate with the General Contractor and/or directly with the Owner's Testing Agency to ensure timely inspection of the substrate and shall procure the written acceptance of that testing agency on the substrate surfaces prior to installation of roof insulation or membrane. All defects and improper installation shall be immediately brought, in writing, to the attention of the General Contractor for correction.
- (E) Roof deck substrate surface shall be clean, smooth, with all rust areas scraped and paint primed, free of sharp edges or any other irregularities detrimental to 100% adhesion of the flashing membrane. Any substrate repairs or modifications shall be done by others.
- (F) Plywood surfaces, where occurs, shall be minimum 5/8" thick (if indicated on the drawings furnished and installed by others) dry, clean, smooth, free of sharp edges, and suitable for acceptance of membrane. Plywood shall be exterior grade with an A or B finish side up and with no joints gapped greater than 1/4 inch. Install slip plates over all gapped or uneven joints where membrane seams will cross to minimize adhesion inconsistency.
- (G) Nailers: Pressure preservation treated wood nailers shall be installed at gravel stops or drip edges (furnished and installed by Others)
 - (1) Nailer shall be anchored with a suitable fastener for the application having a minimum withdrawal of 100 lbs., staggered 6 inches o.c. within 8 feet of an outside corner and 12 inches o.c. along other perimeter areas.
 - (2) Nailer thickness shall be chosen to match the top surface of adjacent construction $\pm 1/4$ inch. This permissible variation shall not contribute to ponding.

14. APPLICATION PROCEDURES

- (A) Insulation or protection board:
 - (1) Manufacturer's instruction: In regard to attachment, compatibility, and spanning of deck flutes, the Manufacturers' instructions or specifications shall determine the suitability for an application, subject to acceptance by the membrane Roofing System Manufacturer.
 - (2) Precautions: Care shall be taken in handling insulation boards, as well as in their mechanical attachment, so no damage or rupture occurs to the surface. All damaged areas shall be cut out and replaced with structurally sound insulation, properly secured in place.
 - (3) Attachment: Insulation shall be recommended by its Manufacturer for mechanical attachment. All boards shall be mechanically attached by FM approved plate and screw. Boards shall be fastened sufficiently to conform to the substrate surface geometry and FM uplift requirements.
 - (4) Tapered insulation: Tapered insulation systems tapering down to a minimum 1/2-inch thickness shall have a tapered edge strip of high density fiber board and shall be used to provide a smooth positive transition to the flat areas.

15. INSTALLATION OF ROOF INSULATION

- (A) Insulation shall be installed in two layers per the recommendations of FM and the roof insulation manufacturer and the membrane Roofing System Manufacturer:
 - (1) The top layer shall be mechanically fastened through the bottom layer to the deck. Fastener quantities shall be per FM requirements:

- (a) Additional fasteners shall be located as required to eliminate high spots in boards.
 - (B) Insulation boards shall be laid in parallel courses with transverse joints staggered. Adjoining edges of board shall be brought into tight contact but shall not be forced into place in such manner as to damage boards. Where the roof meets vertical surfaces, boards shall be cut in a neat workmanlike manner, leaving approximately a ¼" joint. Repair all joints greater than ¼" with insulation. Score or cut boards as necessary to lay flat on deck where same is irregular. Broken corners shall be cut out and replaced with sections of insulation large enough to be supported on two or more deck flutes.
 - (C) Roof insulations shall be cut to fit neatly around projections, pipes, and vents coming through roofing. Provide clearance per Manufacturer around heat conducting pipes.
 - (D) Insulate deck area under parapet cant slopes.
 - (E) Insulate deck area inside RTU curbs.
 - (F) Install only as much roof insulation as can be completely covered with roofing the same day.
16. ROOFING CONSTRUCTION AT EDGES AND PENETRATIONS
- (A) Provide rigid insulation of proper thickness (1" minimum) at all preformed curbs for new roof penetrations (mech. units, exhaust fans, roof hatch, etc.)
 - (B) Perimeter sheets: Install perimeter sheets in compliance with FM Windstorm resistance classification or per manufacturers' recommendation, the more stringent to apply.
 - (C) At all areas where membrane flashings will be adhered to metal, the metal flange shall be primed on both sides and adhered to the field.
 - (D) All sheet metal flanges to which membrane flashing will be adhered, shall be nailed 3" o.c. staggered, prior to the application of the flashings. Wood nailers equal in thickness to the roof insulation shall be installed below all sheet metal flanges prior to the application of the roofing plies.
17. TPO INSTALLATION
- (A) General: Start installation only in presence of the Owner's Independent Roofing Inspector and a qualified technical roof systems manufacturer's representative.
 - (B) Begin application of roofing systems at the highest point of the project area and work to the lowest point to prevent water infiltration.
 - (C) Mechanically Fastened Membrane:
 - (1) A minimum of one-half width membrane sheets shall be installed at the perimeter of each roof level and the maximum practical width membrane sheets shall be installed over the field of roof. All membrane sheets shall be mechanically attached with manufacturer recommended fasteners and seam plates spaced 6,12, or 18 inches maximum on center (depending on project criteria) within the membrane seam.
 - (2) Membrane shall extend from base of parapet up and over the top of the parapet wall and down to 1" below the wood blocking.
 - (3) Protect roofing system from waste products or direct steam venting as instructed by manufacturer.
 - (4) Do not expose membrane and accessories to temperature in excess of 180F.
 - (5) Avoid foot traffic on newly laid roofing system.
 - (D) Membrane Perimeter sheets: Two or more sheets shall be installed at exposed perimeter areas unless located within ASCE Ground Roughness Categories A and B. Buildings located within ASCE Ground Roughness Categories C and D will have increased perimeter sheet

requirements. Sheets shall be laid out in an approved pattern. Plates and screws shall be installed along the edge of the membrane through the insulation and into the roof deck. At perimeters that are to receive a gravel stop or metal edging, the membrane must be brought over the outside edge and secured at a minimum of 12 inches o.c. Follow FM requirements for wind uplift.

- (E) Lap splice: Membrane shall be overlapped a minimum of 5-1/2 inches along the length of the membrane sheet and 2 inches at end roll sections (width of membrane) and hot-air welded without any containments (adhesive, dirt, debris, etc.) prevalent in the seam.
- (1) The entire lap edge must be probed with an approved seam probing tool after it has cooled completely to verify seam consistency. No probing shall be done before the seam area has cooled to avoid damage to the membrane. In addition, a destructive test shall be performed daily on a 3-inch-wide area of seam weld to verify good peel strength. Properly welded seams will exhibit membrane delamination from scrim prior to weld failure. Destruction tests on welds shall be done for the first seam of the day, the first seam after the robot welder has been allowed to cool down, and after any extreme changes in weather conditions. Cut edges shall be caulked by applying seam/caulk. Destructed test areas shall be immediately repaired to specification required quality.
 - (2) The membrane, as with any material after exposure, shall be cleaned prior to seaming. The approved method for cleaning the membrane prior to hot-air welding shall be as follows:
 - (a) Remove any visible dirt and debris with a clean rag and water. Scrub heavily contaminated surfaces with a detergent cleaner followed by a water rinse.
 - (b) Aggressively agitate the seaming areas with a clean scrub pad saturated with Seam Cleaner followed by a thorough cleaning of the seamed area with a clean, dry rag. Care shall be taken not to redeposit any contaminants onto the cleaned sheet surface.
 - (c) Seam cleaner shall be allowed to completely flash off (i.e. membrane should be completely dry).
 - (d) The standard hot-air welding procedures shall be followed with an approximated 20% reduction in speed or as approved by Roofing System Manufacturer allowing several days to achieve final weld strength.
 - (e) Perimeter fastening: Wood nailers shall be installed at perimeter gravel stops or drip edges. Membrane shall be fastened at other terminations by use of plates and screws.
 - (3) Base of parapet or curb: Membrane shall be mechanically fastened in compliance with the roofing system manufacturer's specifications meeting FM requirements (12 inches o.c. maximum spacing). through insulation into deck. Fastening shall be installed at parapet wall, curbs, fire and smoke vents, expansion joints, and any other roof penetrations that exceed 24 inches in any dimension.
- (F) Flashing: Perimeter, curbs, vents, expansion joints, drains, and other details shall be flashed as shown on Drawings.
- (1) Apply Bonding Adhesive to both underside of flashing membrane and surface to which it is bonded.
 - (a) Bonding adhesive shall not be applied to that portion of the flashing that overlaps onto itself.
 - (b) Hot-air welding shall be used throughout the system where membranes overlap.
 - (2) Bonding Adhesive shall be allowed to dry to finger touch until it does not string or stick to a dry finger. Roll the flashing into the dry adhesive.
 - (a) Flashing shall not bridge at elevation or directional change.

- (3) All flashing shall be mechanically fastened at the top, under or through appropriate counter flashing with approved fasteners and with approved termination details.
 - (4) Metal flashings at perimeter shall be made and installed as per Roofing System Manufacturer's recommendations.
 - (5) Pipe flashings shall be installed in accordance with Roofing System Manufacturer's recommendations. Do not flash to lead.
 - (6) Expansion joints shall be installed in accordance with details shown on drawings.
 - (7) Roof drains if applicable, shall be installed in accordance with Drawings and Roofing System Manufacturer's recommendations. All bolts must be properly secured to supply 100% continuous compression of the clamping ring. Field seams shall not be run through drains.
- (G) Metal work: Metal work other than roof manufacturer's metal systems is not covered by Manufacturer's warranty.
- (1) Metal work shall be installed to prevent damage from buckling or wind.
 - (2) All metal work shall be sealed and waterproofed in an acceptable manner.
- (H) Overnight seal/temporary water stop shall be made by a sealant method approved by the Membrane Manufacturer. Protect the insulation from inclement weather at the end of a day's work or if work is interrupted, the membrane shall be extended beyond the insulation and set into the approved overnight seal material. Roofing System Installer shall coordinate installation to ensure the system is made watertight at the end of each workday or at any interruption in the work.
- (I) Installation
- (1) Approved insulation boards shall be installed with the longest dimension perpendicular to the direction of the membrane seams and with end joints staggered. Boards will be butted as closely as possible with no gaps over ¼ inch and mechanically attached.
 - (2) Perimeter sheets: Sheets shall be laid out in an approved pattern. Plates and Screws shall be installed along the edge of the membrane through the insulation and into the roof deck, per manufacturer's installation instructions. At perimeters that are to receive a gravel stop or metal edging, the membrane shall be brought over the outside edge and secured at a minimum of 12 inches o.c. Follow FM requirements for wind uplift. Buildings located within ASCE Ground Roughness Categories C and D will have increased perimeter sheet requirements to be verified by Roofing Contractor.
 - (3) Sheets fully adhered with manufacturer's membrane adhesive with no contamination of field seams, which must be heat welded.

18. WALKWAY INSTALLATION

- (A) Walkway Installation: See drawings for layout.
- (1) Install walkway material over clean, dry surfaces.
 - (2) Layout areas where walkway material is to be installed with most of the material being oriented so that it is placed between the field seams with each adjacent and abutting section gapped according to manufacturer's recommendations.
 - (3) Weld or glue the perimeter of the properly positioned walkway material. Check seams for any voids or inconsistencies that might prevent water tightness. Provide a double width (approximately 5'0") of protective walkway around all HVAC and roof hatch.
 - (4) Apply seam sealant at all edges if required by Roofing System Manufacturer.

19. WATERSTOPS

- (A) Install temporary cutoffs around incomplete edges of the roofing assembly at end of each day's work and when work must be postponed because of inclement weather or other reasons. Straighten the insulation line using pieces of insulation loosely laid and seal the sheet membrane to the deck or existing membrane.

20. ROOFING APPLICATION QUALITY CONTROL

- (A) The General Contractor shall request the Roofing Manufacturer to provide a competent technical representative to provide one interim and one final inspection and to also inspect and direct the handling, methods, and application of the roofing materials. While it shall not be required that the Manufacturer's Representative remain constantly at the building during installation, he shall inspect all phases of the work in the application of the roofing as it progresses. Representatives should at all times be easily accessible during the execution of the work to properly attend to questioned items. The Manufacturer's Representative shall provide written certification that the workmanship and installation have been properly and correctly performed and that the Manufacturer's warranty is valid.
- (B) If this inspection and certification process is not provided by the General Contractor then the roof test cuts as specified below shall be performed by the General Contractor.
- (1) General Contractor is to be responsible for obtaining roof test cuts and analysis as provided by a certified independent testing laboratory for all roof systems as specified by ASTM. All sampling procedures and documentation shall be in accordance with ASTM. Copies of the results shall be submitted to the Owner's Representative for review and approval.
- (2) The cost of the required test and all subsequent roof repairs are the responsibility of the General Contractor and shall be included as part of the base bid proposal.

END OF SECTION

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DIVISION 7 - MOISTURE CONTROL

PART 1: GENERAL

1. RELATED DOCUMENTS

- (A) The general provisions of Division 1 apply to the work specified in this Section.

2. SCOPE OF WORK

- (A) Furnish all labor, materials, tools, equipment and scaffolding required for completing flashing and associated sheet metal work and related items indicated on the drawings and specified herein.
- (B) The extent of flashing and sheet metal work is shown on the drawings and includes copings, fascias, soffits gravel stops, seamless gutters, downspouts, scuppers, leader heads, column cover caps, sealants and boot connection to underground storm water system (if required).
- (C) Coordinate this work with other trades involved to avoid delays and to ensure a satisfactory and watertight installation.
- (D) Finishes (factory prefinished or field painted) are as called for on the drawings.
- (E) Where field painting is indicated, painting of sheet metal specified in Section 09900. Note: Painting of downspouts to be performed prior to installation.

3. SUBMITTALS

- (A) Samples:
- (1) Submit 3" x 4" minimum sample of each finish/color on each type of metal used to Owner.

PART 2: PRODUCTS

4. MATERIALS

- (A) Galvanized Sheet Metal: Gutters, scuppers, leaders, and downspouts will be a minimum of 22 gage, remaining flashing and sheet metal items will be a minimum of 24 gage, zinc-coated (galvanized) steel sheet, conforming to ASTM A653/A653M, G90 (Z275) coating designation, commercial quality, mill phosphatized where field painted.
- (B) Solder: ASTM B32, 60 percent lead and 40 percent tin with low antimony, as recommended by manufacturer.
- (C) Flux: Muriatic acid, diluted with equal amount of water.
- (D) Exposed Coil-Coated Finish:
- (1) Three-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
- (2) Color: As indicated on drawings.
- (3) Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.
- (E) Miscellaneous Material:
- (1) Cleats: Same metal as sheet being anchored.
- (2) Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil (0.4-mm) dry film thickness per coat. Provide inert-type non-corrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

- (3) Adhesives: Type recommended by manufacturer for substrate and project conditions and formulated to withstand minimum 60-psf uplift force.
 - (4) Butyl Sealant: ASTM C1311, single-component, solvent-release butyl rubber sealant, polyisobutylene plasticized, heavy bodied for hooked-type expansion joints with limited movement.
 - (5) Asphalt Roofing Cement: ASTM-D 4586, asbestos free, of consistency required for application. Provide type which is normally free of sulphur.
 - (6) Elastomeric Sealant (if recommended by supplier): ASTM C920, elastomeric polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- (F) Galvanized parts shall be thoroughly cleaned and dried. Wipe off all oil residue. Shop apply a corrosion resistant metal primer (minimum 1 gallon per 150 square feet). Do not paint seams prior to soldering.

5. FABRICATION

- (A) General: Shop-fabricate metal flashings and trim units to the greatest extent possible. Fabricate as shown and, to the extent not shown, fabricate to comply with SMACNA "Architectural Sheet Metal Manual" metal manufacturer's recommendations, and recognized industry standards. For continuous running work, fabricate with expansion joints in flashings, spaced sufficiently close to prevent flashing damage and failure in resistance to water penetration, permanently. Form flashing to fit substrate in each application.
- (B) Downspouts: Fabricate to cross section indicated, complete with accessories as required. Fabricate as continuous sections. Fabricate downspout accessories from same metal as downspouts.
- (C) Seamless Metal Gutters: Fabricate to cross-section indicated complete with outlet tubes, end pieces, and other accessories as required all of the same metal as gutters. Fabricate guttering in continuous lengths to create the fewest joints while allowing for thermal expansion. Furnish hangers and brackets (when shown on drawings) from same metal as gutters and of size and thickness recommended by SMACNA.
- (D) Form copings joints with equal splice plates both over and under coping expansion gap. Caulk watertight. Reference SMACNA Manual (9/03) Figure 3-3, Detail 21.
- (E) Scuppers and leader heads: Fabricate per drawings to fit actual masonry opening dimensions from same metal as gutters. Solder joints watertight.
- (F) Fabricate work with lines and corners of exposed units true and accurate. Form exposed faces flat and free of buckles, excessive waves and avoidable tool marks, considering temper and reflectivity of metal. Provide neat, uniform seams with minimum exposure of sealant. Except as otherwise shown, fold back sheet to form hem on concealed side of exposed edge.
- (G) Support and Anchorages: Fabricate units with adequate provisions for support and anchorage, of the type needed for indicated method of installation.

PART 3: EXECUTION

6. INSTALLATION, GENERAL

- (A) The Installer must examine substrates and conditions under which metal flashing and trim will be installed and notify Contractor in writing of unsatisfactory conditions. Do not proceed with installation until unsatisfactory conditions have been corrected in a manner acceptable to Installer.
- (B) SMACNA Details: Except as otherwise shown or specified, comply with applicable recommendations and details of "Architectural Sheet Metal Manual" by SMACNA.
- (C) Manufacturer's Recommendations: Except as otherwise shown or specified, comply with recommendations and instructions of manufacturer of sheet metal being installed.

- (D) Some flashing and sheet metal work is to be built into roofing systems.
- (E) Separate dissimilar metals from each other by painting each metal surface in area of contact with a heavy application of bituminous coating, or by other permanent separation as recommended by manufacturers of the dissimilar metals.
- (F) Expansion: Install work with provisions for thermal expansion. Maintain a water-tight installation at expansion seams, locate expansion seams as shown or, if not shown, at the following maximum spacings:
 - (1) Flashing, Expansion Joints, Copings and Trim: At 10'-0" intervals, and 2'-0" each side of corners and intersections.
- (G) Elastomeric Sealant-Filled Joints: Provide elastomeric joints at fixed interfaces with other work, form flashing to provide proper shapes and sizes of sealant beads, with adequate joint bond surfaces. Install sealants in accordance with manufacturer's instructions.
- (H) Fabricate and install work with lines and corners of exposed units true and accurate. Form exposed faces flat and free of buckles, excessive waves and avoidable tool marks, considering temper and reflectivity of metal. Provide uniform, neat seams with minimum exposure of solder, welds and sealant. Except as otherwise shown, fold back sheet metal to form hem on concealed side of exposed edges.
- (I) Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal work as required for a water-tight installation.
 - (1) Provide cleat-type anchorages for metal copings arranged to relieve stresses from building movement and thermal expansion.
 - (2) Do not, under any circumstances, top-nail copings.
- (J) On vertical overlaps, lap 2-piece flashings a minimum of 3".
- (K) On sloping surfaces, for slopes of not less than 6" in 12", lap unsealed flashings a minimum of 6".
- (L) On horizontal surfaces, such as parapets, lap adjoining sections a minimum of 4".
- (M) For embedment of metal flashing flanges in roofing or composition flashing or stripping, extend flanges for a minimum of 4" to 5" embedment.
- (N) Roofing Cement Edges: Where indicated, seal edges of metal flashings to substrates with roofing cement; install bed or bead of cement in manner which will maintain a water-tight seal.
- (O) Moving, Lapped and Expansion Joints: Seal with mastic sealant of polyisobutylene; non-hardening, non-skinning and non-drying type. Do not use elastomeric sealant.
- (P) Gutters: Gutters are to be painted prior to installation (refer to Specification Section 09900). Attach gutters at eave or fascia with firmly anchored gutter hangers to allow free floating movement during thermal expansion and contraction. Provide end closures and seal watertight with sealant. Slope to downspouts.

7. GUARANTEE

- (A) Provide guarantee for all sheet metal work for a period of two (2) years from date of acceptance of same, as evidenced by final payment, and binding Contractor to repair, or replace, at his own expense, all work which may show defective material or workmanship within said period. This guarantee shall include leaking, failure of materials to stay in place, defects in sheet metal work and caulking.

- END OF SECTION -

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DIVISION 7 - MOISTURE CONTROL

PART 1: GENERAL

1. RELATED DOCUMENTS:

(A) The general provisions of Division 1 apply to the work specified in this Section.

2. SCOPE OF WORK:

(A) Furnish the roof hatch including a telescoping safety post and all accessories necessary to complete the roof hatch work.

3. JOB CONDITIONS:

(A) Coordinate the installation of roof accessories with roofing and flashing, so that the best possible integration of work is achieved, resulting in permanent water-proof construction.

PART 2: PRODUCTS

4. PRODUCTS, MATERIALS AND FABRICATION, GENERAL:

(A) Provide manufacturer's standard products except as otherwise indicated and comply with applicable recommendations and details of the "Architectural Sheet Metal Manual" by SMACNA for custom fabricated work.

(B) Fabricate units to withstand 40 lb. live loading.

5. ROOF HATCHES:

(A) Provide metal roof hatch units of the sizes shown, complete with curbs, anchorage system, gaskets, hardware and accessories, and prepared to receive roofing and flashing.

(B) Metal: Aluminum, sheet or extrusions, mill finish.

(C) Insulation: Provide not less than 1" thick rigid fiberglass board type insulation in curbs and in hatch door, sandwiched between metal faces to form double-wall construction.

(D) Hardware: Hinges, self-lifting devices, hold-open device, latch, padlock hasp and operating handle. Provide exterior latch operating handle. Hardware shall be cadmium plated.

(E) Manufacturers: Provide the following:

(1) Bilco Co. - Type S-50; **NO SUBSTITUTIONS**

6. SAFETY POST

(A) Install on fixed ladder below hatch cover Model 1 LadderUP safety post as manufactured by the Bilco Company, New Haven, Connecticut. NO SUBSTITUTIONS. Device shall be manufactured of high strength steel with telescoping tubular section that locks automatically when fully extended. Upward and downward movement shall be controlled by a stainless-steel spring balancing mechanism. Finish shall be black enamel. Unit shall be completely assembled with fasteners for securing to the ladder rungs in accordance with the manufacturer's instructions.

PART 3: EXECUTION

7. INSTALLATION:

(A) Separate metal surfaces of roof accessories from dissimilar metals, and from wood and cementitious substrates, by a thick coating of fibrated bituminous compound or other separation as recommended by the metal manufacturer, and as required to prevent corrosive action.

- (B) Bed Flanges of set-on accessories in mastic or compound which is compatible with roofing and flashing. On sloping decks, shingle flanges with other work for proper water shed.
- (C) Anchor roof accessories permanently to the substrate, by methods which are adequate for the sizes and locations of units.
- (D) Padlock will be provided under Section 08711, Finish Hardware.

8. CLEANING AND PROTECTION:

- (A) Clean surfaces of roof accessories as required to prevent deterioration and uneven weathering.
- (B) The installer shall advise the Contractor, in writing, of protection and surveillance requirements, to ensure that roof accessory units will be without deterioration or damage at the time of acceptance by the Owner.

- END OF SECTION -

DIVISION 7 - MOISTURE CONTROL

PART 1: GENERAL

1. RELATED DOCUMENTS

- (A) The general provisions of Division 1 apply to the work specified in this Section.

2. SCOPE OF WORK

- (A) Furnish all labor, materials, equipment, tools, equipment and scaffolding required for completing caulking and joint sealant work indicated on the drawings and herein specified.
- (B) The extent of the work is indicated on the drawings and specified herein.

3. QUALITY ASSURANCE

- (A) Contractor qualification includes at least five (5) consecutive years in the same business must be able to show experience of satisfactory completion of work on projects of similar size and scope.

4. APPLICATION

- (A) The required applications of sealants and caulking include, but are not necessarily limited to, those locations herein listed.
- (B) Flashing and counterflashing adjoining wall areas.
- (C) Exterior wall joints; Exterior side of concrete masonry, natural stone veneer, and brick veneer control joints, and both exterior and interior sides of concrete masonry unit back-up control joints.
- (D) Joints between wall and adjacent windows, doors, grilles, Owner provided items and miscellaneous frames on exterior and interior.
- (E) Joints at penetrations of walls, decks and floors by piping and other services and equipment.
- (F) Drywall control joints and other joints where drywall abuts wood trim, decorative items or other dissimilar materials.
- (G) Caulk around masonry, glass block, mirrors, metal work, wood trim, decorative items, Owner provided items, countertops, millwork, and window sills or at other dissimilar materials.
- (H) Construction or expansion joints within sidewalks. Joints between sidewalks and curbs. Joints between sidewalks or slabs at masonry walls. Joints between sidewalk and floor slab under thresholds. Joints between sidewalk and concrete pedestals for columns at canopies.
- (I) Exterior expansion joints in cast-in-place concrete and control and construction joints in exposed slabs.
- (J) Joints in E.I.F.S. wall finish systems at control joints, joints between E.I.F.S. and masonry and exposed canopy steel or other dissimilar materials and between E.I.F.S. and at metal roof coping.

5. RELATED WORK SPECIFIED ELSEWHERE:

- (A) Joint sealants at E.I.F.S. specified in Section 07241.

6. SUBMITTALS

- (A) Submit manufacturer's specifications, recommendations, installation instructions, and samples of color and cured finish for each type of sealant required. Include Manufacturer's Published Data, or Certified Test Laboratory Report, indicating that each material complies with the requirements and is intended for the applications shown.

- (B) Submit samples of color and cured finish for each type of sealant to Owner's Representative.

7. REFERENCE STANDARDS

- (A) Unless otherwise indicated or specified, the work shall conform to the following Standards:
 - (1) American Society for Testing and Materials (ASTM).
 - (a) ASTM C834, Latex Sealing Compounds.
 - (b) ASTM C920, Elastomeric Joint Sealants.

8. GUARANTEE, SEALANTS

- (A) Submit 2 copies of written guarantee agreeing to repair or replace sealants which fail to perform as air-tight and water-tight joints; or fail in joint adhesion, cohesion, abrasion resistance, weather resistance, extrusion resistance, migration resistance, stain resistance, or general durability; or appear to deteriorate in any other manner not clearly specified by submitted manufacturer's data, as an inherent quality of the material for the exposure indicated. Provide guarantee signed by the installer and contractor.
- (B) Guarantee period is 2 years.

9. JOB CONDITIONS

- (A) The installer must examine the joint surfaces, backing, and anchorage of units forming sealant rabbet, and the conditions under which the sealant work is to be performed, and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the work and performance of the sealants. Do not proceed with the sealant work until unsatisfactory conditions have been corrected in a manner acceptable to the installer.

PART 2: PRODUCTS

10. MATERIALS, GENERAL

- (A) Provide standard or custom colors to match adjoining surface colors as closely as possible. Final colors subject to Owner approval.
 - (1) Caulk at wood trim abutting drywall to match drywall.
 - (2) Metal trim to drywall: Match drywall paint color. Please note that if metal trim is tight to drywall, caulk is not required.
 - (3) Office countertops: Match countertop color.
 - (4) Restroom countertops: Match countertop color.
 - (5) For gaps greater than ¼", contractor shall install backer rod and caulk.
- (B) Compatibility: Before purchase of each specified sealant, investigate its compatibility to adhere with the joint surfaces, joint materials (manufacturer's recommended variation of the specified materials) which are known to be fully compatible with the actual installation condition, as shown by manufacturer's published data or certification.
- (C) Provide size and shape of preformed sealant tapes as shown or, if not shown, as recommended by the manufacturer, either in his published data or upon consultation with his technical representative.
- (D) Exterior One-Component Sealants: Provide one of the following:
 - (1) Acrylic terpolymer sealant conforming to F.S. TT-S-00230.
 - (2) Silicone sealant conforming to ASTM C920.

- (E) Interior Caulking: Provide one of the following (paintable):
 - (1) Acrylic latex water emulsion compound conforming to ASTM C834.
- (F) Exterior Concrete Paving Joint Sealant at dumpster pad, recycle/dumpster enclosure including adjacent apron slab joints, sidewalk joints and joints at walls: One or two component polyurethane self-leveling sealant conforming to ASTM C920, Type M or S, Grade P, Class 25, Use T. Provide grey color to match concrete.
- (G) Miscellaneous Materials:
 - (1) Joint Cleaner: Provide the type of joint cleaning compound recommend by the sealant or caulking compound manufacturer, for the joint surfaces to be cleaned.
 - (2) Joint Primer/Sealer: Provide the type of joint primer/sealer recommended by the sealant manufacturer, for the joint surfaces to be primed or sealed.
 - (3) Bond Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer, to be applied to sealant- contact surfaces where bond to the substrate or joint filler must be avoided for proper performance of sealant. Provide self-adhesive tape wherever applicable.
 - (4) Sealant Backer Rod: Compressible rod stock polyethylene foam, polyethylene jacketed polyurethane foam, butyl rubber foam, neoprene foam or other flexible, permanent, durable non- absorptive material as recommended for compatibility with sealant by the sealant manufacturer. Provide size and shape of rod which will control the joint depth for sealant placement, break bond or sealant at bottom of joint, form optimum shape of sealant bead on back side, and provide a highly compressible backer to minimize the possibility of sealant extrusion when joint is compressed.

PART 3: EXECUTION

11. JOINT SURFACE PREPARATION

- (A) Clean joint surfaces immediately before installation of sealant or caulking compound. Remove dirt, insecure coatings, moisture and other substances which would interfere with bond of sealant or caulking compound.

12. INSTALLATION

- (A) Comply with sealant manufacturer's printed instructions except where more stringent requirements are shown or specified and except where manufacturer's technical representative directs otherwise.
- (B) Prime or seal the joint surfaces wherever shown or recommended by the sealant manufacturer. Do not allow primer/sealer to spill or migrate onto adjoining surfaces.
- (C) Install sealant backer rod where shown allowing proper depth for sealant bead.
- (D) Install bond breaker tape wherever shown and wherever required by manufacturer's recommendations to ensure that elastomeric sealants will perform properly.
- (E) Employ only proven installation techniques, which will ensure that sealants will be deposited in uniform, continuous ribbons without gaps or air pockets, with complete "wetting" of the joint bond surfaces equally on opposite sides. Except as otherwise indicated, fill sealant rabbet to a slightly concave surface, slightly below adjoining surfaces. Where horizontal joints are between a horizontal surface and a vertical surface, fill joint to form a slight cove, so that joint will not trap moisture and dirt. Finish joint surface shall be smooth.
- (F) Install sealants to depths as shown or, if not shown, as recommended by the sealant manufacturer but within the manufacturer's general limitations, measured at the center (thin) section of the bead.
- (G) Clean excess material off adjacent surfaces. Remove cartons and other debris related to this work from the project site at the direction of the project superintendent.

- (H) Perimeter caulk at storefronts and entrances to be recessed back to the pressure plate. Coordinate installation with Architectural details and storefront supplier.

- END OF SECTION -

DIVISION 8 - DOORS, WINDOWS & GLASS

PART 1: GENERAL

1. RELATED DOCUMENTS

(A) The general provisions of Division 1 apply to the work specified in this Section.

2. SCOPE OF WORK

(A) This Section includes all labor, materials, tools and equipment necessary for and incidental to the execution and completion of Hollow Metal Work, as shown on the drawings and specified herein.

3. REFERENCE STANDARDS

(A) Unless otherwise indicated or specified, the work shall conform to the following standards:

(1) American Society for Testing and Materials (ASTM)

- (a) ASTM A153, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- (b) ASTM A366, Standard Specification for Steel, Carbon, Cold-Rolled Sheet, Commercial Quality.
- (c) ASTM A525 Standard Specification for General Requirements for Delivery of Zinc-Coated (Galvanized) Iron or Steel Sheets, Coils, and Cut Lengths by the Hot-Dip Method.
- (d) ASTM A526, Standard Specification for Steel Sheet, Zinc-coated (galvanized) by the Hot-Dip Process, commercial Quality.
- (e) ASTM A568, Standard Specification for Steel, Carbon and High-Strength Low Alloy Hot-Rolled Sheet, Hot-Rolled Strip and Cold-Rolled Sheet, General Requirements.
- (f) ASTM A569, Test for Specification for Steel, Carbon (0.15 maximum percent) Hot-Rolled Sheet and Strip, Commercial Quality.
- (g) ASTM E152, Standard Methods of Fire Tests of Door Assemblies.

(2) American National Standards Institute (ANSI)

- (a) ANSI A115, Specification for Door and Frame Preparation.

(3) National Builder's Hardware Association (NBHA)

- (a) Recommended Locations for Builder's hardware.

(4) National Fire Protection Association (NFPA)

- (a) NFPA 80, Fire Doors and Windows.

(5) Steel Door Institute (S.D.I.)

- (a) S.D.I. 100, Recommended Specification Standard Steel Doors and Frames.

(6) Underwriters Laboratories, Inc. (UL)

- (a) Building Materials Directory.

4. SUBMITTALS

(A) Manufacturer's Data: For information only, submit two (2) copies of manufacturer's data for fabrication and installation instructions. Transmit one copy of instructions to the Installer.

- (B) Shop Drawings: Submit shop drawings for the fabrication and installation of hollow metal work. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, gauges of metal, finishes, location and installation requirements of finish hardware and reinforcements, and details of joints and connections.
- (C) Provide a schedule of doors and frames using same reference numbers for detail and openings as those on the contract drawings.

5. FIRE RATED ASSEMBLIES

- (A) Fire Rated Assemblies: Wherever a fire-resistance classification (3-hour, 1-1/2-hour, etc., or "A", "B", etc.) is shown or scheduled for hollow metal work, provide fire-rated hollow metal doors and frames investigated and tested as a fire door assembly, complete with type of fire door hardware to be used. Identify each fire door and frame with UL labels, and indicate applicable fire rating of both door and frame. Construct and install assemblies to comply with NFPA Standard No. 80, and as herein specified.
- (B) Oversize Assemblies: Wherever hollow metal assemblies are larger than size limitations established by NFPA and UL, provide manufacturer's certification that assembly has been constructed with materials and methods equivalent to labeled construction.
- (C) Label Construction: Each required fire door and frame, including hardware, shall be an exact duplicate, except for size, of a type investigated and successfully fire tested in accordance with ASTM E152 Standard Methods of Fire Tests for Door Assemblies, for the period of time and with the performance under test as required for the various ratings indicated. The assembly shall be identified by labels of the approving agency. The label on the door or frame shall indicate the applicable fire test rating for the construction furnished. Approved agencies shall include the Underwriters' Laboratories, Inc., the Underwriters' Laboratories of Canada, the Factory Mutual Laboratories, and other authorities having local or regional jurisdiction.

6. PRODUCT DELIVERY, STORAGE AND HANDLING

- (A) Deliver hollow metal work cartoned or crated to provide protection during transit and job storage.
- (B) Inspect hollow metal work upon delivery for damage. Minor damage may be repaired provided the finish items are equal in all respects to new work and acceptable to the Project Manager; otherwise, remove and replace damaged items as directed.
- (C) Store hollow metal units on raised platforms in vertical positions with blocking between units to allow air circulation. Keep stored material covered and protected from damage.

7. JOB CONDITIONS

- (A) Job Conditions: Installer must examine the substrate and conditions under which hollow metal work is to be installed and notify the contractor in writing of any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the installer.

8. QUALITY ASSURANCE

- (A) Provide hollow metal work manufactured by a single firm specializing in the production of this type of work and shall be a current member of S.D.I., unless otherwise acceptable to the Project Manager.

PART 2: PRODUCTS

9. MATERIALS

- (A) Hot-Rolled Steel Sheets and Strip: Commercial quality carbon steel pickled and oiled, comply with ASTM A569 and ASTM A568.
- (B) Cold-Rolled Steel Sheets: Commercial quality carbon steel, complying with ASTM A366 and ASTM A568.

- (C) Galvanized Steel Sheets: Zinc-coated carbon steel sheets of commercial quality, complying with ASTM A526, with ASTM A525, A60 zinc coating, mill phosphatized. Provide for exterior doors and frames.
- (D) Minimum Gauges of Steel: Unless otherwise indicated on drawings doors shall be 18 gauge and frames shall be 16 gauge.
- (E) Core material; for interior doors, honeycomb; exterior doors, polystyrene, U-Factor = 0.21 maximum.
- (F) Supports and Anchors: Fabricate of not less than 16-gauge sheet steel. Galvanize after fabrication units to be built into exterior walls, complying with ASTM A153, Class B.
- (G) Shop Painting
 - (1) Clean, treat and paint surfaces of fabricated hollow metal units, whether concealed or exposed in the finished work.
 - (2) Clean steel surfaces of mill scale, rust, oil, grease, dirt and other foreign materials before the application of the shop coat of paint.
 - (3) Apply shop coat of prime paint of even consistency to provide a uniformly finished surface ready to receive field-applied paint.
 - (4) For steel surfaces use rust-inhibitive enamel or paint, either air-drying or baking, suitable as a base for specified finish paints.
- (H) Inserts, Bolts and Fasteners: Manufacturer's standard units, except hot-dip galvanize items to be built into exterior walls, complying with ASTM A153, Class C or D as applicable.
- (I) Anchors: Provide minimum of 3 anchors each jamb per manufacturer's standards.

10. GENERAL FABRICATION

- (A) Fabricate hollow metal units to be rigid, neat in appearance and free from defects, warp or buckle. Accurately form metal to required sizes and profiles. Wherever practicable, fit and assemble units in the manufacturer's plant. Clearly identify work, that cannot be permanently factory-assembled before shipment, to assure proper assembly at the project site. Weld exposed joints continuously, grind, dress, and make smooth, flush and invisible. Metallic filler to conceal manufacturing defects is not acceptable.
- (B) Exposed Fasteners: Unless otherwise indicated, provide countersunk flat Phillips or Jackson heads for exposed screws and bolts.
- (C) Finish Hardware Preparation: Prepare hollow metal units to receive mortised and concealed finish hardware, including cutouts, reinforcing, drilling and tapping in accordance with final Finish Hardware Schedule and templates provided by hardware supplier. Comply with applicable requirements of ANSI A115 "Specifications for Door and Frame Preparation". (Note: All locksets, latches and cylinders are to be Best.)
- (D) Reinforce hollow metal units to receive surface-applied hardware. Drilling and tapping for surface-applied finish hardware may be done at project site.
- (E) Locate finish hardware in accordance with "Recommended Locations for Builder's Hardware", published by the National Builder's Hardware Association.
- (F) Door Louvers
 - (1) Provide weatherproof stationary louvers for exterior doors, where indicated, constructed of Z-shaped blades formed of 20-gauge galvanized steel sheets. Space blades not more than 1-1/2" o.c. Provide removable insect screens on interior face of doors, of 14 x 18 wire mesh in rigid, formed metal frame.
 - (2) Provide sightproof stationary louvers for interior doors where indicated, constructed of inverted V-shaped or Y-shaped blades formed of 18 gauge cold-rolled steel. Space blades to provide not less than 20% free air opening.

- (3) For fire-rated openings, provide tightly fitted, spring loaded, automatic closing louvers with operable blades, equipped with fusible links, arranged so that metal overlaps metal at every joint.
- (G) Provide stock hollow metal frames of the types and styles indicated on the drawings or schedules and complying with S.D.I. 100 for minimum materials and construction requirements.
- (H) Provide stock hollow metal frames for doors, transoms, sidelights, borrowed lights, and other openings, as shown on the drawings. Conceal all fastenings unless otherwise shown.
- (I) Fabricate frames of fully welded construction.
- (J) Form exterior frames of steel sheets with a stretcher level degree of flatness.
- (K) Rubber Door Silencers: Drill stops to receive 3 silencers on strike jambs of single-swing frames and 2 silencers on head of double-swing frames. Install plastic plugs to keep holes clear during construction.
- (L) Spreader Bars: Provide removable spreader bars for across bottom of frames, tack welded to jambs and mullions.

PART 3: EXECUTION

11. INSTALLATION

- (A) Except for frames located at in place concrete or masonry, place frames prior to construction of enclosing walls and ceilings. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders leaving surfaces smooth and undamaged.
- (B) In masonry construction, locate three wall anchors per jamb at hinge and strike levels. Building-in of anchors and grouting of frames is specified in the Masonry Section.
- (C) At in place concrete or masonry construction, set frames and secure to adjacent construction with machine screws and masonry anchorage devices.
- (D) Install fire-rated frames in accordance with NFPA Standard No. 80
- (E) In metal stud partitions, install at least 3 wall anchors per jamb at hinge and strike levels. In open steel stud partitions, place studs in wall anchor notches and wire tie. In closed steel stud partitions, attach studs to wall anchors with tapping screws.
- (F) Door Installation
 - (1) Fit hollow metal doors accurately in their respective frames, within clearances specified in S.D.I. 100.
 - (2) Place fire-rated doors with clearances as specified in NFPA Standard No. 80.
- (G) Adjust, Repair and Clean
 - (1) Prime Coat Touch-Up - Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer.
 - (2) Install hardware after first finish coat of paint.
 - (3) Check and readjust operating finish hardware items in hollow metal work just prior to final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including doors or frames which are warped, bowed or otherwise damaged.

- (4) Review method of repair for damage with Owner's Representative prior to commencing repairs. For dent: restore primer coat, use Bondo or equal product to fill. Follow manufacturer's directions. Sand smooth and level. Allow for proper drying, prime to match adjacent. First finish coat to be applied after all areas of damage on any one door side have been primed and are ready. Final approval by Owner's Representative.

END OF SECTION

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DIVISION 8 - DOORS, WINDOWS & GLASS

PART 1: GENERAL

1. RELATED DOCUMENTS

- (A) The general provisions of Division 1 apply to the work specified in this Section.

2. SCOPE OF WORK

- (A) The extent of aluminum work under this Section is indicated on the drawings and specified herein. Refer to drawings for location, details, etc. for the work which includes, but is not necessarily limited to:
- (1) Aluminum frames and framing.
 - (2) Aluminum closures.
 - (3) Aluminum clad structural or miscellaneous steel framing.
 - (4) Internal caulking specified for work of this Section.
- (B) Structural Design of curtainwall system including anchorage to the structure and internal stiffeners are part of the work of this Section.
- (1) See 4.(D) below.

3. QUALITY ASSURANCE

- (A) Drawings: Plans, elevations and details show spacing of members as well as profile and similar dimensional requirements of aluminum doors and framing work. Minor deviations will be accepted in order to utilize manufacturer's standard products when, in Project Manager's sole judgment, such deviations do not materially detract from design concept or intended performances.

4. SUBMITTALS

- (A) Shop Drawings: Submit shop drawings for fabrication and installation of aluminum entrances and curtainwalls, including elevations, detail sections of typical composite members, anchorages, reinforcement, expansion provisions, and glazing.
- (B) Samples: Submit samples of each type and color of aluminum finish on 6" long sections of extrusions or formed shapes and on 6" square sheets (if requested).
- (C) Submit product data for all items if requested.
- (D) Curtainwall System Design Certification: Submit a written certification, signed and sealed by an engineer registered in the state where the structure is located, stating that the curtainwall system and its anchorage to the structure has been designed to support the required design wind load as indicated in the "Building Design Data" found on the drawings without exceeding the allowable stresses of the material and without exceeding a deflection of $L/175$ of the span or 3/4 inch, whichever is less. Submit design calculations and shop drawings signed and sealed by the curtainwall system's engineer who is registered in the state where the structure is located.
- (1) Test Reports: Submit certified test reports for framing products (if requested) showing compliance with specified performance characteristics and physical properties.
- (E) Submit documentation (if requested) which verifies that curtainwall system has been approved for use by local authorities having jurisdiction and complies with all applicable state or federal codes or regulations.
- (F) Submit mockup of mitered sill cover end cap to Owner's representative for review and approval.

5. RELATED WORK SPECIFIED UNDER OTHER SECTIONS

- (A) Glass and Glazing: Section 08812.
- (B) The G.C.C. shall prepare all masonry openings required for the installation of work of this Section.
- (C) Masterkeyed Cylinders: Section 08711.
- (D) Sealants and joint fillers for joints at perimeter of entrance and curtainwall systems specified in Joint Sealants Section 07901

PART 2: PRODUCTS

6. ALUMINUM CURTAINWALL WORK

- (A) Drawings are based on Kawneer 1600. Use System-1 (captured) and/or System-2 (silicone glazed) as detailed on the drawings for vertical aluminum framing. Use System-2 (silicone glazed) for sloped aluminum framing. ~~and~~ Use 350 IR Swing Entrances for doors. Similar and equivalent system by Old Castle Building Envelope, YKK, and U.S. Aluminum will be acceptable for use unless otherwise indicated or specified.
- (B) Materials: Aluminum shall be free from streaking and die marks. Extrusions : Alloy 6063-T5 or 6063-T6. Exposed fasteners shall be aluminum, stainless steel or zinc plated steel ASTM A164.
- (C) Finish: (Refer to Drawings for Color Required).
 - (1) A Fluoropolymer Paint Coating, based on 70% KYNAR 500, conforming with the requirements of AAMA 605.2 (American Architectural Manufacturers Association). Color: Custom Colors as indicated or as selected. On doors, provide (over the finish) manufacturer's standard clear protective topcoat.
 - (a) The finish coating on the aluminum work shall be a factory-applied oven baked finish. This finish, Valspar's Floropan coating or as approved equal, shall be a dispersion coating based on Autochem's 70% KYNAR 500 resin (polyvinylidene fluoride) as formulated by a licensed coating formulator. The finish and application and application shall be in strict accord with the formulator's specifications and applied by an approved applicator.
 - (2) Mild steel framing operations shall conform to ASTM A283 Grade "C". All steel to receive one coat of zinc chromate primer after fabrication. Field welds and scratches shall receive one touch-up coat after installation.
- (D) Fasteners: Aluminum alloy 245-T4, bronze, or 300 stainless steel. Do not use exposed fasteners except where unavoidable. Match, including KYNAR 500, finish of adjoining metal or exposed fastener parts. Provide phillips head countersunk head machine screws for exposed fasteners.
- (E) Flashing: 20-gauge aluminum.
- (F) Framing system gaskets, sealants, and joint fillers as recommended by manufacturer for joint type.
- (G) Steel Reinforcement: Complying with ASTM A 36 (ASTM A 36M) for structural shapes, plates and bars; ASTM A 611 for cold-rolled sheet and strip; or ASTM A 570 (ASTM A 570M) for hot rolled sheet and strip.
- (H) Workmanship:
 - (1) All work shall be straight and true, free from warpage, and of highest standard of material and workmanship. As far as possible, all work shall be performed in the shop. Any departure from indicated details shall be submitted for approval to the Owner's Representative. Joints, corners, copes and miters shall be accurately cut, filed, and fitted and framed together at contact points. All surfaces of joints and

- connections shall match the finish of adjacent metal and be approved by the Owner's Representative. Provide all clips, fastenings and reinforcements required for installation of all work. Removable members shall be carefully formed and fitted. So far as possible, all fastenings and shims shall be concealed. Those which are not shall match finish of adjoining metal. All joints shall be watertight. Provide approved type bituminous insulation between aluminum and dissimilar metals or cement mortar.
- (2) All frames, transoms, and mullions, etc., shall be constructed, sized, dimensioned, and reinforced as required to provide rigid construction. Joints shall be of the hairline type. Reinforce with steel plate for all hardware and accessories, including surface applied items. Include all sealing and caulking between metal to metal contacts, between frames, mullions, etc., to provide airtight and weathertight joints.
- (I) Curtainwall System: This Contractor shall furnish all necessary material, labor and equipment for the complete installation of the following:
- (1) Glass framing, vertical and horizontal; transition members connecting these components, adapters and mountings for trim moldings and facing materials. Provide aluminum tube members to be installed over steel channel framing as indicated.
- (2) Framing members, transition members, mullions, adapters and mountings shall be extruded of aluminum with alloy and temper consistent with the method of manufacture. These members shall be of 6063-T5 or 6063-T6 extruded aluminum alloy (ASTM B221 alloy G.S. 10A-T5).
- (3) All screws, miscellaneous fastening devices and internal components shall be of stainless steel or plated or corrosion-resistant materials of sufficient strength to perform the functions for which they are used.
- (4) All mullions shall have glazing gaskets of elastomeric extrusions and sealant to be structural type silicone as recommended by the sealant manufacturer. Horizontals shall have flexible (PVC) thermal break material located on exterior side of glass plane. Exterior glazing shall be EPDM secured by extended aluminum pressure plates fastened to main horizontal grid members. Provisions shall be made at all sealed horizontals to lead moisture accumulation to exterior.
- (5) Where indicated, provide for butt-glazed construction. See Details.
- (a) Joints, water stops, sealants as recommended by the manufacturer. Joints between framing members and adjoining metals made watertight by caulking with caulking compounds, or other approved sealant material.
- (6) All anchorage required to transmit live and dead loads to building structure at all locations necessary.
- (J) Protection: Provide required protection to prevent damage to finished work. Provide protective barriers as required to prevent damage, after erection, resulting from work of other trades. Use strippable rubber paint on erected work and gummed paper on shop fabricated work.
- (K) Aluminum Swing Doors: Door to be installed complete with frames, horizontal mullions, stops, trim, anchors and hardware. Weather-strip exterior door at sill, jamb, and head with manufacturer's standard devices.
- (L) Door accessories and finish hardware; color and finish shall be US26D surfaces unless otherwise indicated or specified.
- (1) Supplier to verify if codes require hardware other than specified within drawings.

7. PERFORMANCE

- (A) Framing furnished under this Section shall meet or exceed the following performance requirements.
 - (1) Resistance to Water Infiltration: The framing system, shall not leak when tested in accordance with ASTM E331 at a minimum static air-pressure difference of 20 percent of positive wind load design pressure, but not less than 15 P.S.F.
 - (2) Performance Under Uniform Loading: When tested in accordance with ASTM E330 and when the load is removed there shall be no evidence of permanent deformation or damage when tested under a load of 150 percent of the inward and outward acting design pressures as calculated using the appropriate building code.
 - (3) Allow for expansion and contraction resulting from ambient temperature range of 120°F (49°C) and material surfaces range of 180°F (83°C).
 - (4) Air filtration of not more than 0.06 cfm per square foot of a fixed area per ASTM E 283.

PART 3: EXECUTION

8. PREPARATION

- (A) Field Measurement: Wherever possible, take field measurements prior to preparation of shop drawings, and fabrication, to ensure proper fitting of work. However, proceed with fabrication and coordinate installation tolerances as necessary when field measurements might delay work.

9. ERECTION

- (A) All items under this heading shall be set in their correct locations as shown in the details and shall be level, square, plumb, and at proper elevations and in alignment with other work.
- (B) All joints between interior metal, masonry and between interior glass framing and mullion members shall be tightly caulked in order to secure a watertight job. All materials shall be screwed in place using backing, masonry plugs, or anchor straps as required. Where moldings are joined, they shall be accurately cut and fitted to result in a tightly closed joint.
- (C) After erection, the General Contractor shall adequately protect exposed portions of the framing from damage by welding, grinding and polishing machines, plaster, lime, acid, cement, or other harmful compounds.
- (D) All framing, accessories, etc. shall be installed in strict accordance with the manufacturer's recommendations.
- (E) Remove and replace members that are marred or show evidence of deterioration of finish.

10. CURTAINWALL INSTALLATION QUALITY CONTROL

- (A) The Owner will employ and pay for the services of an Independent Testing Agency to provide testing and inspection of the Curtainwall System installation.
- (B) The extent of the curtainwall quality assurance inspections shall include but not be limited to the following:
 - (1) Verify structural steel located within the curtainwall aluminum mullions and transverse beam sills and headers.
 - (2) Verify connections to curtainwall steel member supports and concrete sill at several locations. Remove cover plates to observe bolt and screw connections at several locations as required.
 - (3) Verify that the installation complies with signed & sealed shop drawings reviewed by the Architect.

11. PROTECTION AND CLEANING

- (A) Protect all glass and aluminum frames from welding damage.
- (B) After installation, metal and glass surfaces of the walls shall be cleaned on both interior and exterior, of all mortar, plaster, paint and other contaminants.
- (C) This contractor shall be responsible for removal of protective materials and cleaning with plain water, or water with soap or household detergent. This Subcontractor shall be held responsible for damages resulting from the use of other cleaning materials.
- (D) After being cleaned, all work shall be protected against damage until it is accepted by the General Contractor. Thereafter, it shall be the responsibility of the General Contractor to maintain protection and provide final cleaning.
 - (1) Cleaning of all frames to be complete a minimum of one (1) week before store opening.

12. GUARANTEE

- (A) For all work of this Section provide guarantee that all workmanship, materials, and the completed installations are first class in every respect, and that Contractor will make good at his own expense any and all defects of any nature whatsoever that may develop within one year from date of acceptance of the building.

13. FIELD QUALITY CONTROL

- (A) Testing Agency: Owner may engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- (B) Testing Services: Testing and inspecting of representative areas to determine compliance of installed system with specified requirements shall take place as follows and in successive stages as indicated on Drawings. Do not proceed with installation of the next area until test results for previously complete areas show compliance with requirements.
 - (1) Field Water Testing: Testing of curtain walls for water resistance shall be performed according to ASTM E1105 and AAMA 501.2, applying same test pressures (where applicable) and requirements as listed under Section 1.2. Modified such that uncontrolled water is defined as water infiltrating the system or appearing on any interior surface from sources other than condensation.
 - (2) Testing Extent: Six test areas, three per ASTM E 1105 and three per AAMA 501.2, are to be performed at areas as selected by Owner.
 - (3) Curtain wall and window wall test to incorporate at least two bays wide by 1 floor high including the edge of slab conditions.
 - (4) Any failed test will require an additional two areas to be tested in addition to retesting of the remediated failed specimen.
 - (5) Construction sequence shall include provisions for timely completion of test areas.
 - (6) Remedial measures shall maintain standards of quality and durability and are subject to approval.
 - (7) Test Reports: Shall be prepared according to AAMA 503.
 - (8) Provide powered scaffold, water supply, power supply, manpower and necessary equipment.
- (C) Contractor is to repair or remove work where test results and inspections indicate that it does not comply with specified requirements.
- (D) Contractor is responsible for ensuring adequate water supply and pressure to meet the specified requirements.

- (E) Additional testing and inspection due to failed tests will be performed to determine compliance of remediated or additional work with specified requirements. All costs for remediation and retesting shall be at the Contractor's expense. Additional expense shall include those of the testing agency, Owner, Architect and Consultant.

END OF SECTION

DIVISION 8 - DOORS, WINDOWS & GLASS

PART 1: GENERAL

1. RELATED DOCUMENTS

- (A) The general provisions of Division 1 apply to the work specified in this Section.

2. SCOPE OF WORK

- (A) All hardware shall be neatly packed and labeled with identification as to where it is to be applied.
- (B) All hardware shall have the required screws, bolts, and fastenings, wrapped in paper and packed in the same package as the hardware.
- (C) All hardware that fastens to metal doors and frames shall be made to template and attached with machine screws, except door closers which will be thru-bolted
- (D) The Hardware Contractor shall furnish and ship templates to other contractors as directed, all F.O.B. Factory Site. All hardware shall be shipped to the job site.
- (E) Provide a competent representative who shall inspect and direct the method of setting, applying and adjusting all hardware. It is not required that the Representative shall remain constantly at the building but shall properly inspect all the work in the application of hardware, as it progresses. This representative shall be at all times easily accessible during the execution of the work in order that he may promptly attend to items in connection with the hardware.

3. SUBMITTALS

- (A) Supplier's Hardware Schedule: Submit finish hardware schedule in accordance with Division 1, complying with the actual construction progress. Hardware schedules are intended for coordination of the work. Review and acceptance of schedule does not relieve the Contractor of his exclusive responsibility to fulfill the requirements as shown and specified.

PART 2: PRODUCTS

4. MATERIALS

- (A) See Hardware Schedule on the drawings for materials furnished by this Contractor. **(NO SUBSTITUTIONS)**.
- (B) All locks to have manufacturer's cylinders and a construction core. **(NO SUBSTITUTIONS)**.

5. GUARANTEE

- (A) All hardware items shall be guaranteed by their manufacturer as stated in their catalogs. Vendor shall assume all responsibility.
- (B) Guarantees shall be in writing by the manufacturer and shall be delivered to the Owner. The guarantee shall begin from the date of acceptance of the building.
- (C) Hardware vendor shall make a final check of all installed hardware items together with the Owner's Representative and General Contractor, prior to final acceptance of the building.
- (D) Defective hardware within the guaranteed period must be replaced at Contractor's expense, including labor for removal and reinstallation.

6. HARDWARE SCHEDULE: Items supplied by General Contractor. Refer to drawings for schedule. No substitution for scheduled hardware.

PART 3: EXECUTION

7. INSTALLATION

- (A) For exterior outswinging doors, closers shall be mounted inside (push side) of door. Interior doors shall have closers mounted on the pull side of the doors unless otherwise indicated. Verify mounting location of closer with the Owner's Representative before closer installation.
- (B) All hollow metal doors and frames shall have primer coats and the first finish coat of paint applied prior to the installation of door's finish hardware.

- END OF SECTION -

DIVISION 8 - DOORS, WINDOWS & GLASS

PART 1: GENERAL

1. RELATED DOCUMENTS

- (A) The general provisions of Division 1 apply to the work specified in this Section.
- (B) Other Related Sections:
 - (1) Section 07901: Joint Sealants.
 - (2) Section 08100: Hollow Metal Work.
 - (3) Section 08422: Impact Resistant Curtainwall System.

2. SCOPE OF WORK

- (A) Furnish all labor, materials, tools, equipment and scaffolding required for completing glass and glazing work and related items indicated on the drawings and herein specified.
- (B) Items include but are not limited to the following:
 - (1) Glass for curtainwall system shall be insulating units, unless otherwise noted.
 - (2) Glazing for aluminum entrance and exit doors - 19/32⁺ in. thick, impact resistant, laminated, fully tempered, clear glass.
 - (3) Glazing for door vision panels - 1/4 in. thick, fully tempered, clear glass or 1/4" thick clear wire glass if required by Code.
 - (4) Display Mirrors - in Sales Area with trim.
 - (5) Attic Stock (when noted on drawings). (Verify size noted on drawings.)
 - (6) Plexiglas Decorative Panels.

3. SUBMITTALS

- (A) Manufacturer's Product Data on Glass and Glazing, Mirrors and Trim: Submit manufacturer's specifications, recommendations and installation instructions for each type of glass required. Include manufacturer's published data, or letter of certification or certified test laboratory report indicating that each material complies with the requirements and is intended generally for the application shown. Show by transmittal that one copy of each recommendation and instruction has been distributed to the installer.
- (B) Submit documentation which verifies that glazing and structural silicone used in the storefront system has been approved for use by local authorities having jurisdiction and complies with all applicable state or federal codes or regulations (if requested).
- (C) Submit shop drawings to the Owner for all mirrors, depicting fully dimensioned elevations and details. Include mirror joint details and their required alignment with exterior wall concrete masonry control joints (where applies). The drawings shall also indicate that black paint is to be applied to the substrate behind the mirror joints.

PART 2: PRODUCTS

4. GLASS

- (A) Manufacturing and Fabrication:
 - (1) All plate glass manufacturing and fabrication (laminations and insulating units) shall be manufactured and fabricated in the United States of America.

- (B) Flat Glass:
- (1) Shall comply with ASTM C1036 Standard Specification for Flat Glass, Type 1, Class 1 (clear) or Class 2 (tinted, heat-absorbing and light reducing) and Quality q3.
 - (2) ASTM C 1048 Heat Treated Flat Glass, Kind HS or FT (remove ASTM Standard C 1048 if annealed glass), Condition A (uncoated), B (spandrel glass, one surface coated), or C (other coated glass)
 - (a) Maximum peak to valley rollerwave 0.003" (0.08mm) in the central area and 0.008" (0.20mm) within 10.5" (2678mm) of the leading and trailing edge.
 - (b) Maximum bow and warp 1/32" per lineal foot (0.79mm).
 - (c) All tempered architectural safety glass shall conform with ANSI Z97.1 and CPSC 16 CFR 1201.
- (C) Insulating Units: Units shall be Viracon or Vitro Insulating Units as follows: **NO SUBSTITUTIONS**
- (1) Outboard Lite: Viracon VE1-2M or Vitro SolarBan 60 (2) Clear Glass Multi-Function on Clear heat-strengthened glass.
 - (2) One-half (1/2) inch air space.
 - (3) Inboard Lite: Viracon or Vitro 19/32" +/- Laminated clear heat-strengthened glass (1/4" clear glass plus inter-layer plus 1/4" clear glass).
 - (4) Inter-layer: PVB (polyvinyl butyral) or High Performace Ionoplast as allowed by tested curtainwall system approved by the local authorities having jurisdiction
 - (5) Overall thickness: One and five sixteenths (1 5/16) inch, unless otherwise noted.
 - (6) At sidelites adjacent to entrance/exit doors, both inboard and outboard lites fully tempered as required by code.
 - (7) All units shall be dimensionally standardized as indicated on drawings to ensure compatibility with replacement glass dimensions.
 - (8) Spacers: Color Black
- (D) Monolithic Units (Vision): 1/4" fully-tempered clear glass.
- (E) Wire Glass: 1/4" clear, polished both faces, per ASTM C1036 and ANSI Z97.1, Type II, Class I, Quality 98, Form 2, Mesh 1, diamond mesh wire embedded.
- (F) Mirror Glass: Conforming to ASTM C1036, Product Ultra Mirror by Guardian Consolidated or approved equal. www.guardian.com; 800-822-5599.
- (1) Mirror size: 60" to 72" wide. When mirror is greater than 100" high width has to be less than 72" (but not less than 48").
 - (2) Trim (only where called for on drawings and at all exposed vertical edges): Styl-mark 110024 x 210 (brushed brite) or approved equal.
 - (3) Adhesive: Mirror Mastic by Palmer Products Corp. or approved equal. (No rubberized mastics permitted)
- (G) Plexiglas Glazing: (if indicated on drawings) 1/4" thick minimum Plexiglas "G" acrylic plastic sheet as manufactured by Rohm and Haas Company in clear, translucent, transparent, semi-opaque or patterned sheets as indicated on drawings for interior usage.
- (1) All clear plexiglass material to have 10-year non-yellowing warranty and all frosted

plexiglass to have a one-year warranty.

5. WARRANTY

- (A) High-Performance coated glass: Standard limited warranty of ten (10) years.
- (B) Insulating units: Limited warranty ten of (10) years.
- (C) Laminated units: Limited warranty of five (5) years.
- (D) Hurricane impact units: Limited warranty of ten (10) years.

6. GLAZING SEALANTS

- (A) Molded neoprene gaskets (at exterior glazing in aluminum frames) shall be of proper profile and hardness required for watertight construction; comply with ASTM D2000 designation 2BC 415 to 3BC 620, black.
- (B) Oil-based channel glazing compound (at interior glazing) FS TT-G-410 type and consistency recommended by manufacturer for application shown. Products meeting this specification include "Tremglaze" as manufactured by the Tremco Manufacturing Co., Cleveland, Ohio, "Glazing Compounds M242 and M251" as manufactured by the Pecora Chemical Corp., Philadelphia, Pennsylvania.
- (C) Miscellaneous Glazing Materials:
 - (1) Setting Blocks: Neoprene, 70-90 durometer hardness, with proven compatibility with sealants used.
 - (2) Spacers: Neoprene, 40-50 durometer hardness, with proven compatibility with sealants used.
 - (3) Compressible Filler Rod: Closed-cell or waterproof-jacketed rod stock of synthetic rubber or plastic foam, proven to be compatible with sealants used, flexible and resilient, with 510 psi compression strength for 25% deflection.
 - (4) Cleaners, Primers and Sealers: Type recommended by sealant or gasket manufacturer.
- (D) Reference Specification Section 07901 for the use of sealant where glass, mirrors or framed glass lights meet other materials.

7. FABRICATION

- (A) All glass exposed to the exterior shall be fabricated to produce "Roller Wave" in the vertical direction.

PART 3: EXECUTION

8. STANDARDS AND PERFORMANCE

- (A) Watertight and airtight installation of each piece of glass is required. Each installation must withstand normal temperature changes, wind loading, impact loading (for operating sash and doors) without failure of any kind including loss or breakage of glass, failure of sealants or gaskets to remain watertight and airtight, deterioration of glazing materials and other defects in the work.
- (B) Glazing channel dimensions as shown are intended to provide for necessary minimum bite on the glass, minimum edge clearance and adequate sealant thicknesses, with reasonable tolerances. The Glazer is responsible for correct glass size for each opening, within the tolerances and necessary dimensions established.
 - (1) Glass Sizes: Field verify all glass sizes before installing units.
- (C) Comply with combined recommendations of glass manufacturer and manufacturer of sealants and other materials used in glazing, except where more stringent requirements are

shown or specified, and except where manufacturer's technical representatives direct otherwise.

- (D) Comply with "Glazing Manual" by Flat Glass Marketing Association except as shown and specified otherwise, and except as specifically recommended otherwise by the manufacturers of the glass and glazing materials.

9. GLAZING

- (A) Install setting blocks of proper size at quarter points of sill rabbet. Set blocks in thin course of the heel-bead compound, if any.
- (B) Provide spacers inside and out, and of proper size and spacing, for all glass sizes larger than 50 united inches, except where gaskets are used for glazing. Provide 1/8 inch minimum bite of spacers on glass and use thickness equal to sealant width, except with sealant tape use thickness slightly less than final compressed thickness of tape.
- (C) Voids and Filler Rods: Prevent exudation of sealant or compound by forming voids or installing filler rods in the channel at the heel of jambs and head (do not leave voids in the sill channels) except as otherwise indicated, depending on light size, thickness and type of glass, and complying with manufacturer's recommendations.
- (D) Do not attempt to cut, seam, nip or abrade glass which is tempered, laminated, heat strengthened, or coated.
- (E) Force sealants into channel to eliminate voids and to ensure complete "wetting" or bond of sealant to glass and channel surfaces.
- (F) Tool exposed surfaces of glazing liquids and compounds to provide a substantial "wash" away from the glass. Install pressurized tapes and gaskets to protrude slightly out of the channel, so as to eliminate dirt and moisture pockets.
- (G) Clean and trim excess glazing materials from the glass and stops or frames promptly after installation and eliminate stains and discolorations.
- (H) Gasket Glazing: Miter cut and bond ends together at corners where gaskets are used for channel glazing, so that gaskets will not pull away from corners and result in voids or leaks in the glazing system.
- (I) At completion of work and just prior to final acceptance by Owner, clean both sides of all glass.

10. REPLACEMENT GLASS

- (A) Provide insulating glass units, number of units and size indicated on drawings for main field glazing, crated and stored in the Storage Room. Coordinate with Owner's representative.

11. PLEXIGLAS GLAZING

- (A) All wood or metal surfaces for framing Plexiglas are to be primed and painted or pre-finished before glazing. Cut height and width of Plexiglas shorter to allow for thermal expansion per manufacturers' recommendation. When glazing in an edge supported glazed system, provide 1/8" thick neoprene setting blocks under supporting edge of Plexiglas.
- (B) When glazed on the back side of a frame system, pre-drill Plexiglas attachment holes 1/8" to 1/4" oversized to allow for thermal expansion. Space holes at 18" on center maximum at perimeter, and at 24" on center in the center part of the Plexiglas panel where there is a framing member to receive attachment. Predrill attachment holes in frame and attach with screws and washer. Unmask Plexiglas immediately before attaching. Clean Plexiglas with VM&P naphtha or kerosene, followed immediately by soap and water. Gently clean surface with a soft damp cloth or chamois.

12. FIELD QUALITY CONTROL

- (A) Testing Agency: Owner may engage a qualified independent testing and inspecting agency

to perform field tests and inspections and prepare test reports.

- (B) Testing Services: Testing and inspecting of representative areas to determine compliance of installed system with specified requirements shall take place as follows and in successive stages as indicated on Drawings. Do not proceed with installation of the next area until test results for previously complete areas show compliance with requirements.
- (1) Field Water Testing: Testing of curtain walls for water resistance shall be performed according to ASTM E1105 and AAMA 501.2, applying same test pressures (where applicable) and requirements as listed under Section 1.2. Modified such that uncontrolled water is defined as water infiltrating the system or appearing on any interior surface from sources other than condensation.
 - (2) Testing Extent: Six tests areas, three per ASTM E 1105 and three per AAMA 501.2, are to be performed at areas as selected by Owner.
 - (3) Curtain wall and window wall test to incorporate at least two bays wide by 1 floor high including the edge of slab conditions.
 - (4) Any failed test will require an additional two areas to be tested in addition to retesting of the remediated failed specimen.
 - (5) Construction sequence shall include provisions for timely completion of test areas.
 - (6) Remedial measures shall maintain standards of quality and durability and are subject to approval.
 - (7) Test Reports: Shall be prepared according to AAMA 503.
 - (8) Provide powered scaffold, water supply, power supply, manpower and necessary equipment.
- (C) Contractor is to repair or remove work where test results and inspections indicate that it does not comply with specified requirements.
- (D) Contractor is responsible for ensuring adequate water supply and pressure to meet the specified requirements.
- (E) Additional testing and inspection due to failed tests will be performed to determine compliance of remediated or additional work with specified requirements. All costs for remediation and retesting shall be at the Contractor's expense. Additional expense shall include those of the testing agency, Owner, Architect and Consultant.

– END OF SECTION –

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DIVISION 9 - FINISHES

PART 1: GENERAL

1. RELATED/DOCUMENTS

- (A) The general provisions of Division 1 apply to the work specified in this Section.
- (B) Unless otherwise shown or specified, this work shall conform to the following standard:
AISI Specification for the Design of Cold-Formed Steel Structural Members (1986).

2. SCOPE OF WORK

- (A) This Section includes all labor, materials, tools and equipment necessary for and incidental to the execution and completion of Gypsum Drywall work, as shown on the drawings and specified herein. Work shall include cold rolled structural metal ceiling framing as indicated on the drawings and as specified herein.
- (B) Maintain minimum temperature of 55 degrees F. in building prior to drywall application for a period of 24 hours. The temperature shall be maintained for the entire wallboard and joint treatment application. Ventilation should be provided to eliminate excessive moisture, and control drying time of joint compound. Avoid drafts to prevent too rapid drying of joint compounds.
- (C) The extent of the gypsum drywall work is shown on the drawings and in Finish Schedules.
- (D) Refer to Carpentry Section for wood wall studs.
- (E) Refer to Section 05500, Miscellaneous Metals, for steel angle partition supports.
- (F) Requirements for furnishing and installation of screw-type metal framing for support of gypsum drywall are included in this Section.
- (G) Refer to Section 15301, Fire Protection Systems, for requirement to conceal the inspector's test connection pipe drop in a gypsum drywall chase with access panel if it occurs on the Sales floor.

3. QUALITY ASSURANCE

- (A) Tolerances for Drywall Work: Do not exceed a variation of 1/8" in 8'-0" from plumb, level and flat (all directions); and do not exceed 1/16" offset of planes at joints between panels, shim panels as necessary to comply with tolerances.

4. JOB CONDITIONS

- (A) In cold weather, the building shall be heated during the application of the gypsum wallboard and joint treatment to maintain a uniform temperature in the range of 50 degrees F. to 75 degrees F., and ventilation shall be provided to eliminate excessive moisture.

5. SUBMITTALS

- (A) Submit sample for review of texture.
 - (1) On actual drywall surfaces, provide two 12" x 12" texture finish samples or field sample to Owner for approval.
- (B) Submit Product Data for access panel.

PART 2: PRODUCTS

6. MATERIALS

- (A) Steel Drywall Framing: Studs and Runners - Screw-type complying with ASTM C645. Provide studs of the size indicated with runners of compatible size. **Unless otherwise indicated, fabricate from 20-gauge electro-galvanized steel with zinc coating.**

- (B) Z-Furring Channels: 25-gauge electro-galvanized steel, size indicated.
- (C) Rigid and Resilient Furring Channels: Screw type furring channels complying with ASTM C645, fabricate from 25-gauge electro-galvanized steel with manufacturer's standard zinc protective coating. Sizes as shown on drawings.
- (D) Vertical Deflection Connection: Provide VertiTrack VTX or VertiClip SLD deflection accommodating device, by the Steel Network, Inc., Tel: (888) 474-4876. Products shall conform to the following properties and performance criteria:
 - (1) Code Criteria
 - (a) Meet required head of wall connection criteria as required by applicable code of cyclic wall movement.
 - (2) Material Composition: meeting ASTM A653/A, SS Grade 50, lass 1, 50 ksi minimum yield strength, 65 ksi minimum tensile strength, G-60 hot-dipped galvanized coating.
 - (3) Material Thickness: 0.036 inch for VertiTrack VTD series (interior wall), 0.068 inches for VertiTrack VTX series (exterior walls).
 - (4) Clips shall be designed for positive attachment to structure and stud web using step bushing technology to provide frictionless vertical movement.
 - (5) Provide clips with attached bushings and screws of the series, size and configuration as recommended by the manufacturer.
- (E) Ceiling Furring Channels shall be 3/4" standard galvanized cold rolled lathing channels.
- (F) Ceiling Runner Channels shall be 1-1/2" (0.475 lbs. per ft.) standard galvanized channel runners for suspended ceiling work.
- (G) Ceiling Hangers for runners shall be No 8-gauge steel galvanized annealed wire.
- (H) Ceiling Tie Wire shall be 18 gauge galvanized annealed wire.
- (I) Manufacturer: Same as gypsum wallboard manufacturer or approved equal.
- (J) Gypsum Drywall Board
 - (1) Exposed Drywall Surfaces: Provide gypsum wallboard (48" wide) complying with ASTM C1396 with paperface surface suitable to receive decorated finish and with long edges tapered to receive manufacturer's standard joint treatment, unless otherwise shown.
 - (2) Moisture-Resistant Applications: At toilet room walls, janitor's closet, behind the FRP, behind the drinking fountain in the hall and other areas as noted on the drawings, provide moisture-resistant gypsum backing board and/or face board with core and paper acings treated to resist moisture to comply with ASTM C1396.
 - (3) Manufacturers: Provide gypsum wallboard produced by one of the following or approved equal.
 - Georgia Pacific Corporation
 - National Gypsum Company
 - U.S. Gypsum Company
- (K) Drywall Accessory Materials
 - (1) Fasteners: Provide 1" and up to 1-1/2", Type S drywall screws.
 - (2) Drywall Control Joints: For long continuous runs of drywall systems, provide one-piece joint assembly of non-corrosive metal with continuous un-perforated expansion strip for insertion into joint and perforated flanges for attachment to face of wallboard. Material shall be U.S.G. Control Joint #093 or similar if by another manufacturer. Space joints to correspond with masonry joints at 26'-0"

- maximum.
- (3) Metal Trim Accessories: Provide trim accessories of the sizes required for the drywall applications shown and specified, fabricated from galvanized steel. At external corners, provide 1-1/4" mechanically fastened metal corner bead with smooth rigid nose and perforated and knurled metal flanges. USG Dur-A-Bead or similar if by another manufacturer.
 - (4) For protection of exposed wallboard edge openings and where drywall abuts or intersects dissimilar construction, provide metal casing bead trim. Beaded nose with exposed flange knurled for joint treatment. Where kerfed jambs are shown, provide trim with special leg designed for insertion into jamb slot. U.S.G. 200B Metal Trim or similar if by another manufacturer.
 - (5) Joint Tapes: Paper type complying with ASTM C475, USG sheetrock joint tape or equal by another manufacturer.
 - (6) Joint Compound: Adhesive with or without fillers complying with ASTM C475. Provide in dry powder form or pre-mixed ready for application.
 - (7) Textured Finish: Unaggregated texture coating equal to U.S.G. "Sheetrock Wall and Ceiling Spray Texture (Tuf-Tex)" in Orange Peel finish, medium texture.
- (L) Isolate steel framing from building structure at location indicted to prevent transfer of loading imposed by structure movement.
- (1) Isolate ceiling assemblies where they abut or are penetrated by building structure.
 - (2) Isolate partition framing and wall furring where it abuts structure, except at floor. Install slip-type joints at head of assemblies that avoid axial loading of assembly and laterally support assembly.
 - (a) Use proprietary deflection where indicated.
 - (b) Use proprietary firestop deflection track where indicated.
- (M) Flexible Steel Track: Curved steel stud framed interior partitions shall be constructed using on of the following products:
- (1) FLEX-ABILITY CONCEPTS, Flex-C Trac, (866) 443-3539.
 - (2) The Steel Network, Inc., CircleTrak, (888) 474-4876.
 - (3) ClarkDietrich, Contour Track, (800) 543-7140.
 - (4) Approval Equal.

PART 3: EXECUTION

7. INSTALLATION OF STEEL DRYWALL FRAMING

Manufacturer's Instructions: Unless otherwise shown or specified, install metal framing and accessories in accordance with manufacturer's printed instructions.

- (A) Floor and Ceiling Runner Tracks: Provide Continuous tracks sized to match studs. Align runner tracks accurately to the partition layout at both floor and ceiling. Secure runner tracks as recommended by the stud manufacturer for the floor and ceiling construction involved, except do not exceed 24" o.c. spacing for nail or power-driven fasteners. Provide fasteners at all corners and ends of runner. Use continuous gasket sealers at floor, ceilings, columns and walls of dissimilar materials.
- (B) Height of Partitions: Terminate top of partitions as shown on drawings.
- (C) Provide additional studs to support inside corners and partition intersections, and to support outside corners, terminations of partitions, both side of control joints and adjacent to all openings.

- (D) Use full length studs between runner tracks.
- (E) Friction fit studs to runner tracks by positioning and rotating into place. Provide positive attachment to runner tracks for studs located at partition corners and intersections, and adjacent to openings using 3/8" self-tapping screws on both flanges of studs.
- (F) Provide rough framing at openings using full-length studs adjacent to jambs and horizontal header and sill tracks. Cut horizontal tracks to length and split flanges and bend webs at ends for flange overlap and screw attachment to jamb studs. Install cut to length intermediate studs between jamb studs at head and sill sections at same spacing as full-length studs.
- (G) Where vertical control joints are shown at jamb lines, provide additional vertical studs located on opening side of jambs and not less than 1/2" from jamb studs. Do not fasten studs to tracks or jamb studs.
- (H) For all interior doors wrap door opening (jambs and head) with 2 x 4 wood studs and provide two (2) studs of the same gauge as the wall studs at each jamb and one additional stud not more than 6" from jamb studs.
- (I) Metal Furring Framing
 - (1) General: Provide metal furring where shown, as specified, and as required to provide support for drywall. Where size and spacing of furring members is not shown for support, do not exceed the minimum requirements of GA201. Install z-furring channels vertically.
 - (2) Where control or expansion joints are shown, provide separate supports on each side of joint. Do not bridge joints.

8. INSTALLATION OF GYPSUM DRYWALL BOARD

- (A) General
 - (1) Standards: Comply with the requirements of ANSI C840 "Standard Specification For Application and Finishing of Gypsum Board", except comply with manufacturer's instructions and recommendations where more stringent.
 - (2) Provide drywall of the thickness shown.
 - (3) Form control joints in drywall construction as specified. Allow 1/2" continuous opening between edges of adjacent drywall boards to allow for insertion of control joint trim accessory.
- (B) Single Layer Applications
 - (1) Partition/Walls: Apply gypsum board vertically using floor-to-ceiling length boards with vertical joints located over supports, but offset at least one stud space on opposite faces of partition/walls. Use type S drywall screws in compliance with manufacturer's instructions for fastening, but do not exceed screw spacing of 8" o.c.
 - (2) Wood Supports: Fasten gypsum wallboard with annular ring nails or screws at the Contractor's option. Comply with manufacturer's instructions for fastening, but do not exceed nail, or screw spacings of 8" o.c. (wall and ceilings).
 - (3) Metal Supports: Fasten gypsum wallboard with screws. Comply with manufacturer's instructions for fastening, but do not exceed 8" o.c. spacing. Screws shall be power-driven and screw heads shall provide slight depression below the surface of the board.
- (C) Drywall Finishing
 - (1) Finish exposed drywall surfaces with joints, corners and exposed edges reinforced or trimmed as specified, and with all joints, fastener heads, trim accessory flanges and surface defects filled with joint compound as specified in accordance with manufacturer's recommendations for a smooth, flush surface. Form true, level or

- plumb lines, without joints, fastener heads, flanges of trim accessories or defects visible after application of field-applied decoration.
- (2) Use joint tape to reinforce joints formed by tapered edges or butt ends of drywall units and at interior corners and angles. Set tape in joint compound then apply skim coat over tape in one application.
 - (3) Where open spaces of more than 1/16" width occur between abutting drywall units, (except at control joints), prefill joints with joint compound and allow prefill to dry before application of joint tape.
 - (4) Reinforce external corners of drywall work with corner beads.
 - (5) Securely fasten metal corner beads as recommended by the manufacturer. Use fasteners which will be fully concealed by joint compound fully applied over flanges.
 - (6) Edge Trim: Provide specified type of metal casing bead trim. Install in single unjointed lengths.
 - (7) Insert control joints strips into open joint and staple flanges to drywall in accordance with manufacturer's instructions.
 - (8) In all areas other than Janitor's Closet, Electrical room, Storage Rooms and back lighting chases, provide orange peel medium textured finish.
 - (9) Application of Joint Compounds: After mixing, do not use joint compounds if recommended pot-lifetime has expired. Allow drying time between applications of joint compound in accordance with manufacturer's recommendations for the relative humidity and temperature levels at the time of application. In no case, allow less than 24 hours drying time between applications of joint compound. Apply not less than 2 separate coats of joint compound over joints, fastener heads and metal flanges. (2 coats are in addition to set and skim coat mentioned above.) Sand between coats as necessary. Final coat and subsequent sanding shall leave gypsum wallboard ready for decorator finish.
 - (10) Joint compound treatment is not required above suspended ceilings where partition/walls are shown or specified to extend to structural deck or ceiling above suspended ceiling, unless partition is visible through ceiling grille.
- (D) For Sales Area, spray joint compound on drywall surfaces to match texture of approved submitted samples. Coordinate work with Owner to assure that the final finish, color and texture is achieved.
- (E) Completion and Protection of Finished Work: Installer shall advise Contractor of proper procedures for the protection of completed drywall work from damage or deterioration until acceptance of the work. At the completion of this contractor's work, all unused materials, tools, scaffolds, and equipment shall be removed from the structure. All work installed by others, which is dirty due to the drywall installation, shall be cleaned and restored to its original condition. Clean up all texture overspray. All drywall construction shall be guaranteed against defective materials and workmanship for a period of one year as called for in the General Provisions.

- END OF SECTION -

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DIVISION 9 - FINISHES

PART 1: GENERAL

1. RELATED DOCUMENTS

(A) The general provisions of Division 1 apply to the work specified in this Section.

2. SCOPE OF WORK

(A) Furnish all labor, materials, tools and equipment required for completing tile work and related items indicated on the drawings and herein specified.

(B) The extent of the work is indicated on the drawings and specified herein.

PART 2: PRODUCTS

3. CERAMIC AND PORCELAIN TILE

(A) Standard grade meeting ANSI A137.1

(B) Tile: Refer to Room Finish Schedule and Floor and Wall Finish selections on the drawings for all tile materials and grout.

(C) Mortar Mix for Thin Setting Bed Method: Materials shall be Portland Cement Powdered mortar product of one of the following, manufactured under license to the Tile Council of America, Inc., and all containers shall bear their Hallmark. Use product(s) as appropriate for the substrate.

(1) "Ultraflex 2" as manufactured by Mapei.

(a) Mixed with water, exceeds ANSI A118.4 & A118.11

(2) "Ultraflex LHT" for large and heavy tile, as manufactured by Mapei. (No substitutions)

(a) Mixed with water, exceeds ANSI A118.4TE & A118.11

(D) Sand: ASTM C144 washed clean and graded; use fine sand for grout; use white sand with white cement. Gradation: 100% passing No. 8 sieve, not more than 5% passing No. 100 sieve.

(E) Water: Clean, potable free from deleterious substances.

(F) Marble saddles shall be white vermont marble, even color and rubbed finish of profile and length shown on drawings. Set snugly between door jambs. Set saddles in thin bed of Portland cement mixture and grout.

(G) Metal Transitions: As specified on the drawings. **NO SUBSTITUTIONS**

(1) Klein and Company, Inc., Holly Springs, GA. Phone 1-800-241-0681. 16-gauge zinc angle, metal type, finish, and width as indicated on the drawings and depth as required for flush installation with top surface of tile

(2) Schluter Systems, Inc., Plattsburg, NY 12901, will be acceptable. Phone 1-800-472-4588.

(H) Anti-Fracture tile underlayment: ECB anti-fracture system.

(1) Membrane: SBS modified bitumen, self-adhering formula, reinforcing with stress flex fiber sheet.

(2) Thickness: 40 mil.

- (3) Physical properties of membrane, meet or exceed the following:

<u>Property</u>	<u>Test Value</u>	<u>Test Method</u>
FHA 4900.1	Pass 3' head	ASTM D-583
Tensile MD	880 psi	ASTM D-146
Tensile CD	550 psi	ASTM D-146
Crack bridging	1/4"	NAC Model
Shear/Bond	Pass	A118.1-1985
Impact Resistance	Pass	Mil-D-3134

- (4) Manufacturer: N.A.C. Products, Inc. 3200 S. Main Street, Akron, OH 44319, Tel: 330-644-3117 or 1-800-633-4622 FAX: 330/644-3557

- (I) Grout: Manufacturer: H.B. Fuller Construction Products, Inc., www.tecspecialty.com. Product: For floor and wall applications use TEC AccuColor EFX Epoxy Special Effects Grout 440 (or approved equal). Refer to drawings for grout color.
- (J) Provide Owner with five (5) tiles from each tile type used on this project for Owner's stock.
- (K) Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

- (1) MAPEI Corporation "Mapecem Quickpatch", or approved equal.

PART 3: EXECUTION

4. INSTALLATION OF TILE

- (A) Concrete or Masonry Base: All wall and floor tile to be installed over a base material consisting of concrete or masonry shall be installed by the thin-set mortar bed method. Thin-set mortar shall be mixed thoroughly and applied in strict accordance with manufacturer's printed instruction. Minimum thickness of setting bed shall be 1/8". Install with best practice of the trade in accordance with the procedure set forth in the Tile Council of North America Basic Specifications F 113.
- (B) Provide concrete substrates for tile floors installed with adhesives or thin-set mortar that comply with flatness tolerances specified in referenced ANSI A108 Series of tile installation standards: 1/8 inch in 10 feet or 1/16 inch in 2 feet for large format tile defined as greater than 15 inch on any side. 1/4 inch in 10 feet or 1/16 inch in 1 foot for tile less than 15 inch.
- (1) Fill cracks, holes, and depressions with trowelable leveling and patching compound according to tile-setting material manufacturer's written instructions. Use product specifically recommended by tile-setting material manufacturer.
- (2) Remove protrusions, bumps and ridges by sanding or grinding.
- (C) Floor tile to be installed with 3/16" joints (unless noted otherwise on the drawings), wall tile to be installed with 1/16" joints.
- (D) Wall tile on gypsum board shall be installed per Tile Council of North America Specification No. W243 for Dry Set Mortar. Wall tile on cement board shall be installed per Tile Council of North America Specification No. W244 for Dry Set Mortar.
- (E) Wood floor base shall be set on top of tile floor and trimmed with shoe molding as detailed on the drawings.
- (F) Grout: Force grout into joints, avoiding air traps or voids, strike or tool joints of tile to depth of cushion. Remove excess grout, check for gaps or air holes.
- (G) Anti-Fracture tile underlayment: Base layer is made of a polymer modified elastomeric sheet capable of heavy-duty service per ASTM C-627 laminated to a stress-flex fiber sheet. Joints shall be on a butt-seaming designed, not to be overlapped.
- (1) For joints exceeding 3/16", use manufacturer's recommended backer rod and sealant.

- (H) Adhesives: Amtico SF or epoxy adhesive as recommended by manufacturer and to be applied following manufacturer's directions for trowel notching, coverage, open time and safety precautions.

5. WORKMANSHIP

- (A) Work: Performed by qualified workmen in a manner conforming to best current practice of the trade.
- (B) Cut and drill where necessary, without marring tile. Grind and carefully joint any cut edges against other work.
- (C) Remove loose mortar, laitance, or materials detrimental to bond before applying setting beds.
- (D) Carefully lay out work to ensure straight joints of uniform width. Avoid tile cut less than half size, unless specifically approved by Owner's Representative.

6. CLEANING AND PROTECTION

- (A) At completion of installation, thoroughly clean all surfaces. Use of acid will not be permitted. Use clean water in initial cleaning. Remove all stains, mortar, etc.
- (B) Before traffic is permitted over finished tile floors, cover with waterproof building paper with all joints taped.
- (C) Remove crooked, broken, or damaged tile, replace with new (and apply sealer, if floor tile) before completion of building.

END OF SECTION

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DIVISION 9 - FINISHES

PART 1: GENERAL

1. RELATED DOCUMENTS

- (A) The general provisions of Division 1 apply to the work specified in this Section.

2. SCOPE OF WORK

- (A) Furnish all labor, materials, tools, equipment and scaffolding required for completing acoustical tile ceilings, suspension systems and related items indicated on the drawings and herein specified.

3. QUALITY ASSURANCE

- (A) The acoustical tile, suspension systems and related items shall meet or exceed the following standards:
- (1) American Society for Testing Materials E84.
 - (2) Underwriters Laboratories (UL) Fire Resistance Index - Where acoustical ceilings are components of fire rated assemblies, provide complete ceiling systems complying with UL design numbers corresponding with construction assemblies indicated.
 - (3) ASTM C 635 - Performance requirements for suspension systems, including dimensional tolerances.
 - (4) AIMA Bulletin - Acoustic unit performance data as published by Acoustical and Insulation Materials Association.
 - (5) CISCA Code of Practices - Ceilings and Interior Systems Contractors Association Code of Practice for Acoustical Ceiling System Installations.

4. PRODUCT DELIVERY, STORAGE AND HANDLING

- (A) Deliver materials to the project site in original unopened packages bearing manufacturer's name and specific product identification.
- (B) Store materials in a dry place with continuous support to avoid warping units.
- (C) Handle materials carefully to avoid damaging or discoloring. Replace materials which have been damaged or discolored.

PART 2: PRODUCTS

5. FIRE RATED ASSEMBLIES

- (A) Where acoustic ceiling systems are components of floor-ceiling or roof-ceiling or beam assemblies for which a fire resistance rating is shown or scheduled, provide complete ceiling systems complying with the requirements of UL "Fire Resistance Index" (including referenced requirements) for the UL design numbers corresponding with the construction assemblies shown. Provide suspension system access members complying with applicable UL requirements, as indicated.

6. MATERIALS AND COMPONENTS

- (A) Lay-In Acoustic Tile: Refer to Room Finish Schedule on drawings.
- (B) Bathroom Gypsum Lay-In Panels: Refer to Room Finish Schedule on drawing.
- (C) Painted Acoustical Ceiling Tile: Painting of acoustical ceiling tile, as required in the Room Finish Schedule, shall be done prior to installation of the ceiling tile and shall be coordinated with the painting subcontractor

PART 3: EXECUTION

7. INSPECTION

- (A) Installer must examine the conditions under which the suspended ceiling work is to be performed and notify the Contractor in writing of any unsatisfactory conditions. Do not proceed with suspended ceiling work until unsatisfactory conditions have been corrected in a manner acceptable to the installer.
- (B) Installer shall consult other trades and contractors involved prior to start of ceiling work, to determine areas of potential interference. Do not start installation until interferences have been resolved to the satisfaction of the installer.
- (C) Coordinate layout with other work which penetrates or is supported by ceiling suspension system.

8. INSTALLATION OF FIRE RATED ASSEMBLIES

- (A) Install ceiling suspension systems which are components of fire rated floor-ceiling or roof-ceiling assemblies, complete, in accordance with the requirements of applicable UL "Fire Resistance Index" design numbers.

9. GENERAL INSTALLATION REQUIREMENTS FOR CEILING SUSPENSION SYSTEMS

- (A) Install suspension systems which are part of non-fire rated assemblies in accordance with manufacturer's instructions; the requirements of Article 2 "Installation of Components" of ASTM C 636 "Standard Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels"; and further specified.
- (B) Secure to structural and intermediate framing members by attaching to metal clips designed for the type of member involved, or where possible, by looping and wire-tying directly to members. Do not attach hangers to metal roof deck.
- (C) Space hangers to fall not more than 6" from ends and not more than 4' o.c., between ends of primary suspension members, and as required to support other work resting in or on ceiling. Provide additional hangers at fixtures as required to prevent deflection of suspension system members in excess of ASTM C 635 requirements. Do not attach hangers to ducts, pipes or other similar work which occurs above ceilings; provide additional suspended ceiling members at such locations.
- (D) Install continuous metal moldings for support of runners and units where suspended ceilings meet walls, partitions and other vertical elements. Secure moldings to building construction by fastening through holes in web. Miter cut inside and outside corners.
- (E) Acoustical ceiling tile, as required to be painted by the Room Finish Schedule, shall be painted prior to installation of the painted ceiling tile. Installer shall coordinate work with painting subcontractor.

10. INSTALLATION OF EXPOSED GRID SYSTEMS

- (A) Main Runners: Support directly from hangers; space as required to support ceiling units and other work resting in, or on, ceilings and as required to comply with ceiling performance requirements. Provide unjointed main runners of manufacturer's maximum standard length wherever possible; join abutting sections with manufacturer's standard splice connection; do not pop rivet flanges of abutting runners.
- (B) Cross Runners: Support by interlocking ends of cross runners with main runners (or cross runners classified as main runners) to form 90-degree angle between intersecting runners. Space as required to support each panel unit used in the work
- (C) Moldings: Install with exposed leg in same plane as bottom flange of exposed runners, unless otherwise shown or specified. Caulk ceiling grid at walls.

11. INSTALLATION OF ACOUSTICAL PANELS

- (A) Prior to installation of ceiling tile, the ceiling tile installer shall coordinate with the painting subcontractor to insure the painting of ceiling tile, as required to be painted by the Room Finish Schedule, is painted prior to installation.

- (B) Install acoustical panels only after the building is enclosed and moisture is at a low level compatible with manufacturer's requirements. Workmen shall not fingerprint panels with dirty hands or gloves.

END OF SECTION

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DIVISION 9 - FINISHES

PART 1 - GENERAL

1. RELATED DOCUMENTS

- (A) Drawings and general provisions of the contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- (B) The General Contractor shall provide Relative Humidity Testing on the concrete floor slabs in the designated areas to receive the resilient flooring.

2. SUMMARY

- (A) Extent of resilient flooring and accessories is shown on drawings and in schedules and includes the following types:
 - (1) Composite, vinyl, or luxury vinyl tile (LVT).
 - (2) Engineered Vinyl Tile (EVT).
 - (3) Rubber wall base and accessories.

3. SUBMITTALS

- (A) Submit manufacturer's installation for alternates and substitutions only and maintenance instructions for warranty/maintenance manual only for each type of resilient flooring.
- (B) Samples for Verification Purposes: Submit the following sample sets of each type, color and pattern of resilient flooring required, showing full-range of normal color and pattern variations (if requested by Owner).
 - (1) Full size tile samples.
 - (2) 2½ inch long samples of vinyl base and edge strips.
- (C) Shop Drawings: Show installation details including location and layout of each type of resilient flooring and accessory.
- (D) Submit the manufacturer certification that flooring has been tested by an independent laboratory and complies with the required fire tests (for alternates and substitutions only).
- (E) Provide types of flooring and accessories supplied by one manufacturer, including leveling and patching compounds, and adhesives.
- (F) Provide flooring material to meet the following fire test performance criteria as tested by a recognized independent testing laboratory (for alternates and substitutions only):

- (1) ASTM E 648 Critical Radiant Flux of 0.45 watts per sq. cm. or greater, Class I.
- (2) ASTM E 662 (Smoke Generation) Maximum Specific Optical Density of 450 or less.

4. QUALITY ASSURANCE

- (A) Installer Qualifications: An experienced installer who is competent in the installation of resilient tile and who has completed resilient flooring work similar in material, design, and extent to that indicated for this Project and whose work has resulted in resilient flooring installations with a record of successful in-service performance.
- (B) Source Limitations: Obtain each type of material and product from one source with resources to provide materials and products of consistent quality in appearance and physical properties.
- (C) Certification: Provide resilient flooring that carries the Industry Standard mark on each bundle or piece.

5. DELIVERY, STORAGE AND HANDLING

- (A) Deliver materials in good condition to the jobsite in the manufacturer's original unopened containers that bear the name and brand of the manufacturer, project identification, and shipping and handling instructions.
- (B) Store materials in a clean, dry, enclosed space off the ground, and protected from the weather and from extremes of heat and cold. Protect adhesives from freezing. Store flooring adhesives and accessories in the spaces where they will be installed for at least 48 hours before beginning installation.
- (C) Maintain a minimum temperature in the spaces to receive the flooring accessories of 65°F (18°C) and a maximum temperature of 100° F (38° C) for at least 48 hours before, during, and for not less than 48 hours after installation. Thereafter, maintain a minimum temperature of 55° F (13° C) in areas where work is completed. Protect all materials from the direct flow of heat from hot-air registers, radiators, or other heating fixtures and appliances.
- (D) Install flooring and accessories after the other finishing operations, including painting, have been completed. Close spaces to traffic during the installation of the flooring. Do not install flooring over concrete slabs until they are sufficiently dry to achieve a bond with the adhesive, in accordance with the manufacturer's recommended bond and moisture tests.
- (E) General Contractor shall be notified to provide broom clean surfaces for resilient materials installation.

6. WARRANTY

- (A) General Warranty: Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

PART 2 - PRODUCTS**7. RESILIENT FLOORING COLORS AND PATTERNS**

- (A) Provide resilient flooring, colors, patterns as indicated on drawings and schedules.

8. RESILIENT TILE FLOORING

- (A) Composite, Vinyl, or Luxury Vinyl Tile Flooring: Refer to drawings for product information. Substitution will not be allowed.
- (B) Engineered Vinyl Tile Flooring: Refer to drawings for product information. Substitutions will not be allowed.
- (C) Rubber Wall Base: Refer to drawings for required product. Substitutions will not be allowed.
- (D) Resilient Edge Strips: Refer to drawings for product information. Substitutions will not be allowed.
- (E) Adhesives:
- (1) Resilient Flooring: All resilient flooring requiring glue down installation. Only use products which are approved for the substrate and are approved by the flooring manufacturer.
- (2) Rubber Wall Base and Resilient Edge Strips: Only use products which are approved for the substrate and are approved by the flooring manufacturer unless noted otherwise on the drawings.
- (F) Accessories: For patching, smoothing, and leveling monolithic concrete subfloors, use fast-setting Cement-based underlayment product recommended by the flooring manufacturer.

9. FLOOR LEVELER/UNDERLAYMENT/DAMP PROOF MEMBRANE

- (A) Floor patching Underlayment (Cementitious Type): Custom Building Products "Speed Finish Patching & Finish Compound" for filling and repair of holes, cracks, depressions, sawcuts, etc.
- (B) Damp Proofing Membrane: Custom Building Products "RedGard Waterproofing and Crack Prevention Membrane" or Bostik "MVP4 Moisture Vapor Protection".

- (C) Skim Coat and Patching Compound: Custom Building Products "Speed Finish Patching & Finish Compound" as an encapsulation (Enclosing) coat of the waterproof membrane.
- (D) Conditions: The moisture control/subfloor preparation system incorporating the above listed components shall be applied in accord with manufacturer's instructions and will be warranted by the manufacturer.

PART 3 - EXECUTION

10. INSPECTION

- (A) Examine subfloors prior to installation to determine that surfaces are smooth and free from structural defect, cracks, holes, ridges, and other defects that might prevent adhesive bond or impair durability of appearance of the flooring material.
- (B) Inspect subfloor prior to installation to determine that surfaces are free from curing, sealing, parting and hardening compounds; residual adhesives; adhesive removers; and other foreign material that might prevent adhesive bond. Visually inspect for evidence of moisture, alkaline salts, carbonation, dusting mold, or mildew
- (C) Verify that concrete slabs are dry according to test methods recommended by resilient flooring manufacturer. Particular attention shall be paid to the moisture of slab content of the concrete slab (maximum 3 lbs. of water/1000 sq. ft. laboratory and shown to be in accord with the ASTM F1869-98 calcium chloride test) and to the use of the specified type of adhesive recommended by the manufacturer for proper adhesion of the resilient flooring.
- (D) Report conditions contrary to contract requirements that would prevent a proper installation. Do not proceed with the installation until unsatisfactory conditions have been corrected and all conditions meet manufacturer's specifications and are acceptable to Owner.
- (E) Failure to call attention to defects or imperfections will be construed as acceptance and approval of the subfloor. Installation indicates acceptance of substrates with regard to conditions existing at the time of installation.

11. PREPARATION

- (A) Temperature and Humidity: The environment in which resilient flooring is to be installed must be controlled with the temperature between 65° F and 95° F (18° C and 35° C) and the relative humidity between 10% and 65%. The subfloor temperature should not be less than 65° F. These conditions must be maintained for at least 48 hours before, during and after the installation. Resilient flooring and adhesive must also be acclimatized in these conditions. Any changes in temperature could cause difficulties with the installation (CRI-104 Sec. 6.1).

- (B) Testing of Concrete Subfloors: It is the General Contractor's responsibility to provide the Flooring Contractor a written report on moisture and alkalinity content of the slab to ensure suitability for installation. If the concrete slab exceeds the permissible amount of moisture and alkalinity the General Contractor is responsible for making the necessary correction prior to flooring installation. These tests should be performed and documented not less than once every 5,000 square feet. Refer to CRI-104 sections 6.3.1 and 6.3.2 for more details.
- (C) Alkalinity Testing: The recommended range for pH is between 5 and 9. A rating greater than 9 indicates an alkalinity problem and will require corrective measures as directed by the adhesive manufacturer.
- (D) Moisture Testing: Relative Humidity Testing shall be used to determine the moisture emission rate of concrete slabs. The maximum permissible emission rate for moisture barrier backings and carpet tiles is 3 pounds. Ratings between 3 and 5 pounds are considered acceptable for products with a porous backing. Concrete subfloor exceeding these moisture ratings will require corrective measures.
- (E) Smooth concrete surfaces, removing rough areas, projections, ridges, scales, foreign, deposits, and bumps, and filling low spots, control or construction joints, and other defects with a fast-setting Cement-based underlayment product recommended by the flooring manufacturer. Allow to dry prior to working over patched area.
- (F) Remove paint, varnish, oils, release agents, sealers, and waxes. Remove residual adhesives as recommended by the flooring manufacturer. Remove curing and hardening compounds not compatible with the adhesives used, as indicated by a bond test or by the compound manufacturer's recommendations for flooring. Avoid organic solvents.
- (G) Perform subfloor Relative Humidity Tests (and Bond Test) to determine if surfaces are dry, free of curing and hardening compounds, old adhesive, and other coatings; and ready to receive flooring.
- (H) Vacuum or broom-clean surfaces to be covered immediately before the application of flooring. Make subfloor free from dust, dirt, grease, and all foreign materials.
- (I) Floor Preparation: Each concrete subfloor must be inspected to determine the special care required to make it a suitable foundation for carpet. All concrete subfloor must be clean, dry, free of dust, grease, wax, curing agents, excessive alkalinity, paint, old adhesive and any foreign substance that would prohibit proper bonding of the carpet to the concrete subfloor (CRI-104 Sec 6.2-6.2.10).
- (J) New Concrete: New concrete must be cured, clean and dry. It must also be free of curing or parting agents that interfere with the bonding of the adhesive. If the concrete has a powdery surface, a sealer compatible with the adhesive must be used to provide a suitable surface for direct glue installations.

- (K) Ensure that:
- (1) Heating, ventilation and/or air conditioning (HVAC) in the installation area must be operative for a minimum of 48 hours prior to, during and following the installation. The room temperature, subfloor, tile and adhesive must also be maintained at a temperature of 70° F for 48 hours prior to installation. A fluctuation of +/-5° F within this range is acceptable.
 - (2) Tile and adhesive should be stored on the job site 48 hours prior to installation and tile removed from the cartons or pallet and back stacked to facilitate equalization of temperature and to assure tiles lie flat.
 - (3) Tiles should be loose-laid in the room and all fittings and cuttings made. Corrective adjustments are to be made at this time to avoid color contrasting and to ensure that the overall appearance is to the desired effect.
- (L) Concrete Subfloors:
- (1) General Conditions:
 - (a) Concrete subfloors suitable for the installation of flooring shall be dry, clean, smooth, level, and structurally sound. They should be free from old adhesive, dust, solvent, paint, wax, oil, grease, asphalt, sealing and curing compounds and other foreign substances. Cracks, grooves, and other irregularities shall be filled or leveled. Where filling or leveling is required, the use of a good quality cementitious-based underlayment is recommended. The use of underlayment, leveling and patching compounds is no guarantee against excess moisture (including hydrostatic pressure) or concrete deficiencies.
 - (2) New Concrete Subfloors:
 - (a) New concrete slabs shall be properly cured and meet moisture vapor emission requirements before installation may be attempted. Depending on atmospheric conditions, type of concrete and/or possible excess water content, such subfloors will be required at least six plus weeks drying time before they may be considered ready for application of flooring.
 - (b) Floors containing lightweight aggregate or excess water, and with steel or plastic pan construction may need a much longer drying time and should not be with resilient flooring unless dry.
 - (c) Some lightweight concrete has such low strength that it is unsuitable for resilient tile unless 1" or more of regular concrete is used as a topping. This topping layer should be installed as per the recommendations outlined by the Portland Cement Association.
 - (d) Since dampness must be always suspected, Relative Humidity testing per ASTM F2170 is required to check subfloor moisture when installing

the flooring. Directions for the use of these units are shown in this section. It is the responsibility of the flooring contractor to determine whether or not the concrete is sufficiently dry for covering. Record all moisture test results into the project log. Results of the test must be made available upon request to the Owner.

12. INSTALLATION OF RESILIENT FLOORING

- (A) Install flooring in strict accordance with the latest edition of flooring manufacturer's installation literature.
- (B) Install flooring wall to wall before the installation of floor-set cabinets, casework, furniture, equipment, movable partitions, etc. Extend flooring into toe spaces, door recesses, closets, and similar openings as shown on the drawings.
- (C) Scribe, cut and fit to permanent fixtures, columns, walls, partitions, pipes, outlets and built-in furniture and cabinets.
- (D) Adhere flooring to the subfloor without cracks, voids, raising and puckering at the seams. Roll with a 100-pound (45.36 kilogram) roller in the field areas. Hand-roll flooring at the perimeter and the seams to assure adhesion. Refer to specific rolling instructions of the flooring manufacturer.
- (E) Install flooring with adhesives, tools, and procedures in strict accordance with the manufacturer's written instructions. Observe the recommended adhesive trowel notching, open times, and working times.
- (F) Lay tile flooring from center marks established with principal walls; adjust as required to avoid use of cut units less than $\frac{1}{2}$ tile wide at perimeters. Match tiles for color and pattern by using manufactured and packaged sequence. Do not bridge floor expansion joints, stop at both sides of expansion joint covers.

13. INSTALLATION OF ACCESSORIES

- (A) Apply butt-type metal edge strips where shown on the drawings, before flooring installation. Secure units to the substrate, complying with the edge strip manufacturer's recommendations.
- (B) Apply top set wall base to walls, columns, casework, and other permanent fixtures in areas where top-set base is required. Install base in lengths as long as practical, with inside corners fabricated from base materials that are mitered (mitered outside corners are not acceptable) or coped. Tightly bond base to vertical substrate with continuous contact at horizontal and vertical surfaces.
- (C) Fill voids with manufacturer's recommended adhesive along the top edge of the resilient wall base or integral cover cap on masonry surfaces or other similar irregular substrates.

- (D) Place resilient edge strips tightly butted to flooring, and secure with adhesive recommended by the edge strip manufacturer, unless listed otherwise on the drawings. Install edge strips at edges of flooring that would otherwise be exposed.

14. CLEANING AND PROTECTION

- (A) Installer to clean resilient floors and accessories and perform initial maintenance according to the latest edition of the flooring manufacturer's installation literature. Do not strip and wax flooring. Owner may perform this operation during store fixturing.
- (B) Protect installed flooring as recommended by the flooring manufacturer against damage from rolling loads, other trades, or the placement of fixtures and furnishings. Allow newly installed resilient flooring to set, free of traffic, for a minimum of 24 hours. Periodically clean the flooring as instructed. Sweep the floor regularly to keep grit off. Clean up spillage immediately.

END OF SECTION

DIVISION 9 - FINISHES

PART 1: GENERAL

1. RELATED DOCUMENTS

- (A) The general provisions of Division 1 apply to the work specified in this Section.
- (B) The Contractor shall be responsible for providing a copy of Division 1 specifications to each subcontractor and for coordinating the work accordingly.
- (C) Submittal data, shop drawings, and samples:
 - (1) Shall be submitted for review only when required by and in accordance with the procedure set forth in Division 1 of these specifications.
 - (2) All references to submittal data, shop drawings, and samples in the context of the technical specifications shall be taken to mean "if required under the provisions of Division 1, unless stipulated otherwise.
- (D) Refer to Division 1 for requirements relating to Base Bid Products, Alternates, and Substitutions.

2. SCOPE OF WORK

- (A) Furnish all labor, materials, tools and equipment required for completing the carpeting work in the areas designated, and related items indicated on the drawings and herein specified.
- (B) The extent of the work is shown on the drawings and specified herein and is defined to include carpet and accessories. Carpet installer must follow floor plan layout.
- (C) Carpeting shall be installed by glue-down method.

3. QUALITY ASSURANCE:

- (A) Installer shall be a firm with not less than 5 years of carpeting experience, similar to work of this section.
- (B) The carpet installer shall comply with installation requirements and recommendations of the manufacturer.
- (C) General Standard: "Carpet Specifier's Handbook" by The Carpet and Rug Institute; for definitions of terminology not otherwise defined herein, and for general recommendations and information.

4. SUBMITTALS:

- (A) Adhesive: Submit data sheet for manufacturers approved adhesive.
- (B) Submit a seaming plan to the Owner's Representative for review.

5. DELIVERY AND STORAGE:

- (A) When the Owner delivers materials to the jobsite, the installer shall accept and unload materials from truck, and store inside, protected from weather, moisture and soiling.

PART 2 - PRODUCTS

6. MATERIAL:

- (A). Carpet to be furnished as indicated on the Drawings.

7. CARPET ACCESSORIES

- (A) Installation Adhesive: Parabond #4092 or approved equal with qualification that product must be recommended or acceptable to manufacturer.
- (B) Seaming Adhesive: Chapco #29 or approved equal with qualification that product must be recommended or acceptable to manufacturer.–

- (C) Sub Floor Filler: Ardex K15 self-leveling underlayment to be approved by carpet manufacturer or approved equal with qualification that product must be recommended or acceptable to manufacturer.
- (D) Miscellaneous Materials: As recommended by manufacturers of carpet and selected by Installer to meet project circumstance and requirements.
- (E) Leveling Compound: Ardex K 13 Premium Self-Leveling Underlayment to be approved by carpet manufacturer or approved equal with qualification that product must be recommended or acceptable to manufacturer.
- (F) Transitional moulding to match carpet field color. Field verify job specific color.

8. PRE-INSTALLATION REQUIREMENTS

- (A) Temperature and Humidity: The environment in which carpet is to be installed must be controlled with the temperature between 65° F and 95° F (18° C and 35° C) and the relative humidity between 10% and 65%. The subfloor temperature should not be less than 65° F. These conditions must be maintained for at least 48 hours before, during and after the installation. Carpet and adhesive must also be acclimatized in these conditions. Any changes in temperature could cause difficulties with the installation. (CRI-104 Sections 7.0 – 7.3).
- (B) Testing of Concrete Subfloors: It is the General Contractor's responsibility to provide the Flooring Contractor a written report on moisture and alkalinity content of the slab to ensure suitability for installation. If the concrete slab exceeds the permissible amount of moisture and alkalinity the General Contractor is responsible for making the necessary correction prior to carpet installation. These tests should be performed and documented not less than once every 5,000 square feet. Refer to CRI-104 Sections 6.0 - 6.3 for more details.
- (C) Alkalinity Testing: The recommended range for pH is between 5 and 9. A rating greater than 9 indicates an alkalinity problem and will require corrective measures as directed by the adhesive manufacturer.
- (D) Relative Humidity Testing: Relative humidity testing per ASTM F2170 may be performed. In situ readings exceeding 80% will require corrective measures.
- (D) Floor Preparation: Each concrete subfloor must be inspected to determine the special care required to make it a suitable foundation for carpet. All concrete subfloors must be clean, dry, free of dust, grease, wax, curing agents, excessive alkalinity, paint, old adhesive and any foreign substance that would prohibit proper bonding of the carpet to the concrete subfloor (CRI-104 Sections 8.0 – 8.1).
- (E) New Concrete: New concrete must be cured, clean and dry. It must also be free of curing or parting agents that interfere with the bonding of the adhesive. If the concrete has a powdery surface, a sealer compatible with the adhesive must be used to provide a suitable surface for direct glue installations.
- (F) General Contractor with Owner's Representative should coordinate timing for carpet installation. Contractor to prepare all surfaces as required for complete installation as designated below.

- (G) Prior to the carpet installation date, General Contractor must examine the slab for moisture, leakage, dusting and other conditions. All tests deemed necessary for slab acceptability including moisture tests must be provided by and performed by General Contractor at this time.
- (H) If unsatisfactory conditions exceed limits and tolerances as dictated in Section 03301 Concrete, then the contractor will take all steps deemed necessary to rectify slab deficiencies. The Owner's Representative will monitor and arbitrate as required.
- (I) If slab conditions are in compliance, then the Contractor will perform all minor repairs, imperfections, leveling, normal deficiencies, filling joints, etc. prior to carpet installation.
- (J) Contractor to sequence carpeting with other work so as to minimize possibility of damage and soiling of carpet during remainder of construction period.
- (K) Floor joints occurring below carpet shall be filled with subfloor filler.

9. INSTALLATION

- (A) General:
 - (1) Follow floor plan, maintaining uniformity of direction and lay of pile.
 - (2) Extend carpet under open-bottomed obstructions, under removable flanges and furnishings, and into alcoves and closets of each space.
 - (3) Provide cut-outs where required, and bind cut edges properly where not concealed by protective edge guards or overlapping flanges.
- (B) Glue-Down Carpet Installation
 - (1) Fit sections of carpet into each space prior to application of adhesive. Trim edges and butter cuts with seaming cement.
 - (2) Apply adhesive uniformly to substrate in accordance with manufacturer's instructions. Butt carpet edges tightly together to form seams without gaps. Roll lightly to eliminate air pockets and ensure uniform bond. Remove adhesive promptly from face of carpet.

10. CLEANING AND PROTECTION

- (A) Remove debris, sorting carpet pieces to be saved from scraps to be disposed of.
- (B) Vacuum carpet using commercial machine with face-beater element. Remove spots and replace carpet where spots cannot be removed.
- (C) Cover installed carpet to protect it from damage or wear during remainder of construction period. Use heavy kraft-paper or other suitable covering. Do not use plastic sheet or film that could cause condensation.
 - (1) Do not cover site-finished floors with kraft paper or any other material, until adhesives reaches full cure.
- (D) Maintenance materials: Deliver usable scraps of carpet to Owner's designated storage space, properly packaged (paper wrapped) and identified. Usable scraps are defined to include roll ends of less than 9'-0" length, and pieces of more than 3 sq. ft. area and more than 8" wide. Dispose of smaller pieces as "construction waste".

END OF SECTION

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DIVISION 9 - FINISHES

PART 1: GENERAL

1. RELATED DOCUMENTS

(A) The general provisions of Division 1 apply to the work specified in this Section.

2. SCOPE OF WORK

(A) The extent of the work is indicated on the drawings and specified herein.

3. PROJECT CONDITIONS

(A) Environmental Limitations: Do not deliver or install wall coverings until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above ceilings is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

(B) Lighting: Do not install wall covering until a permanent level of lighting is provided on the surfaces to receive wall covering.

(C) Ventilation: Provide continuous ventilation during installation and for not less than the time recommended by wall-covering manufacturer for full drying or curing.

PART 2: PRODUCTS

4. WALL COVERINGS

(A) General: Provide rolls of each type of wall covering from same print run or dye lot.

(B) Provide product(s) as indicated on the drawings.

5. ACCESSORIES

(A) Adhesive: Mildew-resistant, nonstaining, strippable adhesive, for use with specific wall covering and substrate application; as recommended in writing by wall-covering manufacturer and with a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

(B) Primer/Sealer: Mildew resistant and recommended in writing by wall-covering manufacturer for intended substrate.

PART 3: EXECUTION

6. EXAMINATION

- (A) Examine substrates and conditions, with Installer present, for compliance with requirements for levelness, wall plumbness, maximum moisture content, and other conditions affecting performance of the Work.
- (B) Proceed with installation only after unsatisfactory conditions have been corrected.

7. PREPARATION

- (A) Comply with manufacturer's written instructions for surface preparation.
- (B) Clean substrates of substances that could impair bond of wall covering, including dirt, oil, grease, mold, mildew, and incompatible primers.
- (C) Prepare substrates to achieve a smooth, dry, clean, structurally sound surface free of flaking, unsound coatings, cracks, and defects.
- (D) Moisture Content: Maximum of 5 percent on new plaster, concrete, and concrete masonry units when tested with an electronic moisture meter.
- (E) Gypsum Board: Prime with primer as recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
- (F) Painted Surfaces: Treat areas susceptible to pigment bleeding.
- (G) Check painted surfaces for pigment bleeding. Sand gloss, semigloss, and eggshell finish with fine sandpaper.
- (H) Remove hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.
- (I) Acclimatize wall-covering materials by removing them from packaging in the installation areas not less than 24 hours before installation.

8. INSTALLATION

- (A) General: Comply with wall-covering manufacturers' written installation instructions applicable to products and applications indicated except where more stringent requirements apply.
- (B) Cut wall-covering strips in roll number sequence. Change roll numbers at partition breaks and corners.
- (C) Install strips in same order as cut from roll.
- (D) Install wall covering with no gaps or overlaps, no lifted or curling edges, and no visible shrinkage.
- (E) Match pattern 72 inches (1830 mm) above the finish floor.

- (F) Install seams vertical and plumb at least 6 inches (150 mm) from outside corners and 6 inches (150 mm) from inside corners unless a change of pattern or color exists at corner. No horizontal seams are permitted.
- (G) Fully bond wall covering to substrate. Remove air bubbles, wrinkles, blisters, and other defects.
- (H) Trim edges and seams for color uniformity, pattern match, and tight closure. Butt seams without any overlay or spacing between strips.

9. CLEANING

- (A) Remove excess adhesive at finished seams, perimeter edges, and adjacent surfaces.
- (B) Use cleaning methods recommended in writing by wall-covering manufacturer.
- (C) Replace strips that cannot be cleaned.
- (D) Reinstall hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

END OF SECTION

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DIVISION 9 - FINISHES

PART 1: GENERAL

1. RELATED DOCUMENTS

(A) The general provisions of Division 1 apply to the work specified in this Section.

2. SCOPE OF WORK

(A) The extent of the work is indicated on the drawings and specified herein.

(B) "Paint" as used herein means all coating systems materials, including primers, emulsions, enamels, stains, sealers and fillers and other applied materials whether used as prime, intermediate or finish coats.

(C) Spraying the exposed steel and underside of the roof deck or ceiling of the room includes painting of the suspended electrical, mechanical, fire sprinkler and other appurtenances permanently installed in the building. Paint shall not be sprayed on the ceiling until all aforementioned items have been installed.

(D) Mask off nameplates, equipment identifications and similar items. Cover sprinkler heads with plastic bags and protect moving parts during painting. Remove all protective coverings at the completion of painting activity.

(E) The painting contractor is responsible for the application of the paint or finishing material. If any surface to be finished cannot be put in proper condition for finishing by customary cleaning, sanding and puttying operations, the painting contractor will immediately notify the General Contractor in writing; or assume responsibility for and rectify any unsatisfactory finish resulting.

(F) The painting contractor shall examine all documents that form this contract, and the alternates that affect the work under this Section. Examine the specifications under other divisions and thoroughly familiarize himself with all provisions regarding their painting.

(G) Do not apply paint in snow, rain, fog or mist, or when relative humidity exceeds 85%. When surface temperature is below 50 degrees F., do not apply paints, varnishes, and special coatings. Stop exterior work sufficiently early to permit film to set up before condensation, frost and moisture, caused by night temperature drops, occur. Do not begin exterior painting until frost or condensation evaporates and surface is moisture free. Do not varnish when temperature is below 70 degrees F. Comply with manufacturer's written requirements. Painting may continue in inclement weather only if surfaces to be painted are enclosed and heated within temperature limits set by manufacturer.

(H) Surfaces to be painted or finished including but are not limited to the following:

- (1) Interior gypsum board surfaces, including priming area behind mirror locations.
- (2) Interior wood surfaces and trim.
- (3) Surfaces of hollow metal doors and jambs which are shop or factory prime painted only, in other sections of the specifications.
- (4) Surfaces of access doors, covers, and frames.
- (5) Surfaces of all exterior and interior ferrous metal, metal ladder, miscellaneous iron work, interior structural steel columns and exterior structural steel, except factory finish painted items, but including items prime painted under other Sections of the specifications.
- (6) Surfaces of all prime painted hardware.
- (7) Miscellaneous roof steel for mechanical equipment.
- (8) Touching up of scuffs, abrasions, marred areas and other imperfections of metal, wood and other surfaces which are required to be painted or finished and are

- prefinished.
- (9) Exterior stair railings (if applicable).
 - (10) Metal gutter, leaders, leader guards, sheet metal flashing to match adjacent color when necessary; or as indicated in Color Schedule, if not called out as factory-finish. (Note: All downspouts and downspout guards to be field painted prior to installation.)
 - (11) Spray paint the following ceiling areas (underside of roof deck) and all of the items and related equipment listed below:
 - (a) This shall include but not be limited to all of these following exposed items and ceiling construction.
 - (1) Structural and miscellaneous steel, steel joists and metal roof deck, etc.
 - (2) All mechanical, electrical, plumbing, piping and fire protection equipment not furnished with factory applied baked enamel finish. Protect sprinkler heads and remove protection after painting.
 - (3) Tops of accessible ductwork, grills, diffusers, piping, conduit, etc. shall be painted.
 - (4) All related devices, hangers or fasteners for the above.
 - (5) Paint all items above whether primed or not.
 - (b) Paint ceiling areas and items above in areas scheduled.
 - (c) Colors as indicated on drawings.
 - (12) Millwork.
 - (13) Metal bollards protecting transformer, rails, pipes, etc. paint OSHA Yellow (unless requested otherwise by Owner).
 - (14) Underside and topside of standing seam roof panels when not provided as prefinished.
 - (15) Sealer for concrete floor slabs at Janitor's Closet, Utility Room and room(s) where indicated.
 - (16) Any new or existing fire hydrants and water backflow preventors to be field painted. (Note: coordinate painting with city requirements.)
 - (17) Fire Sprinkler riser to be painted OSHA SAFETY RED from floor to ceiling.
 - (18) Concrete light pole bases – White (if applicable).
 - (19) Wall mounted HVAC grilles to match wall.
 - (20) Unfinished Owner furnished decorative items.
 - (21) Roof Access Ladder – Yellow.
 - (22) Manhole lid/cover castings, drainage inlets/grate castings, valve covers and other cast metals to be field painted Flat Black (refer to Division 2).
 - (23) Water repellent for exterior masonry and stone.
 - (24) Exposed concrete foundations.
- (I) Work specified under other Sections:

- (1) Prime coat painting and undercoats of paint, factory or shop finish painting specified in other Sections of the specifications or on the drawings.
 - (2) Field touch-up of miscellaneous metals.
 - (3) Field touch up of structural steel.
 - (4) Field painting of piping and condensate line (Ref. Division 15 – Mechanical)
 - (5) Interior caulking (Refer to Section 07901 – Joint Sealants).
- (J) Items not to be painted: Unless otherwise noted, prefinished, prefabricated, or shop fabricated components or equipment, concealed surfaces, finish anodized aluminum, operating parts, labels, identification plates, performance ratings, etc.
- (K) Painting of items excluded from coverage by this section: Decorative Metals covered by Section 10999.

3. DELIVERY AND STORAGE

- (A) The contractor shall store all apparatus and materials used on the job in a single place designated by the General Contractor, or Owner's Representative. Such storage shall be kept clean and painting contractor shall be liable for damage to surrounding areas. All soiled or used rags, waste and trash must be removed from the building every night and every precaution taken to avoid the danger of fire.
- (B) Deliver all materials to jobsite in original, new and unopened packages with containers bearing all manufacturer's data, instructions, spec. numbers, etc. Materials not displaying proper manufacturer's guarantee will not be accepted.

4. CONTRACTOR'S RESPONSIBILITY

- (A) The Contractor shall study the contract, drawings and specifications with regard to the work as shown and required under this Section as to ensure its completeness.
- (B) Contractor shall be responsible to ensure that ALL surfaces receiving subsequent finish or coatings are prepared in accordance with manufacturer's recommendations. Contractor and his subcontractors shall require that a representative of the manufacturer inspect and approve the surface preparation prior to application of his product. Contractor shall advise the Owner's Representative immediately, in writing, of any incompatibilities between materials or surfaces. Commencement of Application implies acceptance of the surface and shall constitute waiver by the respective contractor and General Contractor to any claim of incompatibility.
- (C) The Contractor shall cooperate in the coordination and scheduling of the work of this Section with the work of other Sections so as not to delay job progress.

5. SUBMITTALS

- (A) Submit samples to Owner's Representative for review of color and texture only. Submit Product Data to CASCO for review.
- (1) On actual wood surfaces, provide two 8" long samples to Owner of "stained" wood finish with polyurethane applied.
 - (2) For metallic paints, provide the Owner's Representative a field mock-up for evaluation of surface preparation techniques, application, workmanship and final appearance. Mock-up finish surfaces to be reviewed for verification of products, colors and sheens.

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PART 2: PRODUCTS

6. MATERIALS (NO PRODUCT SUBSTITUTIONS ALLOWED)

- (A) Painting and finishing products for use in the work shall be the standard best or top brands produced for each particular kind of material required herein, by the following manufacturers unless otherwise noted:
- PPG Paints or Sherwin Williams - General interior and exterior paint. Modern Masters for interior metallic paint.
- Textured Coatings of America, Inc. – External ferrous metals and standing seam metal roofing.
- Textured Coatings of America, Inc. or Thoro Systems Products – G.F.R.C. column covers, exposed concrete foundations, concrete light pole bases.
- (1) TEX-COTE products shall be as manufactured by Textured Coatings of America, Inc., shall be applied per the manufacturer's recommendations, and shall carry a manufacturer's 10-year fade and adhesion warranty.
- (B) Colors shall be pure non-fading pigments, finely ground in linseed oil or japan drier, as required. Colors used on plaster, masonry and concrete shall be limeproof. Color schedule shall be approved by the Owner's Representative prior to application of products.
- (1) Refer to drawings for colors required or to be matched by the specified manufacturers.
- (C) Spackling compound shall be finely ground, grit free; when dry, shall set without shrinkage to smooth, hard, white surface, and sand easily to take any finish.
- (D) Wood filler shall be stainable painter's putty.
- (E) Raw linseed oil shall conform to ASTM D234.
- (F) Boiled linseed oil shall conform to ASTM D260.
- (G) Turpentine shall be gum spirits of turpentine conforming to ASTM D13.
- (H) Putty shall conform to ASTM D317, Class B white lead whiting putty.
- (I) All finishes to be Class "C" flame spread or better.

7. PAINTING SCHEDULE (NO PRODUCT SUBSTITUTIONS ALLOWED)

- (A) Exterior Surfaces (PPG Paints, Sherwin Williams, Texture Coatings of America, Inc., and Thoro Systems):
- (1) Ferrous Metal: All structural steel canopy framing, miscellaneous steel, etc. Primer painting scope is limited to touch-up, if items are received properly primed:
- (a) Where yellow color is called for on the Drawings:
- 1 coat TEX-COTE TEX-BOND Primer.
2 coats TEX-COTE REFLECT-TEC Heat Reflective Finish.
- (b) For colors other than yellow:
- Reference Section 05120, Structural Steel, for priming requirements.
1 coat PPG Paints 95-245 Pitt-Guard Rapid Coat
2 coats PPG Paints 95-812 Pitthane Ultra Aliphatic Urethane Gloss Enamel.
- Or
- 1 coat Sherwin Williams B58W00610 Macropoxy 646 Fast Cure Epoxy
2 coats Sherwin Williams B65W00311 Hi-Solids Polyurethane Gloss

- (2) Galvanized Metal: All galvanized metal, including hollow metal doors & frames. Primer painting scope is limited to touch-up, if items are received properly primed.
- 1 coat PPG Paints 95-245 Pitt-Guard Rapid Coat
2 coats PPG Paints 95-812 Pitthane Ultra Aliphatic Urethane Gloss Enamel.
- Or
1 coat Sherwin Williams B58W00610 Macropoxy 646 Fast Cure Epoxy
2 coats Sherwin Williams B65W00311 Hi-Solids Polyurethane Gloss
- (3) Concrete Masonry (smooth face accent band within integrally colored split face):
- 1 coat PPG Paints 4-100XI Perma-Crete Concrete Brick & Masonry Surfacer
2 coats PPG Paints 6-610XI Speedhide Exterior Acrylic Flat Finish.
- Or
1 coat Sherwin Williams LX01W0200 Loxon Acrylic Block Surfacer White
2 coats Sherwin Williams A6W00151 A-100 Exterior Latex Flat
- (4) Concrete Masonry (Non-integrally colored and without integral water repellent):
- 1 coat PPG Paints Perma-Crete 4-100XI Concrete Block & Masonry Surfacer/Filler.
2 coats PPG Paints Perma-Crete Pitt-Flex 4-110XI Elastomeric Coating Smooth.
- Or
- Prime Coat for Concrete Masonry Units: 1 coat Sherwin Williams B42W150 Pro Industrial Heavy Duty Block Filler (Apply in a manner so that there are no pin holes in the block filler. Thorough back rolling of the block filler is required.)
- Prime Coat for Smooth Concrete: LX02W0050 Loxon Concrete & Masonry Primer/Sealer - Interior/Exterior Latex
- 2 finish coats Sherwin Williams CF11W0051 ConFlex XL Smooth High Build Acrylic Coating (Elastomeric). (The first coat shall be back rolled. A total dry film thickness of 12 - 15 mils of elastomeric coating is required to provide the required waterproofing system.)
- Note: A pin hole free application needs to be achieved to provide the required waterproofing properties.
- (5) Concrete masonry (recoating over existing finish).
- Clean entire surface by pressure washing with detergent recommended by paint manufacturer.
- 1 coat PPG Paints Perma-Crete Pitt-Flex 4-110XI Elastomeric Coating Smooth
- OR
1 coat PPG Paints Perma-Crete Pitt-Flex 4-110XI Elastomeric Coating Smooth.
- (6) Integrally colored concrete block (Exterior)
- Water Repellent: Prime-a-Pell 200, clear as manufactured by Chemprobe Coating Systems, Garland, Texas (972) 271-5551.
- (a) Complete manufacturer's application procedure and submit standard five (5) year warranty for materials.
- (7) Aluminum Zinc - Coated Steel (Top Side and underside of standing seam metal roofing where yellow field painting is called for on the Drawings):

- Solvent wipe all areas with Xylol solvent and rags to remove white rust, oil, grease, or soil.
- 1 coat TEX-COTE Metal-Prime Primer
1 coat TEX-COTE.TEX-BOND Primer.
- 2 coats TEX-COTE REFLECT-TEC Heat Reflective Finish.
- (8) G.F.R.C. Column Covers (if applicable):
- 1 coat Thoro CM Primer
1 coat "Thorocoat", Coarse Texture, color as indicated on the drawings.
- Or
- 1 coat TEX-COTE XL-70 "W" Primer
1 coat TEX-COTE XL-70 "W", Coarse Texture, color as indicated on the drawings.
- (9) Exposed Concrete Foundations:
- 1 coat Thoro CM Primer
1 coat "Thorocoat", Coarse Texture, color as indicated on the drawings.
- Or
- 1 coat TEX-COTE XL-70 "W" Primer
1 coat TEX-COTE XL-70 "W", Coarse Texture, color as indicated on the drawings.
- (10) Concrete Light Pole Bases (if applicable):
- 1 coat Thoro CM Primer
1 coat "Thorocoat", Coarse Texture, color as indicated on the drawings.
- Or
- 1 coat TEX-COTE XL-70 "W" Primer
1 coat TEX-COTE XL-70 "W", Coarse Texture, color as indicated on the drawings.
- (B) Interior Surfaces (PPG Paints and Sherwin Williams):
- (1) All drywall surfaces, except in Sales Areas and where ceramic tile is to be applied:
- 1 coat PPG Paints 6-2 Speedhide Interior Quick Drying Latex Sealer.
2 coats PPG Paints 12-310XI Speedhide Pro-EV Zero 0 VOC Interior Latex Eggshell Enamel
- Or
- 1 coat Sherwin Williams B28W04600 ProMar 400 Zero VOC Interior Latex Primer White
2 coats Sherwin Williams B20W04651 ProMar 400 Zero VOC Interior Latex Egg-Shell Extra White
- (2) Drywall surfaces in Sales Areas (spray applied, primer only behind mirrors):
- 1 coat PPG Paints 6-4900XI Speedhide Zero 0 VC Latex Sealer
2 coats PPG Paints 6-4110XI Speedhide Zero 0 VOC Interior Latex Flat
- or
- 1 coat Sherwin Williams B28W02600 Promar 200 Zero VOC Interior Latex Wall Primer White.
2 coats Sherwin Williams B30W02651 Promar 200 Zero VOC Interior Latex Flat Extra White.
- (3) Ferrous Metal - all doors, frames and other ferrous metal, except where noted:

1 coat PPG Paints 6-212 Speedhide Int/Ext Rust Inhibitive Primer.
2 coats PPG Paints 6-1510XI Speedhide Int/Ext WB Alkyd Semi-Gloss.

Or

1 coat Sherwin Williams B50WZ0001 Kem Kromik Universal Metal Primer Off White
2 coats Sherwin Williams B34W08251 ProMar 200 Interior Waterbased Acrylic-Alkyd Semi-Gloss

- (4) Ferrous Metal Ceilings - all structural steel, including bar joists, beams, and decking: (Refer to Par. 2.(H)(11) above and to schedule on drawings)

- (a) All roof deck

Previously shop primed surfaces to be spot primed where damaged.

1 coat PPG Paints DEVFLEX 4020PF primer on roof deck, surfaces that have not been primed or previously painted

Or

Previously shop primed surfaces to be spot primed where damaged.

1 coat Sherwin Williams B66W00011 Pro Industrial DTM Acrylic Primer Finish White on roof deck, surfaces that have not been primed or previously painted.

- (b) Sales Area(s) and all areas with painted ceilings (Refer to drawings for colors). 2 coats minimum required to cover darker existing paint.

1 coat PPG Paints 6-160XI Speedhide Interior Alkyd Dry-Fog Flat or Low VOC Water Based or 1 coat PPG Paints 6-725XI Speedhide Super Tech WB Interior Dry Fog Flat where galvanized surfaces are to be coated.

Or

1 coat Sherwin Williams B48W00060 Dry Fall Flat Brilliant White Modified Alkyd or 1 coat Sherwin Williams B42W00181 Pro Industrial Waterborne Acrylic Dryfall White Flat where galvanized surfaces are to be coated.

- (5) Decorative Metals – Mill Finish Aluminum

1 coat PPG Paints 4020PF Devflex DTM Flat Waterborne Primer/Finish
2 coats PPG Paints 6-411 Speedhide Interior Eggshell.

Or

1 coat Sherwin Williams B71Y00001 DTM Wash Primer Yellow Green
2 coats Sherwin Williams B20W12651 ProMar 200 Interior Latex Egg-Shell Extra White

- (6) Stained Wood Surfaces – Floor base, trim, flat crown, plywood panels:

Sherwin Williams 1500 Minwax Pre-Stain Wood Conditioner

1 coat brushed then hand wiped of PPG Paints, Deft DFT 400 used as a pigmented wiping stain. Submit samples to Owner for approval prior to commencing with work.

2 brushed coats of PPG Paints Deft DFT159 Waterborne Satin Polyurethane.

Or

Sherwin Williams 1500 Minwax Pre-Stain Wood Conditioner

1 coat brushed then hand wiped of Minwax Performance Series Stain 250 VOC Interior Oil Stain used as a pigmented wiping stain. Submit samples to Owner for approval prior to commencing with work.

2 brushed coats of Minwax Polyacrylic Satin Clear.

(7) Metallic-Painted Surfaces: "Copper", "Silver", or "Pewter" accent pieces.

(a) Copper accent pieces:

1 coat PPG paints 17-921XI Seal Grip Interior/Exterior Universal Primer
3 coats Modern Masters Metallic Paint Collection, 2 parts ME702 Burnt Orange and 1-part ME661 Tequila, water based metallic.

2 coats Modern Masters MasterClear Protective Clear Topcoat, Satin Finish

Or

1 coat Sherwin Williams B51W00620 PrepRite ProBlock Interior/Exterior Latex Primer/Sealer

3 coats Modern Masters Metallic Paint Collection, 2 parts ME702 Burnt Orange and 1-part ME661 Tequila, water based metallic.

2 coats Modern Masters MasterClear Protective Clear Topcoat, Satin Finish

(8) Wood Enamel-Coated Surfaces, Wood Trim (where indicated on Drawings):

1 coat PPG Paints 12-900XI Speedhide Pro-EV Zero Interior Latex Primer.

2 coats PPG Paints 12-310XI Speedhide Pro EV Zero Interior Enamel Latex Eggshell.
Or

1 coat Sherwin Williams B28W04600 ProMar 400 Zero VOC Interior Latex Primer White

2 coats Sherwin Williams B20W04651 ProMar 400 Zero VOC Interior Latex Egg-Shell Extra White

(9) Prime Coats - Apply prime coat to material which is required to be painted or finished but has not been prime coated by others.

(10) Concrete Floors – Janitor’s Closet, Utility Room and room(s) where indicated.

Prepare surfaces as specified in above section "PREPARATION OF SURFACES" subparagraph "Interior Concrete Floors".

2 coats PPG Paints 3-510XI 100% Acrylic Floor Enamel.

Or

2 coats Sherwin Williams B90W00111 ArmorSeal Tread Plex 100% Acrylic Floor Coating Extra White/Tint Base.

(11) Concrete Masonry:

1 coat PPG Paints 17-921XI Seal Grip Interior/Exterior Universal Primer.

2 coats PPG Paints Speedhide 6-411 Interior Latex Eggshell.

Or

1 coat Sherwin Williams B28W4600 ProMar 400 Zero VOC Interior Latex Primer

2 coats Sherwin Williams B20W4651 ProMar 400 Zero VOC Interior Latex Egg-Shel

PART 3: EXECUTION

8. PREPARATION OF SURFACES

- (A) Prior to installation of work, the Contractor shall examine surfaces which are to receive painting and finishing coats, and report conditions of surfaces which are not properly prepared to receive work of this section. Start of work shall indicate that work can be performed as specified herein.
- (B) Spaces shall be broom clean and surfaces dust-free before painting is started. Before painting or finishing, plaster, greases and other extraneous matter which would affect the finished work shall be removed.
- (C) Areas and/or spaces where painting and/or finishing work is being performed shall be maintained above 50 degrees F. during application and drying.
- (D) Do repairing or spackling of surface necessary for proper application of paint.
- (E) Surfaces shall be sound, thoroughly dry and cleaned of oil, grease, dust, dirt, rust, sandpapered smooth and otherwise properly prepared.
- (F) Remove stickers from ductwork, bar joists and unistrut, etc. prior to painting.
- (G) Masonry:
 - (1) Thoroughly clean masonry and other absorptive surfaces to be painted of grit, efflorescence, grease, dust and dirt which will adversely affect the adhesion or appearance of the paint finish.
 - (2) Masonry construction shall be cured for 30 days before painting. Check alkalinity and moisture content of surfaces to be painted. If surfaces require corrective measures, General Contractor to correct condition of surfaces to be painted.
 - (3) Existing masonry which has been painted shall be pressure washed with a detergent recommended by paint manufacturer.
- (H) Masonry Water Repellent Application (required for integrally colored concrete masonry, brick, stone and cast stone):
 - (1) Applications contractor shall submit documentation showing 3 years minimum successful experience in procurement and application of specified water repellents on similar types of substrates on project of this size or larger.
 - (2) Waterproofing agent is very harmful to landscape plants and sod. All existing landscaping must be protected. General Contractor and applicator will be responsible for all cost of replacement for damaged landscaping.
 - (3) Job Conditions:
 - (a) Weather and Substrate Conditions: Do not proceed with application of water repellent (except with the written recommendation of manufacturer), when ambient temperature is less than 50 degrees F.; or when substrate surfaces have cured for less than a period of 2 months; or when rain or temperatures below 40 degrees F. are predicted for a period of 24 hours; or earlier than 3 days after surfaces became wet from rainfall or other moisture sources or when substrate is frozen, or at surface temperature of less than 40 degrees F.
 - (b) Applications Contractor must contact local product supplier and fill out proper pre-application and five-year warranty forms in a timely manner. Applications contractor must examine substrate and conditions under which water repellent is to be applied and advise the General Contractor in writing of unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to Applications Contractor.

- (c) Manufacturer's representative and the Owner's representative shall be present at commencement of waterproof coating application to assure utilization of proper equipment, verify material quantities, supervise material techniques, and supervise the onset application of waterproof coating upon a substantial wall section which shall act as a comparative standard for the project. The visual acceptance of the coated wall section shall be at the sole discretion of the Owner's Representative.
 - (d) Manufacturer's representative will inspect all treated surfaces after application of waterproof coating to assure complete product utilization, aesthetic effect and material performance.
- (4) Preparations for Installation:
- (a) Clean substrates of all known spills, stains, and substances which might interfere with penetration /adhesion of water repellents. Test for moisture content, in accordance with repellent manufacturer's instructions, to ensure that surface is sufficiently dry.
 - (b) Coordination with sealants: Where feasible, delay application for water repellents until installation of sealants has been completed in joints adjoining surfaces to be coated with repellent.
 - (c) Mask off areas which receive paint, special coating, ceramic tile or exterior insulation and finish system to ensure that no liquid water repellent is applied on these areas. Protect adjoining work, including sealant bond surfaces, from spillage or blow-over of water repellent. Cover adjoining and nearby surfaces of aluminum and glass where there is possibility of water repellent being deposited on surfaces. Cover grass and landscaping materials with protective drop cloths. Clean water repellent from adjoining surfaces immediately after spillage. Comply with manufacturer's recommendations for cleaning.
- (5) Installation:
- (a) Apply "Prime-a-Pell 200" clear coating in a uniform, one-coat saturation-type spray coating of water repellent on surfaces indicated for treatment. Comply with all manufacturer's instructions and recommended coverage rates.
 - (b) For locations where regulations limit the VOC content of coatings apply "Prime-a-Pell Plus" clear coating in lieu of "Prime-a-Pell 200". Comply with all manufacturer's instructions and recommended coverage rates.
 - (c) Mask off areas which receive paint, special coating, ceramic tile or exterior insulation and finish system to ensure that no liquid water repellent is applied on these areas. Protect adjoining work, including sealant bond surfaces, from spillage or blow-over of water repellent. Cover adjoining and nearby surfaces of aluminum and glass where there is possibility of water repellent being deposited on surfaces. Cover grass and landscaping materials with protective drop cloths. Clean water repellent from adjoining surfaces immediately after spillage. Comply with manufacturer's recommendations for cleaning.
 - (d) Waterproofing agent is very harmful to landscape plants and sod. All existing landscaping must be protected. General Contractor and applicator will be responsible for all cost of replacement for damaged landscaping.
- (6) Warranty
- (a) Applications contractor shall, upon completion of work contained herein, issue a written warranty to the Owner covering workmanship and material. Said warranty shall become effective upon completion and mutual acceptance of water repellent work under this section by manufacturer's representative and Owner. The warranty shall cover workmanship for five years and include material manufacturer's warranty for a period of five

years against failure due to product which did not conform to formula or meet manufacturer's quality control standards at time of its production.

- (I) Gypsum Drywall:
 - (1) Scratches, cracks, holes, indentations, gouges, and similar defects in surface shall be properly cut out and filled with spackling compound, joint compound or other patching material as may be required and brought to a smooth flush surface. Patched portions shall be given a coat of primer-sealer in addition to all other specified coats.
 - (2) Safe moisture level for painting shall be determined by the use of a moisture meter. Patched areas, "hot" or suction spots shall be spot primed as per manufacturer's label directions.
- (J) Wood
 - (1) Interior wood trim shall be finished after installation in the following manner and sequence.
 - (a) Clean surfaces of dirt, oil and other foreign substances with sandpaper as required, then brushed to remove dust and washed off with naphtha or other suitable cleaner.
 - (b) Pre-treat and prepare birch plywood as required to provide a final stain finish that matches the poplar wood base trim and flat crown, unless noted otherwise.
 - (c) Apply conditioner and stain per manufacturer's instructions. After completely dry, apply first polyurethane coat.
 - (d) After application of first sealer coat, all cracks, nail holes, and surface defects in woodwork shall be filled with putty. Putty shall be brought up flush with the surface. All putty and fillers shall be color matched to the finish color.
 - (e) Lightly sand smooth, then apply another coat of polyurethane. Apply the final polyurethane coat to the baseboard after installation of flooring.
- (K) Metals:
 - (1) Metal surfaces shall be washed with mineral spirits to remove dirt or grease before applying materials. Where rust or scale is present, it shall be wire brushed or sanded clean before painting. Shop coat of paint that becomes marred shall be cleaned and touched up with the primer specified.
 - (2) Galvanized metal surfaces shall be thoroughly wiped down so that surfaces are free of dirt, grease or foreign matter, as recommended by approved paint manufacturer.
 - (3) Shop or prime coated metal surfaces shall be cleaned of similar foreign matter as above and shall have all bare spots or rust spots removed by wire brushing or sanding. Apply an anticorrosive primer to the bare or rusted areas and allow to dry to full cure according to the product label instructions.
 - (4) Dents, cracks, hollow places, open joints and other irregularities in metal work to be painted shall be filled with an approved metal filler suitable for the purpose which, after setting, shall be sanded to a smooth, hard surface.
- (L) Mechanical and Electrical Items:
 - (1) Pipe and duct coverings shall be given a heavy coat of glue size before other paint applications, except when sized under the work of other sections. There shall be added to the glue size, and to each coat of paint applied thereafter, a sufficient amount of a fungicidal agent to render the fabric mildew-proof. The fungicidal agent shall be a type which will not adversely affect the color, texture, or durability of the paint.

- (2) Exposed panel boxes, electric cabinets, piping, ducts, and other mechanical and electrical work and equipment in finished spaces, shall be given one (1) prime coat and then shall be finished to match walls and ceilings on which or near which they are located.
 - (3) Gas lines above roof shall be painted OSHA Yellow.
 - (4) Backflow preventors, fire sprinkler riser shall be painted red and fire hydrants shall be painted OSHA Safety Red or color as required by local authorities.
 - (5) Condensate lines above roof shall be painted medium gray.
- (M) Interior Concrete Floors: Floors to be painted shall be cured minimum of 28 days and shall be acid etched or sandblasted to remove laitance as recommended by coating manufacturer. If curing compounds have been used on floors, remove these compounds before applying epoxy coating.
- (N) Exposed Concrete Foundations:
- (1) All concrete surfaces must be sound, clean, and free of all dust, dirt, oils, grease laitance, efflorescence, mildew, fungus or any biological residues of chemical contaminants that prevent good adhesion, and surface defects. Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins, and other projections on the surface.
 - (2) A combination of cleaning methods may be used. High pressure abrasive blasting (or water blasting with various abrasives added to the water stream) has been proven to be very effective techniques. Some stains and contaminants may require chemical removal. Any method or combination of methods selected should be the least destructive method possible.
 - (3) Remove all laitance to achieve a visual or tactile roughness standard equivalent to 150 grit or coarser sandpaper. Patch all spalls and delaminations. Allow the patches to cure and air dry. Allow all free water to evaporate from the surface. Surface moisture should not be present. If surface is chalky after cleaning the preparation, apply primer and allow to dry.
- (O) Hollow Metal doors and Frames
- (1) Hollow metal doors and frames shall have primer coats and the first finish coat of paint applied prior to the installation of any of the doors finish hardware.

9. WORKMANSHIP

- (A) Painting materials shall be applied by skilled mechanics well versed in the several branches of the work. Each painting operation shall be performed in the Owner's Representative opinion in accordance with the best practices which are consistent with the surfaces being finished and the types of materials being applied. Painting materials shall be free of skins, lumps or any foreign matter and the solids shall be kept well stirred in the vehicle of any such material while being applied.
- (B) Painting materials shall be evenly and smoothly spread or flowed on and shall be free of runs, drips, sags, crawling, brush marks and clogging of angles. No successive coats of painting materials shall be applied until the preceding coat is thoroughly dry and hard. Wood and metal surfaces with varnish or enamel finish shall be sanded between coats to produce even, smooth surfaces.
- (C) Each painting material shall be stirred, blended, tinted, thinned and/or applied in accordance with the manufacturer's directions. Each coat of paint shall be a different tint from that of the preceding coat. Each final coat of the painting shall be the exact shade and texture as represented by the sample previously selected and approved by the Owner's Representative. Where two coat work is specified, the first coat shall be tinted toward the final color.
- (D) Unless otherwise specified, materials for succeeding coats on any one surface shall be the

products of the same manufacturer who furnished the first prime-sealer coat or undercoat for that particular surface, except when metal primers are used as specified under other Sections of the specifications.

- (E) An ambient temperature of not less than 50 degrees F. shall be obtained in all spaces or locations where work required under this specification is in progress, unless otherwise directed by the Project Manager.
- (F) Exterior painting shall not be done during any period of high humidity which would prevent the attainment of satisfactory results from any painting operation.
- (G) Coat shall be thoroughly dry before succeeding coats are applied. Allow a minimum of 24 hours between coats on any surface, unless otherwise specified by the manufacturer.
- (H) Except as noted, the number of coats herein specified shall be in addition to any priming or other coats specified under the various Sections. Painted surfaces shall receive at least one (1) priming coat and two (2) finishing coats, unless otherwise specified.
- (I) Hardware, lighting fixtures, switch plates and the like shall be removed before painting and afterward replaced.
- (J) In the painting of movable or operating parts, no paint shall be applied to sliding contacts and the like, where the bare material is necessary for proper operation. Paint applied to such surfaces shall be removed.
- (K) Access doors, plates, panel boxes, conduits and the like shall be painted in with the adjoining surfaces on which they occur, using the same kind of paint, number of coats, color and finish. In spaces where adjoining surfaces do not receive paint the work shall be painted the same as similar work in painted spaces and of color directed.
- (L) Mechanical work shall not be painted while materials contain heat. They shall remain unheated until after the final coat has thoroughly dried.
- (M) No interior painting shall be done until the building is thoroughly dried out and all conditions are suitable to produce satisfactory results, in accordance with manufacturer's directions.
- (N) Provide and use a sufficient number of drop cloths and exercise care to protect finished surfaces of floors and other work, and immediately remove spatter, stains and droppings from such surfaces. Particular care shall be taken when painting above wainscots and other finished surfaces, furnishings, equipment and the like.
- (O) Interior wood trim shall be finished after installation.
- (P) Remove doors to paint tops and bottoms.
- (Q) Materials shall be thoroughly mixed and strained before using. Addition of thinners such as linseed oil, turpentine and the like shall be added to ready-mixed materials only in accordance with the manufacturer's printed instructions. If no printed instructions appear on the container, the contractor shall obtain this information in writing from the manufacturer. A copy of these printed instructions shall also be transmitted to the Project Manager.
- (R) Materials used to prepare surfaces and apply clear epoxy sealer on concrete floors where scheduled, shall be mixed, water-thinned and applied in strict accordance with sealer manufacturer's instructions and specified herein.

10. PROTECTION AND CLEANING

- (A) Work under this Section shall not check, crack, peel, discolor or have other defects due to improper materials or workmanship, due to improper preparation of the surfaces, or due to the painting, varnishing, or surfaces which were not in proper condition to receive paint, varnish or other painter's materials, and such unsatisfactory work shall be refinished at no additional cost to the Owner.
- (B) The Contractor shall, when so directed, retouch where necessary, restore where damaged or defective, and clean off paint spots from floors, walls, finished hardware, glass and other surfaces not scheduled to receive paint, and shall leave painted surfaces clean and in a

satisfactory condition. The contractor shall touch-up the showroom walls the day before store opening.

- (C) Upon completion of work, surplus materials, empty packages and containers and debris shall be removed from the site by legal means.
- (D) Acceptance at final inspection will be governed by body finishes exhibited and the contractor shall apply additional costs as required to produce proper finish and coverage in accordance with the approved samples. At acceptance, the paint and varnish finished work shall be in a neat, sound and undamaged condition.
- (E) Surfaces shall be thoroughly cleaned at completion and before acceptance of work.
- (F) This contractor shall protect his work and the work of other trades against damage or injury by his employees or by the materials, tools and equipment used in connection with the painting. Work that is damaged as the result of the painting operations, shall be repaired at the Contractor's expense.
- (G) When Owner's personnel take over store for fixturing, move all paint materials and equipment to a location outside of store. No storage of paint or painting equipment will be allowed in the store.

11. WARRANTY

- (A) Applications contractor shall, upon completion of work contained herein, issue a written warranty to the Owner covering workmanship. Said warranty shall become effective upon completion and acceptance of work under this section by the Owner. The warranty shall cover workmanship for a period of five (5) years.

END OF SECTION

DIVISION 10 - SPECIALTIES

PART 1: GENERAL

1. RELATED DOCUMENTS

(A) The general provisions of Division 1 apply to the work specified in this Section.

2. SCOPE OF WORK

(A) Furnish all materials, inserts, anchors, etc. required for a complete installation.

(B) Refer to Section 10811 for toilet room accessories.

(C) The extent of the work is indicated on the drawings and specified herein.

(D) Comply with local Codes or handicap provisions of local agencies, if no local codes are applicable comply with the requirements of the latest edition of all applicable Codes for handicap use of toilet rooms.

3. SUBMITTALS

(A) Shop Drawings

(1) Show fabrication and installation of toilet compartment and screen assemblies, include plans showing room layout, dimensions, elevations, sections and details.

(2) Show anchorage, panel and stile core construction, accessory items and finishes.

(3) Provide location drawings for bolt hole locations in supporting members for attachment of partitions.

(4) Manufacturer's Data Sheets

4. PRODUCT DELIVERY, STORAGE AND HANDLING

(A) Deliver items in manufacturer's original unopened protective packaging.

(B) Store materials in original protective packaging to prevent soiling, physical damage or wetting.

(C) Handle so as to prevent damage to finished surfaces.

5. WARRANTY

(A) Furnish one-year warranty against defective materials and workmanship, including delamination of panels and corrosion of hardware.

PART 2: PRODUCTS

6. MANUFACTURER

(A) Subject to compliance with requirements, provide products by the following:

(1) Bobrick

(2) NO SUBSTITUTIONS ALLOWED.

7. MATERIALS

(A) General: Provide materials that have been selected for surface flatness and smoothness. Exposed surfaces that exhibit seam marks, roller marks, stains, discolorations, telegraphing of core material, or other imperfections on finished units are unacceptable.

(B) Stile core material: Resin-impregnated, 45 lb. density particle board bonded to each side of 11 gage steel sheet.

- (C) Panel and door core material: Resin-impregnated, 45 lb. density particle board.
- (D) Screen posts: tubing, 1-1/4" square, 18-8S Type 304, stainless steel with satin finish.
 - (1) Floor and ceiling connections: Type 304 stainless steel.
- (E) Compartment headrail: Extruded anodized aluminum with satin finish, sloping top and grip-resistant edge.
- (F) Plastic laminate: High pressure laminated plastic NEMA LD-1, minimum thickness 0.050 inches.
- (G) Hardware: Hinges, slide latches, door keepers, pulls/handles, coat hooks and mounting brackets shall be 18-8S, Type 304 stainless steel with satin finish.
 - (1) Door hardware: Stainless steel one-way sheet metal screws.
- (H) Leveling device: Steel bar 3/8" x 1" with 3/8" diameter threaded rod, nuts and sleeve.
- (I) Stile shoes: One piece, 4" high, Type 304, stainless steel with number 4 satin finish.
- (J) Fasteners – stainless steel tamper resistant.
- (K) Door Pulls: All handicap accessible toilet stall doors (in- swinging and out-swinging) shall have a door pull on both sides of the door, located near the latch and 34" minimum and 48" maximum above the floor.

8. FABRICATION

- (A) Toilet Compartments
 - (1) Toilet compartments shall be overhead-braced type, Bobrick Series 1042. – **NO SUBSTITUTIONS.**
 - (2) Bond plastic laminate to core material with adhesive specifically formulated to prevent delamination in moist, warm areas of public washrooms. Bond edges prior to bonding face sheets. No splices or joints allowed in faces or edges.
 - (3) Finished thickness: 1 inch.
 - (4) Leveling device: Continuously weld anchoring and leveling, device to steel reinforcing core of stiles.
 - (5) Hardware: Self-lubricating balanced hinge with adjustable hold open feature, combination slide latch and bumper, and coat hook.
 - (a) Door hardware or mounting brackets shall not be exposed on exterior toilet compartments.
- (B) Urinal Screens
 - (1) Urinal screens shall be Post-to-Ceiling type, Series 1043, with top of screen mounted 70 inches above finish floor.
- (C) Laminate color: D354-60 Designer White, Matte Finish (Wilsonart)

PART 3: EXECUTION

9. INSPECTION

- (A) Check areas scheduled to receive partitions for correct dimensions, plumbness of walls and soundness of surfaces that would affect installation of holding brackets.
- (B) Verify spacing of plumbing fixtures to assure compatibility with installation of partitions.
- (C) Do not begin installation of partitions until conditions are satisfactory.

10. ERECTION

(A) General:

- (1) Install partition rigidly, straight, plumb and level.
- (2) Installation methods shall conform to manufacturer's recommendations for backing and proper support.
- (3) Conceal evidence of drilling, cutting and fitting to room finish.

(B) Overhead Braced Partitions:

- (1) Attach stile to supporting floor, anchored with minimum 2 in. penetration into supporting floor system. Partition shall not be in contact with floor, only shoe.
- (2) Level, plumb and tighten installation.
- (3) Secure stile shoes in position.
- (4) Set tops of doors parallel with overhead brace when doors are in closed position.

11. ADJUSTMENT AND CLEANING

- (A) Adjust hardware for proper operation after installation.
- (B) Set hinges on inward swing doors to hold doors open approximately 15 degrees from closed position when unlatched.
- (C) Set hinges on outward swing doors for physically handicapped compartments to hold doors in closed position when unlatched.
- (D) Clean exposed surfaces of partitions, hardware, fittings and accessories.

- END OF SECTION -

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DIVISION 10 - SPECIALTIES

PART 1: GENERAL

1. RELATED DOCUMENTS

(A) The general provisions of Division 1 apply to the work specified in this Section.

2. SUMMARY

(A) This section includes surface-mounted fire extinguishers.

3. QUALITY ASSURANCE

(A) Comply with NFPA 10 – Portable Fire Extinguishers.

4. SUBMITTALS

(A) Product Data: Include physical dimensions, operational features, color and finish, wall-mounting brackets with mounted measurements, anchorage details, rough-in measurements, location details, and manufacturer's installation instructions.

(B) Operational and Maintenance Data: In compliance with Section 01700 "Contract Closeout" and as specified herein.

(1) Include testing, refill or recharge schedules, procedures, and recertification requirements.

PART 2 – PRODUCTS

5. FIRE EXTINGUISHERS

(A) Manufacturer and Type: Potter-Roemer, Inc.'s "Model 3005", 5 lb. ABC multi-purpose dry chemical extinguisher; red enamel steel; complete with pressure gauge and wall-mounting bracket.

(B) Other Acceptable Manufacturers:

(1) J. L. Industries.

(2) Larsen's Manufacturing Company.

PART 3 - EXECUTION

6. INSTALLATION

(A) Install wall-hung extinguishers on wall-mounting brackets mounted 4'-0" from finished floor to top of extinguisher assembly. Coordinate all locations with Owner prior to installation.

(B) Secure rigidly in place in compliance with manufacturer's written instructions.

7. SCHEDULE

- (A) Fire extinguisher size, type, location, spacing and quantity shall be as required by NFPA 10 and the governing authorities. Fire extinguisher locations, types, and sizes shown on the drawings and called for in the specifications are the minimum standard to be fulfilled.

- END OF SECTION -

DIVISION 10 - SPECIALTIES

PART 1: GENERAL

1. RELATED DOCUMENTS

(A) The general provisions of Division 1 apply to the work specified in this Section.

2. SCOPE OF WORK

(A) Furnish all labor, materials, tools and equipment required to complete the toilet room accessories installation as indicated on the drawings and specified herein, including inserts, backing plates, anchoring devices, etc. for support of accessories.

(B) Mounting bolts and screws shall be concealed wherever possible. Exposed mounting bolts shall have theftproof type heads and shall match the material of the accessories.

3. SUBMITTALS

(A) Submit Manufacturer's Data Sheets for material variations due to code requirements. Otherwise submittal to the Architect is not required.

PART 2: PRODUCTS

4. MATERIALS

(A) All the toilet room accessories will be provided by the General Contractor; (unless noted otherwise on the drawings):

(B) Schedule on drawings is based on prototype store requirements. Contractor is to revise accessory type, location and quantity for variations due to code requirements, etc.

(C) Items scheduled on the drawings: NO SUBSTITUTIONS.

PART 3: EXECUTION

5. INSTALLATION

(A) Check all accessories received at jobsite to determine correct type and quantity. Report missing or damaged merchandise to the superintendent promptly. Installer to examine all areas and conditions under which toilet accessories are installed and coordinate with G.C.C. that corrections are made prior to proper installation.

(B) Install all Contractor furnished accessories at standard heights and proper locations per manufacturer's requirements. Protect adjacent surfaces during installation of accessories and correct any damaged areas to the satisfaction of the superintendent.

(C) Remove paper, boxes and other items at the end of each day's work.

(D) Check to assure that all accessories are securely fastened before leaving project.

SEND OF SECTION

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DIVISION 10 - FINISHES

PART 1: GENERAL

1. RELATED DOCUMENTS

(A) The provisions of Division 1 apply to the work specified in this section.

2. DIVISION OF WORK

(A) The interior space frame with required assembly hardware and accessories under this Section.

(B) General Contractor shall include in his price, all labor, equipment, anchorage (i.e. bolts), rental necessary to completely install interior space frame as indicated on the plans, and perform all warranty work required during the warranty period.

(1) Prepare in accordance with all applicable standards and specifications.

3. SUBMITTALS

(A) Shop Drawings in accordance with Division I, including dimensions, details, anchorages, and all pertinent data and schedules for fabrication and complete installation, to be submitted to Owner by manufacturer. Contractor to review and coordinate/confirm dimensions and provide approval. Types of fasteners to be clearly shown.

(B) Submit manufacturer's product specifications, technical product data, and installation instructions for each component.

PART 2: PRODUCTS

4. SPACE FRAME

(A) Space Frame – NO SUBSTITUTIONS ALLOWED

(1) Framework is composed of a 2" x 10" 3 chord truss or 2" diameter chords in a 10" high isosceles triangle. The tube truss pieces join together to create a rigid display system. Truss pieces and accessories to be manufactured by Versatruss, A Division of 622254 Ontario, Inc. P.O. Box 2031, Perth Ontario, Canada K7h 3M9, phone: (888) 430-7613.

(2) Aluminum finish on truss and all visible accessories unless otherwise indicated on drawings or as selected by Owner.

PART 3: EXECUTION

5. ERECTION

(A) Erection

(1) All work shall be carefully and accurately assembled to carry out the design as shown.

(2) Furnish all erection equipment, bracing, bolts, shims, etc., necessary to execute this part of the work.

(3) General Contractor is responsible for "touch-up" of finish after completion of installation.

- END OF SECTION -

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DIVISION 10 - SPECIALTIES

PART 1: GENERAL

1. RELATED DOCUMENTS

(A) The general provisions of Division 1 apply to the work specified in this Section.

2. DESCRIPTION

(A) Work included: Furnish all labor, materials and tools required for installation of decorative metal indicated on the drawings and herein specified.

(B) Related work specified elsewhere:

(1) Mirrors and Trim: Section 08812.

(2) Miscellaneous Metals: Section 05500.

(3) G.F.R.G. Columns: Section 03456 (if applicable).

3. SUBMITTALS

(A) Submit shop drawings and product data in accordance with Division 1 of these specifications. Shop drawings shall indicate materials, gauges of metal, details, finishes, joints, terminations, dimensions, attachment etc. to make the submittals complete.

(B) Submit samples with finish to Owner for approval.

PART 2: PRODUCTS

4. MATERIALS

(A) Decorative Aluminum Frames (Interior): Shall be custom formed from aluminum tubing, ASTM B221, ASTM B429, 6063-T6.

(B) All exposed fastenings, accessories, etc. shall be shop finished aluminum as indicated on the drawings.

(C) All items under this section shall be ordered in time for assembly and shipping per schedule of Owner's Representative.

5. FABRICATION

(A) General:

(1) Tubing, accessories and other components shall be shop-fabricated and ready for installation to the greatest extent possible.

(2) All connections shall be welded. Mechanical connections not permitted.

6. FINISHES

(A) All decorative metal items shall be free of scratches and blemishes.

(B) Shop Finish: All decorative metal items shall be shop painted with a satin low luster sheen - colors vary, see Drawings and Specification Section 09900 Painting.

(1) Provide a sprayed-on acrylic urethane paint system on primed metal. Do not brush apply.

(2) The paint finish shall be coordinated with, and match the final appearance of the contractor selected metallic paint system specified in Section 09900 Painting, which will be one of the following:

(a) Copper accent pieces:

1 coat, **roller or spray and back roll applied**, Roman Decorating

Products ULTRA-PRIME Pro-977 Acrylic Primer/Sealer.

Any patching compound must be completely dry before applying Pro-977 Primer/Sealer. Pro-977 Primer/Sealer must be allowed to dry a minimum of 48 hours before ArmorMetallix application. Longer dry time may be required for extremely humid conditions.

1 coat, **spray applied only**, Roman Architectural Finishes ArmorMetallix Como Copper.

2 coats, **spray applied only**, Roman Architectural Finishes ARMORFAUX Matte Glaze & Varnish.

The above are available through Glidden Professional.

Or

1 coat (if bare substrate) Sherwin Williams as follows: For drywall and wood - ProMar 200 ZERO VOC Latex Primer B28W2600; For metal - Pro-Cryl Universal Metal Primer B66-310 Series.

2 coats, **roller or spray and back roll applied**, Sherwin Williams copper base coat GALLON formula is ULTRA DEEP BASE -B1-8/32, W1-2oz+63/32 +1/64+1/128, R2-56/32+1/64+1/128, Y3-6oz+27/32, L1-9/32.

2 coats, **spray applied only**, Sherwin Williams Faux Impressions Metallic "Rooms To Go Copper Metallic" 1 quart formula: GOLD BASE B1 = 1/32, R4 = 3/32 + 1/64. Y3 = 1/128, R2 = 1/64.

2 coats Sherwin Williams Sher-Clear 1k Acrylic Clear Coat Semi-Gloss B66C380 after completely dry.

(b) Silver accent pieces:

1 coat Roman Decorating Products ULTRA-PRIME Pro-977 Acrylic Primer/Sealer.

Any patching compound must be completely dry before applying Pro-977 Primer/Sealer. Pro-977 Primer/Sealer must be allowed to dry a minimum of 48 hours before ArmorMetallix application. Longer dry time may be required for extremely humid conditions.

1 coat Roman Architectural Finishes ArmorMetallix Piazza Platinum.

2 coats Roman Architectural Finishes ARMORFAUX Matte Glaze & Varnish.

The above are available through Glidden Professional.

Or

1 coat (if bare substrate) Sherwin Williams as follows: For drywall and wood - ProMar 200 ZERO VOC Latex Primer B28W2600; For metal - Pro-Cryl Universal Metal Primer B66-310 Series.

2 coats, **roller or spray and back roll applied**, Sherwin Williams ProMar 200 ZERO VOC eggshell SW 7673 Pewter Cast.

2 coats, **spray applied only**, Sherwin Williams Faux Impressions Metallic "Rooms To Go Silver Metallic Custom" 1 quart formula is PEARL BASE B1-64 = 1/32, R4 = 3/32 + 1/64. Y3 = 1/128, R2 = 1/64.

2 coats Sherwin Williams Sher-Clear 1k Acrylic Clear Coat Semi-Gloss

B66C380 after completely dry.

PART 3: EXECUTION

7. PREPARATION

- (A) General Contractor to prepare all surfaces as required by fabricator's printed instructions and requirements.

8. INSTALLATION

- (A) Install frames and accessories in accordance with fabricator's written installation instructions and reviewed shop drawings.
- (B) Frames to be erected plumb and level.
- (C) Caulk all joints between decorative metal and adjacent materials.

9. CLEANING TOUCH-UP AND PROTECTION

- (A) Wash all surfaces clean following installation.
- (B) Touch-up all surfaces marred or damaged during installation.
- (C) Protection of frames and accessories from damage by other trades after installation to be provided by General Contractor.

- END OF SECTION -

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DIVISION 15 – MECHANICAL WORK1. GENERAL

- (A) All work under Division 15 of these specifications will be subject to and governed by the following:
 - (1) GENERAL PROVISIONS FOR MECHANICAL AND ELECTRICAL WORK - Section 01041
- (B) All mechanical work shall be governed by and subject to the provisions of this Section and all Sections of Division 1.
- (C) Refer to Section 00011 for requirements relating to Base Bid Products, Substitutions, and Alternates.
- (D) Refer to Section 01021 for requirements relating to total HVAC system testing and balancing.
- (E) All piping work for mechanical and plumbing systems shall be governed by and subject to the provisions of Section 15061.
- (F) All air distribution systems and accessories shall be governed by and subject to the provisions of Section 15881.
- (G) This is a prototype design. Strict adherence to design details is required.
- (H) The General Contractor shall be responsible for providing a copy of Division 1 specifications to each subcontractor and for coordinating the work accordingly.
- (I) Submittal data, shop drawings, and samples:
 - (1) Shall be submitted for review only when required by and in accordance with the procedure set forth in Section 00011 of these specifications.
 - (2) All references to submittal data, shop drawings, and samples in the context of the technical specifications shall be taken to mean "if required under the provisions of Section 01021", unless stipulated otherwise.

2. PROTECTION AND INSTALLATION

- (A) All mechanical equipment and materials stored on the site shall be suitably sheltered from the elements. All materials and items subject to moisture damage shall be stored in dry, heated spaces. All equipment shall be protected against dirt, water, and corrosive or mechanical damage, and theft.
- (B) All mechanical systems and equipment shall be stored, protected, installed, tested, adjusted, and started up in strict accordance with the manufacturer's directions and instructions. Each Contractor shall promptly notify the Engineer of any conflict between any requirement of the Contract Documents and the manufacturers' instructions and shall receive written instructions before proceeding with the work. Any work that does not comply with the manufacturers' instructions or such written instructions from shall be corrected by the Contractor at no increase in the contract amount or additional cost to other trades.
- (C) All mechanical systems and equipment shall be installed to permit removal of coils, heat exchangers, fan shafts, fan wheels, filters, belt guards, sheaves, drives, and all other parts requiring periodic replacement or maintenance. The installations shall be arranged such that the removal can be accomplished without damage to the part removed and without damage to or disassembly of any other equipment, piping, device, or system.
- (D) All anchor bolts, inserts, supports, and installation hardware shall be provided by the Contractor responsible for installing the respective equipment or system unless otherwise noted on the drawings or specified. Each Contractor shall be responsible for the location of all anchoring hardware, inserts, supports, and related accessories.

- (E) All open ends of pipes and equipment connections shall be capped or plugged (until final connections are made) to keep out dirt and other foreign materials. Caps and plugs shall be designed for the intended purpose. Plugs of rags, waste, insulation, or similar materials shall not be used for plugging.
- (F) Equipment and materials of the same general type shall, in as much as practical, be of the same manufacturer throughout the work for uniform appearance, operation, maintenance, and repair parts.
- (G) If the size of any piping, valves, devices, ductwork, or related accessories is not clearly evident on the Drawings, the Contractor shall request clarification prior to proceeding with the work.
- (H) All V-belt, chain, coupling, gear, and similar rotating drives shall be equipped with a protective guard provided by the Contractor installing the equipment. Other than factory furnished guards, all guards shall be constructed of small pattern, flat expanded metal over a steel angle frame or rigid sheet metal guard securely bolted to the floor and/or equipment. Provide a tachometer hole at the motor shaft and driven equipment shaft for guards protecting field adjustable drives and all belt driven equipment. All motor couplings, such as with base mounted pumps, shall be provided with sheet metal coupling guards. All guards, other than factory finished guards, shall be painted with rust inhibiting primer and a final heavy coat of enamel to match the adjacent equipment.
- (I) All mechanical equipment shall be installed in a rigid and secure manner and shall be installed plumb, level, and square with the building, unless otherwise indicated on the drawings or specified herein. All piping connections to pumps and other equipment shall be installed without strain, distortion, or excessive forces in the piping or on the equipment.

3. THERMAL INSULATION FOR MECHANICAL WORK

- (A) General
 - (1) The following specifications are the general requirements for thermal insulation for all mechanical systems. The specific insulation requirements for systems and equipment shall be as specified in the respective Sections of Division 15.
 - (2) Refer to Section 15061 for the basic requirements governing the application of thermal insulation common to all piping systems.
 - (3) Each contractor shall be responsible for the insulation on all work in installed under his contract. For example, if certain equipment is furnished by the Owner or others, but installed by the HAC, the cost of the required insulation shall be included in the HAC proposal unless otherwise noted on the drawing or specified herein.
 - (4) Thermal insulation work shall be installed in a workmanlike manner by workmen regularly engaged in this type work. Insulation work may be done by an insulation subcontractor. The name of each insulation subcontractor shall be submitted to the Owner's Representative for approval prior to authorization of the work by the respective contractor.
- (B) Materials and Installation
 - (1) All thermal and acoustical insulation materials shall be the products of Owens-Corning, Certain-teed Products CSG Group, or Johns-Manville, except as otherwise specified.
 - (2) All insulation materials used shall have composite (insulation, jacket or facing, and adhesive used) fire and smoke hazard ratings as tested by procedure ASTM E-84, NFPA 255, and UL 723 not exceeding flame spread of 25, smoke developed of 50, and fuel contributed of 50. The only exception to the above is where flexible foamed plastic insulation is allowed for specific applications by these specifications.
 - (3) Any treatment of facing or jackets applied to meet the above fire and smoke hazard ratings shall be permanent. The use of water-soluble treatments is prohibited.

- (4) Insulation accessories, such as coatings, adhesives, mastics, tapes, and cloths shall have the same component fire and smoke hazard ratings as specified above.
- (5) All insulating materials or their containers shall be labeled to indicate that the fire and smoke hazard ratings do not exceed the above requirements.
- (6) All insulation shall be applied and installed in accordance with the insulation manufacturer's instructions using the materials, accessories, and methods required to meet the fire and smoke hazard ratings.
- (7) Insulation shall be applied on clean, dry surfaces after inspections, testing, and any other operations requiring exposed conditions are completed.
- (8) All cold surfaces shall be insulated using vapor barrier with permeability rating suitable for the intended service. Vapor barrier shall be continuous and unbroken with all joints properly sealed.
- (9) All existing insulation on existing piping, equipment, or systems that is damaged due to relocation of equipment, new piping or sheet metal connections, or other operations under the contract, shall be patched or replaced to match the existing insulation and finishes. New insulation work which is subsequently damaged due to negligence shall be repaired or replaced at the cost of the contractor causing the damage.
- (10) Pipe and externally applied duct insulation shall be continuous through wall and floor openings except at penetrations through fire rated construction and where penetrations are required to be firestopped. Duct linings shall be interrupted at fire dampers as required to avoid interference with the fire damper operation. Sleeves for insulated piping and externally insulated ductwork penetrating walls and floors shall be sized to accommodate the specified insulation thickness except where insulation must be interrupted as specified above.

4. LAYOUT AND PLANNING

- (A) Contractor shall be responsible to layout, plan, and locate all systems, equipment, ductwork, and piping based on accurate field measurements and shop drawings or certified prints as required to properly install, maintain, repair and operate all systems and equipment. Contractor shall not scale the drawings to locate equipment, ductwork or piping. The drawings are diagrammatic and indicate the general arrangement and routing. Contractor shall plan the work to minimize offsets, to avoid interferences, and to provide for the neat and proper erection of the systems. All piping and ductwork shall be installed as high above floor and/or mezzanine as possible to avoid interference with the Owner-installed fixturing and racking.

5. TESTING AND BALANCING

- (A) The General Contractor shall select, retain, pay for, and contract with an Independent Testing Consultant (ITC) to provide total HVAC system testing and balancing (TAB) services for this project. The Independent Testing Consultant shall be paid by the General Contractor for a complete HVAC system test and balance and re-test of noted deficiencies.
- (B) The Independent Testing Consultant selected by the General Contractor shall be experienced in this specialty work and shall be certified by the Associated Air Balance Council (AABC). Certification by other Testing and Balancing Bureaus will not be accepted for review. The Owner reserves the right to reject the ITC selected if the ITC's credentials do not meet these certifications and experience at no additional cost for the TAB work.
- (C) The HVAC contractor shall be on site to correct deficiencies at the times while ITC is on site. The General Contractor shall be responsible to coordinate scheduling with the ITC and the HVAC Contractor. The HVAC Contractor shall complete the "Systems Start-Up Checklist (Exhibit B)" and fax copies to the ITC and General Contractor before confirming the arrival date of the ITC on-site. Should return trips become necessary due to incomplete systems installation/operation or HVAC installer/Contractor not present to correct deficiency items, return cost shall be the responsibility of the General and HVAC Contractors. Refer to Section 15501 (Test Requirements) for further requirements.

6. ACCEPTANCE

- (A) The system shall not be considered for acceptance until the Mechanical Subcontractor has completed his work and demonstrated to the representative of the Owner, proper operation of the system and strict compliance with Specifications and Drawings, particularly in reference to the following articles of these specifications:
- (1) HVAC system Testing and Balancing is complete, all deficiencies noted in the report have been corrected and the Owner has accepted the report.
 - (2) Cleaning.
 - (3) Instructions and operating manuals.
 - (4) Training of operating personnel.
 - (5) As-Built drawings.
 - (6) Guarantee certificates.
 - (7) Start-up and test document.
 - (8) Equipment Performance Check (EPC) document from rooftop HVAC equipment supplier.

EXHIBIT B**ROOMS TO GO
SYSTEMS START-UP**

Performance of an equipment operation check (EOC) shall provide verification and documentation of equipment condition, integrity of installation and operational performance with regard to the specifications. It shall also include all associated components provided by rooftop unit manufacturer. The following equipment and installation integrity checks shall be performed as part of an EOC. Any installer defects shall be noted, and any factory defects shall be repaired. A report for each unit along with a summary report for the job site will be provide to the owner, installing contractor and general contractor upon completion.

JOB SITE REQUIREMENTS PRIOR TO EOC:

- A. Complete installation of rooftop unit per mechanical drawings, specifications and the rooftop unit manufacturer's installation instructions.
- B. Rooftop unit must be started up and running 24 hours prior to EOC.
- C. Unit's return air filters must be new and at least equivalent to factory provided filters.
- D. All field installed hoods accessories must be installed and operational.

1. UNIT INSTALLATION CHECK:

- _____ A. RECORD RTU #, UNIT C/N, UNIT MODEL #, AND UNIT SERIAL #.
- _____ B. CHECK CURB INSTALLATION INCLUDING VIBRATION ISOLATION AND WIND OR SEISMIC RESTRAINTS. VERIFY PER OWNER SPECIFICATIONS AND THE ROOFTOP UNIT MANUFACTURER'S INSTALLATION INSTRUCTIONS.
- _____ C. CHECK UNIT CLEARANCES AND VERIFY INSTALLATION PER THE ROOFTOP UNIT MANUFACTURER'S INSTALLATION INSTRUCTIONS.
- _____ D. CHECK DOOR ALIGNMENT AND ADJUST AS NECESSARY.
- _____ E. CHECK UNIT INSTALLATION IS SECURE AND CLEAN.
- _____ F. CHECK INSTALLATION OF CONDENSATE TRAP AND DRAIN LINES PER THE PROJECT SPECIFICATIONS, DRAWING DETAILS AND ROOFTOP UNIT MANUFACTURER'S INSTALLATION INSTRUCTIONS.
- _____ G. CHECK AND NOTE INSTALLATION OF ANY ROOFTOP UNIT MANUFACTURER'S PROVIDED ACCESSORIES PER THE ROOFTOP UNIT MANUFACTURER'S INSTALLATION INSTRUCTIONS.
- _____ H. CHECK CLEANLINESS OF UNIT AND AREA AROUND IT. DISPOSE OF ANY DEBRIS FOUND.

2. ELECTRICAL SYSTEM CHECK:

- _____ A. CHECK AND RECORD INCOMING POWER SUPPLY. VERIFY PER THE ROOFTOP UNIT MANUFACTURER'S SPECIFICATIONS AND RECORD.
- _____ B. VERIFY INSTALLATION AND PROPER SIZING OF ELECTRICAL DISCONNECT OR CIRCUIT BREAKER INCLUDING WIRE SIZE.
- _____ C. CHECK ELECTRICAL CONNECTIONS AND TIGHTEN AS NEEDED.
- _____ D. VERIFY INSTALLATION OF WIRING TO 120v CONVENIENCE OUTLET (IF APPLICABLE).
- _____ E. CHECK AND RECORD UNIT'S CONTROL TRANSFORMER(S) SECONDARY VOLTAGE. ADJUST PER THE ROOFTOP UNIT MANUFACTURER'S SPECIFICATIONS.

3. INTEGRATED MODULAR CONTROLLER CHECK:

- _____ A. VERIFY LED HEARTBEAT ON ALL THE ROOFTOP UNIT MANUFACTURER'S PROVIDED CONTROL BOARDS.
- _____ B. RECORD HARDWARE AND SOFTWARE VERSIONS OF ALL PROVIDED CONTROL BOARDS.
- _____ C. VERIFY DIP SWITCHES ON ALL CONTROL BOARDS ARE SET FOR OWNER SPECIFICATIONS PER THE ROOFTOP UNIT MANUFACTURER'S INSTALLATION INSTRUCTIONS
- _____ D. VERIFY ALL THE ROOFTOP UNIT MANUFACTURER'S PROVIDED TEMPERATURE SENSORS READINGS ARE ACCURATE.

4. SUPPLY FAN SYSTEM CHECK:

- _____ A. CHECK BLOWER PULLEY SET SCREWS FOR PROPER TORQUE. ADJUST AS NEEDED.
- _____ B. CHECK BELT TENSION AND ALIGNMENT AND ADJUST AS NEEDED.
- _____ C. START UNIT INDOOR BLOWER TO CHECK ROTATION. CORRECT AS NEEDED. VERIFY AMP DRAW IS PER THE ROOFTOP UNIT MANUFACTURER'S SPECIFICATIONS AND RECORD.

5. COOLING SYSTEM CHECK:

- _____ A. LEAK CHECK ALL CIRCUITS.
- _____ B. CHECK COIL INTEGRITY AND CLEANLINESS. CLEAN AS NEEDED.
- _____ C. START EACH COMPRESSOR IN UNIT. CONFIRM PROPER ROTATION AND CORRECT AS NEEDED
- _____ D. CHECK REFRIGERANT PRESSURES OF EACH CIRCUIT PER THE ROOFTOP UNIT MANUFACTURER'S SPECIFICATION. CORRECT CHARGE AS NEEDED.
- _____ E. RECORD TEMPERATURE DROP ACROSS THE EVAPORATOR COIL IN FULL COOLING (ALL COMPRESSOR RUNNING).

6. GAS HEATING SYSTEM (WHEN SPECIFIED):

- _____ A. RECORD FUEL TYPE.
- _____ B. CHECK INSTALLATION OF INTAKE AND EXHAUST HOODS. VERIFY PER THE ROOFTOP UNIT MANUFACTURER'S INSTALLATION INSTRUCTIONS.
- _____ C. CHECK INSTALLATION OF GAS UNIONS.
- _____ D. CHECK AND RECORD INCOMING GAS PRESSURE TO UNIT.
- _____ E. CHECK MANIFOLD GAS PRESSURE FROM THE OUTLET OF THE GAS VALVE(S) PER THE ROOFTOP UNIT MANUFACTURER'S SPECIFICATIONS. ADJUST AS NECESSARY.
- _____ F. CHECK AND RECORD TEMPERATURE RISE ACROSS HEAT EXCHANGER IN FULL HEAT.
- _____ G. CHECK OPERATION OF TEMPERATURE LIMIT.

7. ELECTRICAL HEAT SYSTEM CHECK: (WHEN SPECIFIED):
- _____ A. CHECK AND RECORD AMP DRAW OF THE HEATING ELEMENTS.
 - _____ B. CHECK HEATING SECTION OPERATION. RECORD TEMPERATURE RISE THRU UNIT IN FULL HEATING OPERATION PER THE ROOFTOP UNIT MANUFACTURER'S SPECIFICATIONS.
 - _____ C. VERIFY REMOTE SENSORS ARE OPERATIONAL
 - _____ D. VERIFY CO² SENSORS ARE OPERATIONAL
 - _____ E. CHECK OPERATION OF TEMPERATURE LIMIT.
 - _____ F. CHECK REFRIGERANT PRESSURES OF EACH CIRCUIT PER
8. THERMOSTAT/UNIT CONTROLS SYSTEM CHECK:
- _____ A. RECORD THERMOSTAT OR DDC SYSTEM MAKE, MODEL AND SERIAL NUMBER.
 - _____ B. VERIFY CLASS 2 CONTROLS WIRING INSTALLATION TO TERMINAL BOARD OF UNIT.
 - _____ C. PERFORM COOLING SIMULATION TEST. VERIFY COOLING STAGES PER OWNER'S SPECIFICATIONS.
 - _____ D. PERFORM HEATING SIMULATION TEST. VERIFY HEATING STAGES PER OWNER'S SPECIFICATIONS.
 - _____ E. PERFORM VENTILATION SIMULATION TEST. VERIFY VENTILATION OPERATION PER OWNER'S SPECIFICATIONS.
9. INDOOR AIR QUALITY SYSTEM CHECK:
- _____ A. CHECK AND RECORD CONDITION AND TYPE OF FILTERS.
10. OUTDOOR AIR ACCESSORY CHECK:
- _____ A. CHECK OPERATION OF ECONOMIZER OR MOTORIZED OUTDOOR AIR DAMPER BY DRIVING IT FULL OPEN AND CLOSED.
 - _____ B. RECORD MINIMUM DAMPER POSITION AND ENTHALPY SETTING (IF PROVIDED).
 - _____ C. CHECK ECONOMIZER CONTROL BOARD SETTINGS PER OWNER SPECIFICATIONS. RECORD SETTING.
 - _____ D. CHECK OPERATION OF BAROMETRIC RELIEF DAMPER IF INSTALLED.
 - _____ E. CHECK OPERATION OF POWER EXHAUST IF INSTALLED. CHECK MOTOR AMP DRAW PER THE ROOFTOP UNIT MANUFACTURER'S INSTALLATION INSTRUCTIONS.
11. CONTROL CHECK:
- _____ A. VERIFY COMPLETE INSTALLATION/OPERATION OF ALL THERMOSTATS AND TIME CLOCKS IF UTILIZED.
 - _____ B. VERIFY COMPLETE INSTALLATION/OPERATION OF SMOKE DETECTOR/FIRE ALARM INTERFACE.
12. DUCT SYSTEMS AND AIR DISTRIBUTION:
- _____ A. VERIFY INSTALLATION CONFORMS TO DESIGN AND ALL PIECES OF AIR DISTRIBUTION, DUCTWORK, DIFFUSERS AND GRILLES ARE COMPLETE AND PROPERLY INSTALLED.

_____ B. VERIFY ALL MANUAL VOLUME DAMPERS ARE IN FULL OPEN OR NEUTRAL POSITION.

13. EXHAUST FAN(S):

_____ A. VERIFY PROPER INSTALLATION/OPERATION AND FAN ROTATION.

COMMENTS: _____

SIGNATURE: _____ DATE: _____

PLEASE DATE AND INITIAL EACH ITEM AS VERIFIED. COMPLETED VERIFICATION CHECK LIST IS INCLUDED IN OUR REPORT TO THE OWNER AND MUST BE RETURNED PRIOR TO SCHEDULING ARRIVAL OF HVAC SYSTEMS TEST DATE. PLEASE FAX TO THE ITC UPON COMPLETION.

THE HVAC INSTALLER IS REQUIRED TO BE ON SITE FOR THE TWO (2) DAYS THAT THE ITC IS PERFORMING THEIR WORK IN ORDER TO CORRECT ANY PUNCH LIST ITEMS THAT MAY EXIST. SHOULD RETURN TRIPS BECOME NECESSARY AFTER THE INITIAL TWO (2) DAYS, ANY RETEST COST INCURRED BY THE ITC SHALL BECOME THE RESPONSIBILITY OF THE GENERAL CONTRACTOR. THE ESTIMATED COST IS \$600.00 PER DAY.

- END OF SECTION -

DIVISION 15 - MECHANICAL WORK1. GENERAL

- (A) All work under this Section shall be governed by and subject to the provisions of the following:

SECTION 15051 - BASIC MATERIALS, METHODS AND REQUIREMENTS

- (B) This Section is intended to establish the basic requirements for piping work common to all mechanical and plumbing systems. This Section shall govern all piping work except as otherwise modified in other Sections and/or as required to comply with governing Codes and/or regulations of Utilities.
- (C) Fire Protection Systems: Refer to Section 15301. The installation of all fire protection systems and piping shall comply with the requirements of governing Codes. The provisions of the National Fire Codes (latest edition) published by the National Fire Protection Association (NFPA) shall govern as minimum requirements in the absence of requirements from governing Codes.

2. PIPING MATERIALS

- (A) The piping materials for each type of mechanical system are specified in the respective sections of these specifications. The specified materials shall be used to establish the base bid by each contractor, unless otherwise specified and/or allowed by addendum.
- (B) Substitute Piping Materials
- (1) At the time of bidding, Contractors are encouraged and invited to propose as substitutes any piping materials and/or systems potentially suitable for the services involved in lieu of the specified materials. NOTE: Schedule 5 or 10 piping is not allowed.
 - (2) Contractor's proposal for substitute materials shall be accompanied by the respective add or deduct to the contract amount. Any substitute piping material accepted by the Owner's Representative shall be subject to approval by the Engineer. Contractor shall submit data on the substitute in sufficient detail to permit the Engineer to evaluate joining and installation methods, expansion and contraction, corrosion resistance, flow performance, and other pertinent features. Contractor shall be responsible to assure that the substitute materials can be installed properly with the restraints imposed by the geometry and construction features of this project.
- (C) Provide chrome plated escutcheon plates to finish and conceal pipe penetrations through walls in all locations where exposed to view.

3. VALVES

(A) General

- (1) All valve catalog numbers specified herein refer to Jenkins valves, except as otherwise noted.
- (2) Equivalent valves as manufactured by Stockham, Fairbanks, Kennedy, Hammond, or Nibco are acceptable for base bid.
- (3) At the time of bidding, Contractors are encouraged and invited to propose as substitutes any valves of other manufacturers and/or designs potentially suitable for the applications and services involved in lieu of the specified valves. Contractor's proposal for substitute valves shall be accompanied by the respective add or deduct to the contract amount. Any substitute valves shall be approved by the Engineer prior to award of the contract by the Owner's Representative. Contractor shall, when requested, submit complete and detailed data on the substitute valves to the Engineer. The data shall include an identification of the proposed service and application of each valve.
- (4) Hose-end valves (H.E.V.) shall be provided as gate valves with hose-thread adaptor having 3/4" hose thread, except as otherwise noted or specified.
- (5) Valves for special applications or systems which are not specified in this section

shall be specified in the appropriate section of Division 15.

- (B) Gate Valves
 - (1) Domestic Hot and Cold Water
 - (a) 2-1/2" and larger - Fig. 651-A, 125 lb., IBBM (iron body, bronze mounted), solid wedge, OS&Y, flanged.
 - (b) 2" and smaller - Fig. 47-U, 125 lb., bronze, rising stem, solid wedge disc, union bonnet, screwed.
- (C) Globe Valves
 - (1) Domestic Hot and Cold Water
 - (a) 2-1/2" and larger - Fig. 613, 125 lb., IBBM, OS&Y, bolted bonnet, regrind-renew beveled bronze disc and seat ring, flanged.
 - (b) 2" and smaller - Fig. 106-A, 150 lb., bronze, composition disc, disc holder, screw-over bonnet, screwed.
- (D) Check Valves
 - (1) Domestic Hot and Cold Water
 - (a) 2-1/2" and larger - Fig. 624, 125 lb., IBBM, swing check, bolted cap, regrind-renew bronze seat and disc, flanged.
 - (b) 2" and smaller - Fig. 92-A, 125 lb., bronze, swing check, regrinding bronze disc, screwed.
- (E) Shut-off and Isolation Valves; Open-end Valves
 - (1) Required shut-off and isolation valves are shown on the drawings and/or specified in Division 15 of these specifications.
 - (2) In general, a shut-off valve will be required at the mains and at each piece of equipment so that the system and equipment may be isolated for service or repairs. Valves shall be line size, unless otherwise shown on the drawings.
 - (3) Each Contractor is requested to notify the GC prior to any piping installation, if, in the opinion of the Contractor, any additional shut-off valves might be desired. If approved by Owner's Representative, a change order will be issued.
- (F) Drain Valves
 - (1) The installation of all liquid piping shall be such that the contents may be easily drained at the end or at the beginning of each run. Provide 1/2" drain valves with 3/4" hose-end connections for all drainage, unless larger size is shown on the drawings or required by Code or regulation.
 - (2) When a sudden change of piping elevation is unavoidable due to construction obstructions, a drain valve must be installed at the low point for draining.

4. JOINING OF PIPING SYSTEMS

- (A) Threaded Joints
 - (1) All steel or wrought iron pipes with threaded joints shall have full cut, taper threads and the interior of the pipe shall be reamed out clean and to full size of pipe.
 - (2) Factory threaded pipe shall be furnished with thread protector during shipment and until pipe is installed.
 - (3) Threaded pipe joints shall be made with an approved pipe thread compound, applied to male threads only.
- (B) Sweat Joints

- (1) All copper piping shall have sweat joints, except at screwed valves and devices where sweat-to-threaded adaptors shall be provided.
 - (2) Solders for Sweat Joints - For domestic hot and cold water and DWV services, a good grade of 95/5 antimony solder with a compatible flux with a lead content not greater than .2% for refrigeration service, silver solder, 35 or 45% alloy.
- (C) Welded Joints
- (1) Welded joints shall be made by the shielded metal-arc process. Welders shall be currently qualified by tests in accordance with the Standards for Qualification of the American Welding Society or the ASME Boiler and Pressure Vessel Code. For portions of the work falling within the jurisdiction of ASME Code, welders shall be qualified in accordance with ASME Standards. The level and type of welder qualification shall be consistent with the pressures, temperatures, hazards of the respective systems, and as required by governing Codes.
 - (2) As minimum requirements, welding work shall be in accordance with the applicable provisions of AWS and/or ASME Specifications to assure proper procedures for joint preparation, joint alignment, electrode selection, and welding techniques.
- (D) Use of Fittings and Unions
- (1) All changes in direction and size of pipe shall be made with fittings. No mitering, saddling, or welding of smaller pipe into larger will be permitted. Run-outs in steel or wrought iron piping (except galvanized), one-half the size of the main or smaller may be made by use of "Weld-O-Lets"; runouts larger than one-half the main size shall be made with tees.
 - (2) Unions shall be provided at the connections to all equipment unless the connections are made with flanged fittings or mechanical couplings.
- (E) Connection Between Dissimilar Metals
- (1) No direct connection between dissimilar metals is permitted.
 - (2) For screwed connections, use insulating "dielectric" unions.
 - (3) For flanged connections (including bronze or copper to cast iron or steel; cast iron to steel; or stainless steel to cast iron or steel) the raised face shall be removed, or flat face flange provided. A full face, non-metallic, gasket suitable for the service shall separate flange faces. Flange bolts shall be isolated from the dissimilar material by means of insulating sleeves or bushings and washers.
- (F) Gaskets - Gaskets for flanged connections shall be of suitable materials and thicknesses for the service involved. For natural gas and water systems, "CC Rubber" by Crane, or equal shall be used. For fuel oil systems, cork-fiber or neoprene compressed asbestos shall be used.
- (G) Joints for Sewer Piping Systems - Refer to Section 15401, Plumbing Systems.
- (H) Mechanical Couplings
- (1) At the Contractor's option, mechanical couplings and fittings may be used for applications as specified herein. Mechanical couplings shall be considered for other systems provided the Contractor submits a proposed substitution and receives approval from the Owner's Representative.
 - (2) Couplings and fittings shall be Victaulic, Gustin-Bacon, or approved equal. Couplings shall be Victaulic Style 77 and/or Style 75. Gaskets shall be grade "H" synthetic and bolts shall be oval neck track-type with hexagonal nuts. Galvanized couplings with cadmium-plated bolts and nuts shall be used with galvanized pipe. Where malleable fitting pattern is not available, standard seamless welding fittings may be used in conjunction with the grooved fittings.
 - (3) Before assembly of couplings, lightly coat pipe ends and outside of gaskets with manufacturer's recommended lubricant to facilitate installation. Pipe shall be grooved in accordance with manufacturer's specifications and instructions. Manufacturer's field instructions shall be provided.

- (I) Joints for other piping systems, if applicable, shall be as specified in the appropriate Section of Division 15.

5. ROUTING OF PIPING SYSTEMS

- (A) All piping shall be run parallel to and perpendicular to walls, floors, joists and ceilings with due allowance for pitch.
- (B) All horizontal piping above ground shall be run above the bottom cord of the bar joists in Sales areas. All vertical above ground piping in sales to be concealed.
- (C) All piping above ground shall be run concealed in finished areas, including offices and office areas, finished toilet rooms, and similar finished areas. An area shall be considered "finished" whenever a ceiling is required to conceal structural framing. Concealed piping shall be installed within ceiling plenums or spaces, within wall construction, enclosed in furred columns, etc. Piping to be concealed in unfinished areas shall be so noted on the drawings.
- (D) In general, all horizontal piping shall be run as high above finished floors as possible, with proper allowance for pitch. Elevations and routings of piping shown on the drawings are reasonably accurate and are intended as a guide, not as a restriction, for proper piping installation. Contractors shall verify elevations and routings to minimize offsets and to assure proper coordination prior to installation of piping work.

6. SLOPE FOR PIPING SYSTEMS

- (A) All piping shall be sloped to permit draining of the respective piping system. The following minimum slopes shall apply except as otherwise specified or noted on the drawings. The direction (of slope) given below is the direction of piping fall with respect to the primary fluid conveyed.

<u>SYSTEM</u>	<u>COMPONENT OR SIZE</u>	<u>SLOPE RATE</u>	<u>DIRECTION</u>
Domestic Water	All interior piping	1" in 40ft.	against flow
Sewers, Ind. & San.	3" and smaller	1" in 4ft.	with flow
Sewers, Ind. & San.	4" and larger	1" in 8ft.	with flow
Sewers, Ind. & San.	Vents	1" in 4ft.	from stacks
Sewers, Storm Interior		1" in 8ft.	with flow
Natural Gas	Mains and branches	1" in 50ft.	with flow

- (B) When governing Codes or utility regulations require slopes greater than those specified above or prohibit slopes as great as those specified above, the Code or regulation shall apply.
- (C) The direction and magnitude of the slope may be varied from the above specifications for special or unavoidable conditions when approved in writing by the Engineer or Owner's Representative.

7. PIPE HANGERS, SUPPORTS, AND ANCHORS

- (A) All piping and related devices and equipment shall be securely supported to avoid sagging, vibration, and excessive strain or forces on the piping or related devices and equipment. Proper allowances shall be made for expansion, contraction, slope, and anchorage.
- (B) Piping shall be supported from structural framing, concrete floor slabs or walls, or masonry walls as the strength of the supporting construction safely permits.
- (C) No piping shall be supported from roof decks, metal side wall, precast concrete side walls, lateral bracing for structural members, or web members of bar joists without prior written approval from CASCO.
- (D) Each Contractor shall provide all beams, channels, angles, Uni-Strut, and similar members, including brackets, braces, stanchions, saddles, clips, etc., as required to support piping from building framing, platforms, or floor. Column-type supports and stanchions anchored to floor or concrete pad (exterior) shall be permitted only where shown on the drawings, specified herein, or approved by CASCO. All steel supporting elements for piping shall be painted with rust inhibiting primer, white or light grey in color except as otherwise specified. Sections of pipe shall not be used to support piping systems or pipe hangers in

any way.

- (E) Piping supported from field-placed concrete floors or walls shall be attached by means of appropriate inserts installed at the time concrete is poured. Each contractor shall provide all inserts for his portion of the work and shall be responsible for the location of same.
- (F) No cutting or drilling of structural members shall be permitted without prior written approval from the Engineer.
- (G) Hangers and supports shall be trapeze, split or solid ring, clamp or clevis type on adjustable hanger rods. Hanger rods shall be attached to beam clamps or other suitable brackets or supports. Welding of hanger rods to steel framing will not be permitted. The use of piping as trapeze members will not be allowed on any Rooms To Go project (no exceptions). The use of steel angles or unistruts (no hols" as trapeze members only shall be allowed.
- (H) Pipe hooks, strap iron, or chains will not be permitted for supporting piping.
- (I) Hangers and supports in direct contact with copper tubing shall be copper plated and suitably isolated from tube to prevent contact between dissimilar metals. All hangers, rods, and supporting devices shall be primed with light grey rust inhibiting primer, cadmium plated, galvanized, or equivalent non-corrosive finishes or materials.
- (J) Piping shall be supported and/or anchored at each change in pipe direction, at branch connections to mains and runouts to equipment, at valves 3" and larger, and at heavy devices.
- (K) Vertical piping shall be supported with riser clamps placed at each floor or ceiling and at each coupling and fitting. Clamps shall not be exposed where exposed piping passes through finished areas. Clamps shall be securely supported by brackets or similar structural members which are in turn supported from suitable building construction.
- (L) The maximum center-to-center spacing of pipe hangers and supports, in feet, shall comply with the following schedule for hard drawn copper tubing, for steel pipe, Schedule 40, and for Schedule 40 PVC.

PIPE SIZE	COPPER	PVC	STEEL	PIPE SIZE	COPPER	PVC	STEEL
1/2"	4	4	5	3"	6	4	10
3/4"	4	4	6	3-1/2"	-	-	10
1"	4-1/2	4	7	4"	6-1/2	4	10
1-1/4"	5	4	8	5"	-	-	10
1-1/2"	5	4	9	6"	7-1/2	4	10
2"	5	4	10	8"	8	4	10
2-1/2"	6	4	10	10"	8-1/2	4	10
				12"	9-1/2	4	10

- (M) Hanger and support spacing for other types of piping shall comply with the following, except as otherwise specified or noted on the drawings.
 - (1) Cast Iron Soil Pipe: 10-feet (maximum) with supports and hangers located at the joints, but not less than one (1) hanger or support for each length of pipe. When 5-foot sections of pipe are used or when piping is not supported at joints, hanger and support spacing shall not exceed 5-feet.
 - (2) Cast Iron or Asbestos-Cement Pressure Pipe: 12-feet (maximum) with supports and hangers located at the joints, but not less than one (1) hanger or support for each length of pipe.
 - (3) Plastic or Fiberglass Piping: The maximum spacing of supports and hangers for specified plastic or fiberglass piping shall be as specified in the appropriate section of these specifications.
 - (4) Substitute Piping Materials or Systems: Contractors offering substitute piping shall submit proposed hanger spacing, preferably the manufacturer's printed recommendations, to the Engineer for approval.
- (N) Refer to separate paragraph covering thermal insulation for additional requirements for hanging and supporting insulated piping.

8. UNDERGROUND PIPING

- (A) Underground piping shall not be laid in contact with rocks, boulders, cinder fill, frozen earth, or any other materials or objects which could cause physical damage to the piping or unusual corrosion action.
- (B) All underground cast iron, vitrified clay, and concrete piping shall be laid with the bottom quadrant (90 degrees) of the piping fully and uniformly supported on a shaped trench bottom, including bell or hub ends, except as otherwise specified or noted on the drawings.
- (C) Vitrified clay pipe shall be installed in accordance with the applicable provisions of ASTM C-12 as minimum requirements.
- (D) Vitrified clay pipe under exterior paved areas shall be installed with the following bedding conditions, unless more stringent conditions are noted on the drawings or required by site conditions.
 - (1) Total cover over top of pipe 18" or less: Lay pipe with bottom half (180 degrees) in a concrete cradle not less than 4' thick below pipe barrel.
 - (2) Total cover over top of pipe 30" to 19": Lay pipe with bottom quadrant in a concrete cradle not less than 4" thick below pipe barrel.
- (E) Underground piping subject to thrusts or "pull-apart" forces due to pressure testing, shock loads, or other potential movements shall be anchored with clamps and rods and/or with concrete thrust blocks as required to resist such forces or potential movements. Clamps, rods, or similar metal anchors shall be painted or coated to prevent corrosive action.

9. THERMAL INSULATION - Applications to Piping

- (A) Refer to Section 15051 for basic requirements for thermal insulation work and materials. Refer to each Section of Division 15 for the types and thicknesses of insulation and other requirements for insulation of specific systems and equipment.
- (B) The following specifications are for the methods of application of thermal insulation common to all piping systems. Special and/or additional requirements (if any) for particular systems shall be as specified in the respective Section of Division 15.
- (C) Fittings - Insulate with equal insulating value and vapor barrier as the respective pipe insulation with built-up covering, with pre-molded (such as Insul-Sure as manufactured by Insul-Coastic, Corp.) or with one-piece pre-molded PVC insulated fittings such as manufactured by Zeston. Fittings insulated with built-up and mitered segments shall have cement, mastic, and wrap applied in accordance with the manufacturer's recommendations for proper ratings and for a smooth, even, finished appearance.
- (D) Valves
 - (1) Valve bodies on low temperature systems shall be insulated with built-up and mitered segments of fiberglass, asbestos cement, or pre-molded insulation as required to equal the insulating and vapor permeability values of the respective pipe insulation. Valves shall be covered with a glass fab jacket.
 - (2) Valve bodies on high temperature systems (above 250 degrees F.) shall be insulated with asbestos cement and glass fab jacket as required to equal the insulating value of the respective pipe insulation. Valve bodies on hot systems (below 250 degrees F.) shall be insulated similar to valves on low temperature systems.
 - (3) Exposed portions of valves shall be insulated as much as practical, except the hand wheel and exposed portions of the stem.
 - (4) Apply cements, mastics, and straps in accordance with the manufacturer's recommendations for proper ratings and for a smooth, even, finished appearance.

- (E) Flanges
- (1) On hot systems (below 250 degrees F.) insulation may stop at flanges so as to allow access to bolts. Ends of insulation shall be finished.
 - (2) On high temperature systems (250 degrees F. or higher) flanges shall be insulated same as piping.
 - (3) On low temperature systems insulation shall stop at flanges and shall be sealed. Cover flanges with 1/2" flexible foam plastic "slip cover" which shall be stretched over the flanges and shall be fitted snugly against the piping insulation forming tight vapor seal. Slipcover shall be removable.
- (F) Pipe Saddles
- (1) No insulation shall rest directly on pipe supports. Provide heavy gauge galvanized steel or aluminum protector saddles on the bottom half of the piping at each support of sufficient length and stiffness to prevent noticeable deformation of insulation.
 - (2) "Hot" Piping (hot water, etc.)
 - (a) Piping may be supported by pipe hangers directly, with insulation fitted around the hangers and finished in a similar manner as fittings, or insulation may pass through hangers.
 - (3) "Cold" Piping (cold water, internal roof drain lines, RTU condensate drain lines, etc.)
 - (a) All insulation of "cold" piping shall pass uninterrupted through pipe hangers.
 - (b) Insulation saddles on which pipe is supported shall be of sufficient density to safely support the weight of piping and contents without noticeable deformation. Bottom portion of the pipe cover shall be provided with galvanized steel or aluminum protectors.
 - (c) Prefabricated pipe saddles shall be "Insul-Shield", as manufactured by Insul-Coustic Corp., or similar shop fabricated saddles. Sample of shop fabricated saddles shall be submitted to the Engineer for approval prior to installation.
- (G) Accessories
- (1) All accessories, specialties, and thermal conducting components on low temperature piping systems shall be insulated with 3/8" thick flexible foam plastic material or insulation and vapor barrier equivalent to adjacent piping.
 - (2) All accessories, specialties, and thermal conducting components on high temperature piping systems shall be insulated equivalent to adjacent piping.
 - (3) Insulation for removable components shall be easily removable without disturbing the main piping insulation.

10. CLEANING AND PRESSURE TESTING

- (A) General
- (1) Refer to Section 15401 for additional requirements relating to Plumbing Systems.
 - (2) Definition: Cleaning as used herein shall be taken to mean the removal of all materials foreign to the respective piping system, which is or could be contaminating, obstructing, or unsightly.
- (B) Cleaning
- (1) The interior of all piping work shall be thoroughly cleaned of foreign materials as the work is installed.
 - (2) After installation, the interior of all piping shall be cleaned and flushed in

accordance with the specifications governing the respective systems.

- (3) The exterior of all above grade piping shall be cleaned of mud, dirt, grease, rust and other foreign materials by brushing and/or washing with suitable solvents or detergents as required to leave the piping clean in general appearance and suitable to receive thermal insulation. Further cleaning and preparation of piping to receive painting, when required, shall be performed by the Painting Contractor. Prime any remaining rust prior to painting or installing thermal insulation.
- (C) Pressure Testing
- (1) All piping shall be pressure tested in accordance with the following specifications and as required by other Sections of Division 15.
 - (2) Testing work shall be successfully completed prior to application of any thermal insulation or pipe covering, prior to backfilling any buried piping, and prior to enclosure of any concealed piping.
 - (3) Testing shall be in the presence of CASCO and/or the Owner's Representative and all authorities having approval jurisdiction over the installed work. Each contractor shall perform and conduct the testing at times mutually agreed upon with the Owner's Representative.
 - (4) Isolate or remove any and all devices and equipment from the piping prior to the pressure testing if the devices or equipment are not designed to withstand the test pressures. If the maximum pressure rating is not marked on the device or equipment or is otherwise not known to the Contractor, the Engineer shall be notified prior to testing for directions.
 - (5) Testing shall be repeated or continued until all piping is proven leak-free. All defects shall be repaired or replaced to the satisfaction of the Owner's Representative. Defective welds in welded piping shall be ground off and the piping shall be rewelded. Defective pipe or fittings shall be replaced, not patched or repaired.
 - (6) Gaseous Fuel Piping shall be pneumatically tested with compressed air at a minimum of 25 psig and in no case less than 50% above the operating pressure of the system. Pressure in the section of piping under test shall hold constant for a period of 24 hours after applying correction factors for temperature changes. Where required by code or utility company, a certificate of compliance shall be obtained from the utility company or code enforcing authority.

- END OF SECTION -

DIVISION 15 - MECHANICAL WORK1. GENERAL

- (A) All work under this Section shall be governed by and subject to the provisions of the following:

Division 1	GENERAL REQUIREMENTS (All Sections)
Division 2	SITE WORK (Section 02668 WATER PIPING)
Section 15051	BASIC MATERIALS, METHODS, AND REQUIREMENTS
Section 15061	BASIC REQUIREMENTS FOR PIPING SYSTEMS

- (B) All work under this Section shall be the responsibility of the Fire Protection Contractor (FPC), except as otherwise specified herein, noted on the drawings, or modified by the Contract Documents.

2. RESPONSIBILITY AND SCOPE

- (A) These specifications for the Fire Protection Systems are "Performance" specifications and are intended to establish minimum design criteria and basic guidelines for the work. The FPC shall assume full responsibility for the criteria, design, layout, and details of all fire protection work to meet the requirements of governing Codes or regulations. The FPC shall be responsible to establish, retain and identify the "Engineer of Record" for the fire protection sprinkler work.
- (B) As minimum requirements, all fire protection work shall comply with the latest applicable provisions of the National Fire Codes published by the National Fire Protection Association (NFPA).
- (C) The scope of work shall include all labor, materials, equipment, and accessories necessary for the complete fire protection systems including, but not limited to the following major items.
- (1) Modification of existing sprinkler riser and accessories at the general location indicated on the drawings, as required by local jurisdiction, including alarm check, retard chamber, water motor gong, flow detector, and accessories.
 - (2) Modification of existing siamese fire department connection as required by local conditions and code requirements.
 - (3) Sprinkler systems in all parts of the building based upon the criteria indicated on the drawings and/or specified herein.
 - (4) Preparation of detailed shop drawings for the fire protection systems to meet the approval of State and local authorities having jurisdiction on this project and as required by the Engineer. FPC shall provide the seal and signature of a licensed Professional Engineer on shop drawings, calculations, and other related documents if required to obtain State and local approvals and/or Certificate of Occupancy.
 - (5) Payment of all costs relating to fees, permits, inspections, tests, and plan reviews required for the fire protection work and systems.
 - (6) All signs and labels required by NFPA Standards and/or local authorities.
 - (7) Perform all testing. Provide Contractor's Material and Test Certifications for interior and exterior work in accordance with NFPA 13 and other certifications required by local Codes.

3. SHOP DRAWINGS

- (A) All shop drawings and submittal data shall be furnished and submitted in accordance with the provisions of Section 01021 of these specifications and the following requirements.
- (1) GC to provide a copy of Fire Protection submittal for Owner specified consultant review.

- (B) The FPC shall prepare a set of construction shop drawings, immediately after the award of the contract, showing the complete system and have same approved by local authorities, State agencies as required by codes and regulations. After the above approvals have been obtained, the FPC shall submit the drawings to CASCO for review. Materials shall not be ordered, nor shall any work be installed until all the approvals have been obtained.
- (C) To avoid interference and clear all obstructions, any piping layouts shall be coordinated in the field with contractors of other trades, prior to the submission of shop drawings for approval. On projects with a skylight, show skylight and routing of branch and main piping around the skylight on the shop drawings. Provide sprinkler protection beneath the skylight as required by NFPA Pamphlet 13. Coordinate routing of branch piping to sprinkler heads beneath skylight with the Owner's representative before installation.

4. WATER SUPPLIES

- (A) FPC shall make modifications to the water supply connections to the water system as required by design criteria herein and the Water Utility and local regulations or authorities.
- (B) The FPC shall be responsible to determine all requirements relative to water supplies for the sprinkler system. The FPC shall furnish and install backflow prevention devices and all other specialty valves, tamper switches, metering, detectors and accessories as well as valve enclosures as required to comply with local codes and the requirements of the water utility. Backflow prevention device shall be provided with means for full forward flow testing. Test outlet to be screened for rodent protection.
- (C) In the event local codes and regulations require a backflow prevention device on the sprinkler riser, the FPC shall provide a vertical type whenever possible (subject to approval by local authority) in order to minimize the floor space required for piping and backflow device layout.
- (D) During construction, the FPC shall make all necessary notifications and coordinate the fire protection and water supplies on a timely and proper basis.
- (E) Fire Pump:
 - (1) Unless approved water flow data is indicated on the drawing or in the specifications, the FPC shall, prior to submission of bid, investigate and determine the water flow characteristics for this project.
 - (2) In the event the water supplies are inadequate or considered marginal to support the required design density, the FPC shall provide an ALTERNATE BID, identified as Alternate FP-1, to provide an electric driven fire or booster pump and jockey pump package.
 - (3) The ALTERNATE BID shall be furnished to cover the fire pump/jockey pump complete with all necessary valves, fittings and including, but not limited to, the following:
 - (a) Full service/across the line controllers
 - (b) Bypass piping and fittings
 - (c) Test header and accessories and/or flow meter as required by authority having jurisdiction.
 - (d) Eccentric reducers and concentric increasers as required.
 - (e) Sensing lines and accessories to fire and jockey pumps. All wiring and power to pumps/controllers to be completed by EC. GC shall be required to obtain an ALTERNATE BID for electrical work involved for this installation.
 - (4) In the event the FPC does not submit an ALTERNATE BID or otherwise suitably qualify his bid clearly to the GC, this shall be taken to mean that the FPC accepts the water supplies as suitable. Any subsequent claims for additional compensation due to inadequate water supplies will not be considered.
 - (5) In addition to notifying the GC, each FPC bidder is requested to notify CASCO and

Owner's Representative of their intention to submit an ALTERNATE BID for a fire or booster pump. This will ensure that the ALTERNATE BID is not overlooked by the GC.

5. PIPING MATERIALS

(A) Above Ground Interior Piping

- (1) Black steel schedule 40 pipe conforming to ASTM A120 or ASTM A53. Schedule 30 pipe may be used in sizes 8 inches and larger. Schedule 10 pipe conforming to ASTM A 135 or ASTM A 795/A 795M and pipe with a Corrosion Resistance Ratio (CRR) of 1.0 or greater including when joined, for pipe 2-1/2" and larger. 2" pipe and smaller shall be Schedule 40 only.
- (2) Schedule 40 and 30 piping shall be joined by threaded fittings, flanged connections, and/or by welding. Schedule 10 pipe shall have roll-grooved ends joined with rubber gasketed couplings or plain ends with welded joints. Threads for screwed joints shall be cut to ANSI Standard B2.1. Welded joints and certification of welders shall be in accordance with the provisions of NFPA Pamphlet 13.
- (3) Fittings shall be cast iron, malleable iron or steel welding type. Screwed unions and couplings shall be used on piping 2 inches and smaller. Screwed couplings, flanges, or welding shall be used to join piping 2-1/2 inches and larger, except where mechanical couplings are allowed as specified herein.
- (4) Mechanical couplings and fittings as manufactured by Victaulic, or equal, which are UL listed for fire protection service and meeting with the approval of the insurance underwriting agency and governing Codes may be used to join above ground piping.
- (5) Fitting from a single manufacturer shall be provided for a complete installation on this project. A combination of more than one single manufacturer shall not be acceptable.

(B) Above ground exterior piping:

- (1) Piping penetrating exterior walls shall be galvanized and painted to match wall.

(C) Refer to Section 15061 for provisions relating to the use of other piping materials, piping systems, or methods of joining.

6. WET PIPE SPRINKLER SYSTEMS

- (A) Except as otherwise required, provide wet pipe sprinkler systems for all areas of the building in accordance with a minimum coverage of Ordinary Hazard, Group 2 per NFPA Pamphlet 13. Water test data and calculations shall be submitted with the shop drawings. Sprinkler system design criteria and all work shall meet the requirements of local Codes, Building Officials, and Fire Protection Officials. Verify requirements and criteria during bidding.

For stockroom, storage up to 16'-0" high, of Class III commodity on racks, non-encapsulated (without solid shelving) with 4'-0" minimum aisle width shall be allowed. A density of 0.28 gpm/s.f. over the most remote 2000 sq. ft. shall be required. Utilizing high temperature sprinklers without in-rack sprinklers. 500 gpm combined hose allowance shall be required.

(B) Sprinkler Heads

- (1) Ceiling sprinklers in finished areas shall be TYCO TY-FRB or equivalent or Viking "flush type" of the flush mounted or recessed mounting type to minimize the projection of the sprinkler head below the ceiling plane. Sprinkler heads shall be centered in ceiling tiles.
- (2) Except as otherwise noted, sprinkler heads shall be rated for 155 degrees F. Temperature ratings, locations, and clearances for sprinkler heads near hot equipment or piping, etc., shall comply with NFPA Pamphlet 13.

(C) Spare Sprinklers

- (1) Provide not less than the minimum number of spare sprinkler heads, for each type

and rating used on the job, in accordance with NFPA Pamphlet 13.

- (2) Provide metal cabinet or cabinets for storage of spare sprinklers. Cabinets shall be provided with hinged door and latch and shall be finished with red enamel paint. Provide engraved plastic sign on each cabinet front to read: SPARE SPRINKLERS. Provide a sprinkler wrench in each cabinet.
 - (3) Cabinets shall be securely mounted to the wall in locations where the space ambient temperature will not exceed 100 degrees F. Verify and coordinate cabinet locations with the Owner's Representative.
- (D) Hangers:
- (1) Hangers and supports, drains, test connections, sleeves, chrome escutcheons, spare sprinkler heads with cabinet, and other necessary appurtenances.
 - (2) Trapeze hangers shall be provided as outlined in NFPA 13, 2007 Edition, Chapter 9 "Hanging, Bracing, and Restraint of System Piping", except the use of piping as trapeze members which **will not** be allowed on any Rooms To Go project (no exceptions). The use of steel angles or unistruts (no holes) as trapeze members **only** shall be allowed.
- (E) Installation
- (1) Modification of existing sprinkler system piping network, as required for compliance with design criteria herein and for maximum clearances as required by design criteria herein. Relocate piping to within joist space or remove and install new piping. Whatever is feasible and deemed appropriate for the condition. Unused piping will not be abandoned in place.
 - (2) The entire installation shall comply with NFPA Pamphlet 13, as minimum requirements, and with applicable portions of Section 15061 of these specifications.
 - (3) FPC shall coordinate the installation of all fire protection systems with the work of all other trades. Provide all necessary offsets in piping to avoid interference with other equipment and systems and provide additional sprinkler heads due to offsets and/or interference as required to achieve design coverage.
 - (4) All horizontal piping shall be installed above the bottom chord of the roof joists with due allowance for clearances for sprinklers as required by NFPA Pamphlet 13. All piping shall be concealed in areas where hung ceilings are applied. All effort should be made to avoid beam penetrations. Routing should be established, in such a manner, to avoid beam locations. No penetrations will be accepted without the written approval of the Structural Engineer of Record.
 - (5) Coordinate routing of piping with lighting fixtures, HVAC systems, and other piping to minimize offsets and interferences. Where pipe must be routed past a structural steel beam and cannot pass beneath the beam without providing an offset, penetrate and pass through the beam rather than provide an offset below the beam. Penetrations must be approved in writing by the Structural Engineer. Reinforcing of the beam shall be performed per the Structural Engineer's requirements at no additional cost to the Owner. Where necessary and unavoidable, provide offsets in the piping as required to accommodate the space and structural limitations set by the building geometry. Shop drawings shall demonstrate that coordination is being properly considered by showing lighting and HVAC systems in the background form to the extent required.
 - (6) Provide drain valves and piping as required to permit all sprinkler piping to be completely drained. Provide inspector's test connections in accordance with NFPA Pamphlet 13 and as required by governing Codes. Locate inspector's test in non-public area (e.g. utility room) if possible. Otherwise, coordinate location with Owner. If located in the sales area, the drop will need to be concealed in a drywall chase and the valve will require a metal access panel.
 - (7) All drains and test connections shall be discharged into the building storm drainage system through an approved indirect waste connection or shall be piped to discharge to the building exterior at 6" above finished grade. The FPC shall provide precast concrete splash blocks at all drains and test connections discharging to the

building exterior at unpaved points. Discharge points shall not be higher than 0'-6" above finished grade.

- (8) All piping shall be concealed in finished rooms and areas. Refer to Section 15061 for clarification. Drains and/or test connections shall not be terminated exposed in finished rooms or areas or toilet rooms.
 - (9) All piping through interior walls and partitions shall be sleeved and closed off with chrome escutcheons where visible. Penetrations through fire rated walls shall be sleeved, packed, and grouted as required to maintain the fire rating of the wall. Piping through floors and exterior walls, including foundation walls, shall be sleeved, packed, and grouted with non-shrinking cement as required to make watertight.
 - (10) The use of roof decks as point of attachment to pipe hanger is absolutely prohibited.
 - (11) Piping shall not penetrate steel beams. When it becomes absolutely necessary to penetrate steel beams the Structural Engineer shall be consulted for confirmation of the size, location and number of allowed beam penetrations.
- (F) Risers and Alarms
- (1) Flanged connections shall be used at the base of all risers. Steel pipe shall not be extended into the ground at the base of risers. Provide cast iron flange and spigot piece at the floor penetration for connection to the steel pipe riser.
 - (2) Risers penetrating floors shall be sleeved, packed with oakum, and made watertight with non-shrinking grout.
 - (3) Each riser shall be equipped with an alarm check valve assembly, retarding chamber, water motor alarm (if electric alarm is used, General Contractor is responsible for power wiring), drains, gauges, and related piping, valves and accessories. Water motor alarm gong shall be mounted on the exterior face of the building wall near the riser. Pressure gauges, complying with NFPA Pamphlet 13, complete with stop cock and draining provisions shall be provided on the supply and discharge side of each alarm check valve.
 - (4) Provide where indicated on the drawings a siamese fire department connection with two - 2-1/2" hose connections, caps and chains. Hose threads to meet local Fire Department requirements. Additional siamese connection shall be furnished if required by the reviewing authorities.

7. CORROSION MANAGEMENT

- (A) Corrosion Monitoring Stations
- (1) Provide CorrView monitor with 1-1/2 inch National Pipe Thread, 0.035 inch wear dimension and flat front surface; 3,000 psi pressure rating and 11,000 proof burst test.
- (B) Monitoring Stations shall be located as follows: one (1) in the fire sprinkler riser downstream of the check valve; one (1) in the lower side of the horizontal main fire sprinkler piping trunk line; one (1) in the fire department sprinkler test line. Monitoring Stations shall be mounted in accordance with the manufacturer's instructions and at non-concealed locations. Coordinate exact locations with the Owner's construction manager prior to installation.

8. TESTS

- (A) In the absence of current and reliable water test data, the FPC shall arrange and pay for a flow test in the area of the proposed water supply connection prior to beginning the installation. The FPC shall submit to CASCO proof of adequate pressure and flow to serve the project facility.
- (B) The entire Sprinkler System shall be tested as required by NFPA and any agencies having jurisdiction.
- (C) No part of the system to be concealed shall be covered up or closed in until such portions have been tested and approved.
- (D) The FPC shall notify the various agencies and bureaus in advance of the time that the tests are to be made.
- (E) An operating test of sufficient duration shall be made for the equipment, fixtures and accessories to the satisfaction of the Owner's Representative.
- (F) All defective parts shall be replaced or corrected by the FPC and an extra test or tests shall be made until the operation is satisfactory. All arrangements and expenses necessary to conduct all tests required by these specifications and the various bureaus and agencies having jurisdiction over the work installed under this contract, shall be made by this FPC. No extra compensation will be allowed for these tests, the cost thereof being included in the lump sum bid for this contract.
- (G) Where any evidence of stoppage and/or leakage is found in piping or equipment, the FPC shall disconnect, clean, repair and reconnect all obstructed piping or equipment and shall also pay for all necessary cutting and repairs to adjoining work. The FPC shall be responsible for repairing all damage caused by leaks in the piping system, including, but not limited to, touch ups of rust with prime paint, at no cost to the Owner.
- (H) All piping and equipment shall be thoroughly cleaned inside and out, of dirt, cutting, oils, and other foreign substances and shall be left clean.

END OF SECTION

DIVISION 15 - MECHANICAL WORK1. GENERAL

- (A) All work under this Section shall be governed by and subject to the provisions of the following:

Section 15051 - BASIC MATERIALS, METHODS, AND REQUIREMENTS

Section 15061 - BASIC REQUIREMENTS FOR PIPING SYSTEMS

- (B) All work under this Section shall be the responsibility of the Plumbing Contractor (PBC), except as otherwise specified herein, noted on the drawings, or modified by the Contract Documents. PCB is responsible for all work not normally performed by the water and sewer utility.

- (C) Shop Drawings

(1) Submit a "Letter of Certification" stating the manufacturer and model number for all proposed plumbing fixtures and trim. The Letter of Certification shall only be submitted for products matching those specified on the contract documents (same manufacturer and model number).

(2) Submit product data for equivalent products from approved, specified, alternate manufacturers. Clearly mark the particular make, model number, accessories and options along with the plan mark (i.e., WC-1, WC-2, etc.) on all submittals. Submit product data for all plumbing fixtures and trim and water heater.

(3) Letter of Certification or product data submittals shall be prepared in accordance with the requirements of Section 01021 of the specifications.

2. SANITARY SEWER SERVICE

- (A) Waste water disposal for this project shall be accomplished by connection to the underground site sanitary sewer system. See the Civil Engineer's site plans.

- (B) During construction, the PBC shall make all necessary notifications and coordinate the sewer service for the project on a timely and proper basis.

- (C) The PBC shall verify the invert elevation at the point of discharge to the sewer system and all other related details prior to proceeding with the sewer system.

- (D) The entire sewer service installation shall comply with the regulations of the Sewer Utility and with governing building Codes. In the absence of governing Codes, provisions of the National Standard Plumbing Code shall govern as minimum requirements.

3. DOMESTIC WATER SERVICE

- (A) Water supply for this project shall be accomplished by connection to the underground site water main. See Civil Engineer's site plans.

- (B) During construction, the PBC shall make all necessary notifications and coordinate the water service for the project on a timely and proper basis.

- (C) The PBC shall provide all piping, valves, and accessories as required for the installation of the water meter(s). If required by the Water Utility, the PBC shall furnish and/or install the water meter(s). PBC shall perform tap if required by the water utility.

- (D) The entire water service installation shall comply with the regulations of the Water Utility and with governing building Codes. In the absence of governing regulations or Codes, provisions of the National Standard Plumbing Code shall govern as minimum requirements.

- (E) Water service piping shall be laid at a depth as necessary to prevent freezing per NFPA Pamphlet 24 and/or Water Utility Standards.

- (F) Separation between underground potable water piping and all underground storm piping, sanitary and industrial sewer piping, and other potentially contaminating sources shall be as required by governing Codes and regulations. As minimum requirements maintain a separation of 10-feet of undisturbed earth between underground potable water and sewer piping. Where water piping must cross over sewer piping, maintain a clear separation of not less than 18 inches between pipes. Sewer piping shall not be laid above water piping unless approved in writing by the Engineer.
- (G) The PBC shall be responsible to plan and coordinate the water service piping to interface with and comply with the fire protection requirements of this project. Water piping installed without regard to these requirements shall be reworked and/or replaced at no additional cost to the Owner.
- (H) The water meter shall be 1-1/2" unless shown otherwise on the drawings.

4. PIPING MATERIALS (Except as otherwise required by governing Codes)

(A) Sanitary Sewer and Storm Drainage Piping

- (1) Underground sewer piping exterior of building lines shall be gasketed joint PVC, ASTM D-3034, SDR-35, equivalent to Carlon Vylon "Z". Below floor slab and above grade interior DWV piping shall be Schedule 40 PVC pipe with drainage pattern fittings joined by solvent cementing or thermal bonding. PBC shall comply with local jurisdiction having authority and governing code(s) regarding the use of PVC piping. Installation, joining, bedding, and hanger spacing (100 degrees F. ambient basis) shall conform to manufacturer's recommendations for each respective piping system.
- (4) PVC piping used for roof drainage shall be connected to roof drain outlet just below bottom of deck with threaded Iron to PVC fitting.
- (5) DWV copper pipe and fittings may be used for above grade piping.

(B) Domestic (Potable) Hot and Cold Water Systems

- (1) Underground main water service piping 3" and larger shall be push-on joint, gray cast iron pipe and fittings, ANSI A21.6 (AWWA C106), ANSI A21.10 (AWWA C110) and ANSI A21.11 (AWWA C111), having ANSI A21.6 thickness designation of 22, equivalent ductile iron pipe, Johns-Manville "Blue Brute" or "Permastran", SDR-26, rated 160 psig.
- (2) Underground main water service piping 2-1/2" and smaller shall be Schedule 40 CPVC with solvent cemented joints.
- (3) Interior above ground piping shall comply with the following:
 - Pipe – CPVC: ASTM F441/F441M
 - CPVC Socket Fittings: ASTM F438 for Schedule 40
 - Piping Joining Materials: Solvent Cements for Joining CPVC Piping and Tubing ASTM F493

(C) Joints for Cast Iron Soil Piping

- (1) Joint shall be properly packed with jute, oakum, or hemp and filled with molten lead not less than 1" deep. Lead shall be virgin pig lead conforming to the standards of the Lead Industries Association. Reclaimed lead shall not be used. Surfaces of hub and spigot shall be cleaned prior to joint mark-up.
- (2) At the PBC's option, compression-type neoprene gasketed joints, such as Tyler's "Ty-Seal" or equivalent, may be used. Joints shall be made in accordance with the manufacturer's recommendations utilizing the proper gasket lubricant, such as Tyler's "Lubri/Fast", and the proper tooling to drive the spigot into the gasketed hub. This method must comply with governing Codes.

- (3) At the PBC's option, the pipe, fittings, and joints may be of the "No-Hub" design conforming to Standards 301-72 of the Cast Iron Soil Pipe Institute in the following applications and where permitted by governing Codes. Joints shall consist of neoprene gaskets, corrugated stainless steel shield and worm gear draw bands. Draw bands shall be tightened alternately with the proper torquing tools. Installations shall comply with the manufacturer's recommendations and Pamphlet 100 of the Cast Iron Soil Pipe Institute. The "No-Hub" system shall be acceptable for above ground piping only.

5. PIPING SPECIALTIES

- (A) Vacuum Relief Valves - Watts No. 36A for water service on water heaters installed above fixture outlets.
- (B) Water Pressure Reducing Valves - Watts with integral strainer and built-in bypass check valve feature. Type, size and no-flow set point pressure as indicated on the drawings (if required).
- (C) Storm Drain Downspout Nozzle - Provide cast bronze or nickel bronze downspout nozzle with anchor flange for all storm drainage pipes that discharge to grade through the wall (typically discharge from an overflow roof drain). Provide Wade Model 3940-12NH (or equivalent). Provide a 3' wide flume if discharge is into a landscape area.

6. FLOOR DRAINS AND ROOF DRAINS

- (A) Provide floor drains and roof drains in accordance with the schedule on the drawings.
- (B) Drains shall be the product of Josam, Wade, Jay R. Smith, Zurn, Watts or Ancon.
- (C) All drain outlets shall be the same size as the size of the connecting piping unless otherwise indicated on the drawings. Drains used with hub and spigot cast iron pipe shall have caulked outlet unless otherwise required by governing Codes.
- (D) Drains may be installed by means of a Neoprene gasketed joint furnished and guaranteed leakproof by the drain manufacturer, such as the Josam "Jiffie-Joint", where permitted by governing Codes.
- (E) All floor drains shall be installed flush with finished floor.
- (F) All floor drains shall be installed with deep seal P-traps. Provide trap seal primers where required by governing Codes. Floor drains shall be properly located to serve the respective equipment and areas. Prior to rough-in, coordinate and verify drain locations with the Owner's Representative, GC, and HAC as required.

7. CLEANOUTS

- (A) Sanitary Sewers
 - (1) Provide cleanouts as required to comply with governing Codes. The following specifications shall apply as minimum requirements.
 - (2) Cleanouts and accessories shall be the products of Josam, Wade, Blake, Jay R. Smith, or Zurn.
 - (3) In general, cleanouts shall be provided in locations indicated on the drawings and shall be spaced not more than 50-feet apart for interior horizontal piping.
 - (4) Cleanouts shall be of the same size as the pipe served up to and including 4" lines and not less than 4" for larger lines.
 - (5) Cleanouts shall be extended to and flush with finished floor. Exterior cleanouts in paved areas shall be installed in an 18" x 18" x 6" thick concrete pad flush with final grade thickened at the center to encase the pipe joint.

- (6) Cleanouts shall be installed with accessibility for rodding purposes. In the absence of governing Codes, the provisions of the National Standard Plumbing Code shall apply.
- (7) The PBC shall be responsible for selecting the proper types of cleanouts, including accessories and access covers, for each cleanout application. Each cleanout installed shall be compatible with the surrounding construction and finishes. The following specifications shall govern for the given applications unless surrounding construction or finishes preclude their use.

<u>Application</u>	<u>Josam Series Number</u>
Exposed Cleanouts	58500
Floor Cleanouts	
Concrete Floors	58180 or 58190
Vinyl Tiled Floors	58000-12 or 58010-12
Carpeted Floors	58000-14 or 58010-14
Terrazzo Floors	58040-1-13 or 58050-2-13
Ceramic or Quarry Tiled Floors	58020-2 or 58030-2
Wall Cleanouts	
Concrete or Masonry	58710-4 or 58790-4
Drywall on Studs	58710-4 or 58790-4
Plaster on Studs	58700-2 or 58750-2
Ceramic Tile on Drywall	58740-2 or 58770-2
Exterior Cleanouts	
Unpaved Areas	58180 or 58190
Paved Areas	58300-5-15 or 58310-5-15

- (8) Cleanouts with inside caulked outlets may be installed by means of a Neoprene gasketed joint furnished and guaranteed by the cleanout manufacturer, such as Josam "Jiffee/Joint", where permitted by governing Codes.

8. PLUMBING FIXTURES AND TRIM

- (A) Provide plumbing fixtures and trim in accordance with the schedule on the drawings.
- (B) Fixtures and trim shall be the products of American Standard or Kohler, except as otherwise noted on the drawings or in these specifications.
- (C) All flush valves shall be Sloan.
- (D) Carriers for wall hung fixtures shall be the products of Josam, Wade, Blake, Jay R. Smith, or Zurn.
- (E) Unless otherwise specified or noted on the drawings, all fittings and trim shall be chrome plated brass and shall be of the same manufacturer as the fixtures, including P-traps, supplies, stops, and union connections. Strap wrenches shall be used where required to prevent damage to chrome plated pipe and fittings.
- (F) All fixtures shall be set firm and squarely aligned with walls and floors. All fixtures shall be properly connected to soil, waste, and vent piping and required water supplies in a rigid and substantial manner, without damage to any adjoining work or finish. Provide chrome plated escutcheons at exposed wall penetrations for all piping work.
- (G) Stops or gate valves shall be installed in the hot and cold water supplies to each fixture or piece of equipment. Provide union connection on the fixture or equipment side of each stop or gate valve.
- (H) Provide air chambers on hot water supplies to fixtures. Air chambers shall be 18" length and one pipe size larger than the supply connection to the respective fixture.

- (I) Provide water hammer arrestors on cold water lines where indicated on drawings.
- (J) Lavatories, sinks, and all other fixtures where carrier is not applicable for wall mounting shall be installed with through bolts secured with square steel plates (Min. 4" square by 10 gauge) for bearing and support on the opposite side of the wall.
- (K) Fixtures mounted to partition walls where bearing plates and bolts would be exposed in an adjacent room shall be installed with not less than 1/4 inch toggle bolts or other fasteners acceptable to the Engineer. Lead shield anchor bolts will not be acceptable.

9. WATER HEATER (WH-1)

- (A) Provide water heater is size, capacity and make as scheduled on the drawings. Heaters shall be fully warranted for minimum of 5 full years after final acceptance of the building. Furnish heaters with the following accessories:
 - (1) ASME combination temperature and pressure relief valve in excess of heater input. Run full-size drain to location shown on plans.
 - (2) Automatic thermostat actuated controls with 100% shut=off.
 - (3) Dual high-limit controls.
 - (4) Tank drain.

10. THERMAL INSULATION

- (A) Refer to Section 15051 for general requirements and workmanship, and to Section 15061 for methods of application.
- (B) For insulation work, the PBC may employ an insulation subcontractor specializing and experienced in this work. Subcontractor shall meet the approval of the Owner's Representative.
- (C) Cold Water Piping - All exposed piping and all piping concealed above ceilings shall be insulated with 1" thick Owens Corning Fiberglas ASJ/SSL-II insulation with all service jacket (ASJ). In all cases where accumulation of condensation might damage construction materials, piping shall be insulated.
- (D) Storm Drainage Piping – Insulate the first 10'-0" of all storm drainage piping from the roof drain body and roof drain bodies with fiberglass insulation as specified above for cold water piping except that the thickness of the insulation shall be 2". Where drawings are located within 20' of a column or the drains drop thru the slab, all piping exposed to view shall be insulated/wrapped to 24" below tops of partitions or other features concealing pipe drops. Taper end of insulation around pipe. All pipe insulation exposed in the Sales are shall be covered with PVC jacketing and fitting covers. Refer to Section 15061. Provide Zeston 2000 PVC jacketing and fitting covers (or equivalent). All joints and edges shall be sealed with an approved vapor retarder and tape in strict accordance with the jacketing manufacturer's installation requirements. All insulation and jacketing products including mastic and tape) shall meet code requirements for maximum flame spread and some developed ratings. All insulated storm piping shall be wrapped in paintable plastic wrap and painted to match adjacent décor.
- (E) Hot Water Piping - Except as otherwise specified, all hot water piping shall be insulated with 1" thick Fiberglas ASJ/SSL-II insulation with all service jacket (ASJ).
- (F) Electric Water Coolers - Portion of condensate and waste drain pipes within the coolers and exposed shall be insulated with 3/8" thick flexible closed-cell foam-plastic material.
- (G) Instantaneous Water Heater - Shall be factory insulated.

11. CLEANING, DISINFECTION AND INSPECTION

- (A) Definition: Cleaning as used herein shall be taken to mean the removal of all materials foreign to the respective system, fixture, or equipment which is or could be contaminating, obstructing, or unsightly.
- (B) The interior of all piping shall be cleaned as it is being installed. Special care shall be taken to keep potable water piping clean and free of contaminating materials, including rodents and vermin.
- (C) Prior to testing, completed sections of sewer piping shall be flushed to clean and assure the absence of obstructions.
- (D) Prior to testing and insulating, all water piping shall be thoroughly cleaned and flushed by opening valves and faucets, etc., until the discharged water is clean and clear. The exterior of all above grade water piping shall be cleaned of dust, dirt, grease, plaster, concrete, caulking, and other loose or adhered foreign materials.
- (E) The exterior of exposed sewer piping shall be cleaned as specified above for water piping.
- (F) All fixtures, water heaters, water coolers, and other fixtures and equipment installed under the PBC's contract shall be thoroughly cleaned and shall be clean when turned over to the Owner. Gummed labels and gum residue shall be removed unless such label constitutes name plate or performance data or is the certification of a nationally recognized rating agency such as U.L., AGA, ASME, etc.
- (G) All floor drains, roof drains, P-traps, strainers, cleanouts, access panels, aerators, piping specialties, and special fixture and trim shall be thoroughly cleaned and shall be clean when turned over to the Owner.
- (H) Completed section of sewer piping shall be inspected with video equipment to assure proper slope and cleanliness.
- (I) After all cleaning, testing, adjusting, and insulating work is completed, all domestic and potable hot and cold water piping systems, including related tanks, heaters, pumps, and equipment, shall be thoroughly disinfected in accordance with governing Codes prior to placing into service for potable use. In the absence of governing Codes, the disinfection shall be in accordance with AWWA Standards C- 601-54 or C-601-68 for piping and AWWA Standard D-102-64 for tanks, unless otherwise approved by the Engineer.

12. TESTING AND ADJUSTING

- (A) Domestic Hot and Cold Water Piping
 - (1) All piping shall be hydrostatically tested at 125 psig until leak free. Pressure in each test section shall be maintained at the initial test pressure for not less than 12 hours.
 - (2) Any leaks shall be repaired, and the pressure test shall be repeated as specified above until proven leak-free.
 - (3) Any devices or items of equipment not designed or recommended by the manufacturer for the test pressures shall be removed or effectively isolated from the test pressure.
- (B) Sewer and Sanitary Piping
 - (1) Waste, Drain and Vent - Shall be hydrostatically tested in accordance with the governing plumbing code, but in no case less than the "water test" method specified in the National Standard Plumbing Code. In general, all piping shall be tested with not less than 10-feet of water column except the uppermost 10-feet of the system. Piping exposed to subfreezing temperatures may be tested by the BOCA "air test" method with the approval of the Code enforcing authorities.

- (2) Sewers - Shall be tested in accordance with the requirements of local sewer inspection authority. In general, the sewer under test shall be subject to a minimum pressure of 10-feet water column, or a flow test to be witnessed by the sewer inspector.
- (C) Check all faucets, stops, and isolating valves for leaks and repair and/or adjust as required.
- (D) Check and adjust the temperature and operation of all hot water heaters in accordance with the manufacturer's recommendations.
- (E) Check and adjust the bubbler stream on all water coolers and drinking fountains. Check and adjust the timing cycle of all flush valves as applicable.
- (F) Check, test, and adjust as required all equipment, fixtures, and devices installed under the PBC's contract in accordance with the manufacturer's recommendations. Equipment requiring lubrication shall be checked and lubricated, if required, prior to start-up.

13. TEMPORARY WATER

- (A) The GC shall arrange with the utility company to provide a temporary construction service for temporary water.
- (B) The PBC shall furnish and install a temporary water service with backflow prevention as required by the utility at the above location. A temporary hosebibb shall be installed by the PBC as required by the GC for the various trades.
- (C) The PBC shall maintain system during working of all trades.
- (D) The GC shall pay for all water consumed and any other charges by the Utility Company.
- (E) The PBC shall remove all temporary piping and hosebibbs when no longer required and when directed to do so by the GC.

- END OF SECTION -

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DIVISION 15 - MECHANICAL WORK1. GENERAL

- (A) All work under this Section shall be governed by and subject to the provisions of the following:

Section 15051 - BASIC MATERIALS, METHODS, AND REQUIREMENTS

Section 15061 - BASIC REQUIREMENTS FOR PIPING SYSTEMS

- (B) All work under this Section shall be the responsibility of the Heating and Air Conditioning Contractor (HAC), except as otherwise specified herein, noted on the drawings, or modified by the Contract Documents.

- (C) Shop Drawings

- (1) Prepare shop drawing submittals for the following:

- Rooftop Units
- Exhaust Fans
- Automatic Controls

- (2) Clearly mark the particular make, model number, accessories and options on all submittals. Capacities, rating and characteristics of the proposed equipment shall be based on conditions indicated or specified herein. Review of shop drawings is for general conformance with the design concept and contract documents.

- (3) All submittals required by this section shall be submitted in one package. Submittals shall be prepared in accordance with the requirements of Section 01021 of the specifications.

2. VENTILATION FANS AND ACCESSORIES

- (A) Fans shall be provided as shown and scheduled on the drawings and in accordance with the following specifications.

- (B) The fans scheduled on the drawings shall each be considered the "first-named" brand. Equivalent fans as manufactured by Greenheck, Davidson, Penn Ventilator, Jenn Air, Aerovent or American Coolair will be acceptable for base bid.

- (C) Each fan shall be provided with the accessories as noted on the drawings. All accessories shall be furnished by the fan manufacturer, unless noted or specified otherwise.

- (D) When fans are specified on the schedule to have a disconnect switch, the switch and wiring between the switch and fan motor shall be factory installed. Switches shall be of the type and rating as required for the application. The switch shall meet the NEC requirement for local disconnect and the switch and wiring shall comply with provisions of the NEC. Each switch shall be accessible without danger to maintenance or repair personnel.

- (E) The curb cap of curb mounted fans shall be set in a bed of waterproof sealant on the roof curb and securely attached with not less than #10 screws on 9-inch centers. Provide at least two screws on each side for small units. The HAC shall be responsible to verify the size and location of each roof opening with the GC prior to the cutting and/or placement of openings.

- (F) The ELC shall provide power wiring and motor starters for all fans and all control wiring and devices for all manually controlled fans.

- (G) Except as otherwise noted or specified, the HAC shall provide control devices, wiring, and work for all fans which are automatically controlled. All work shall comply with the NEC, latest edition. Control devices shall be Honeywell.

- (H) Refer to Section 15881 for specifications governing prefabricated roof curbs.

3. ROOF TOP COMBINATION HEATING AND COOLING UNITS

- (A) Provide, rig and install in place roof top combination heating and cooling units with all accessories as indicated and scheduled on drawings and according to the following specifications.
- (B) The roof top units shall be Lennox or equivalent by Trane (TC/YC high efficiency) or Carrier (HC, with options). Each unit shall be a complete unitary package consisting of heating section (when specified), condensing section, cooling coil, blower, controls, wiring, piping, casing and structural base. The entire unit shall be factory wired, piped assembled, charged and tested in all modes of operation. The unit shall be AGA certified for outdoor use.
- (C) Units shall be designed to operate on a 408-volt, 3 phase, 60 Hz power supply (unless noted otherwise on the schedule) with single field power connection. All necessary starters, contactors, control transformers, controls, and control safety devices shall be factory installed and wired.
- (D) Each unit shall be provided with and installed on a full perimeter prefabricated roof curb. Roof curbs or units shall be shimmed or blocked as required to set the units level within the tolerances recommended by the manufacturer. Each unit shall be permanently and securely attached to the roof curb to withstand the design wind load. All flashing, counterflashing, and sealing shall be provided by the HAC as required for a watertight installation and interface with the roofing construction. Roof insulation and membrane shall be installed on the exterior of each curb by the Roofing Subcontractor. HAC shall coordinate as required.
- (E) Units shall be provided with a factory equipped fully modulating differential enthalpy economizer with outdoor air hood, filter assembly and barometric relief unless otherwise noted on the schedule. Compressor short cycle protection and crankcase heaters shall be provided.
- (F) Outside air dampers on each unit shall be balanced and set for the specified minimum position and shall be closed when unit is shut down.
- (G) Evaporator condensate drain for each unit shall be trapped and drainpipe shall be extended as noted on the drawings. Piping shall be as noted on the plans. Exposed PVC drain lines shall be painted white exterior latex.
- (H) Provide a manual re-set type firestat for all units. Firestat shall be field installed and wired to shut down unit whenever return air temperature reaches unsafe levels. Refer to paragraph "Automatic Controls" for further requirements. The Contractor shall provide mount, and wire duct smoke detectors when required by local codes.
- (I) Contractor shall remove all filters and shall install new filters throughout the system, one day prior to Testing and Balancing. Replacement filters shall be MERV 11 rated, Class 2 pleated filters, size and quantity per rooftop manufacturer's recommendations. Acceptable manufacturers and models are Flanders Precisionaire-Pre-Pleat 62RM11, Airguard-Powerguard and Airflow Incorporated-M11 Pleat High Capacity (3000 series).

4. AUTOMATIC CONTROLS

- (A) General
 - (1) Except as otherwise specified and/or noted on the drawings, all automatic control devices shall be furnished, installed and wired by the HAC.
 - (2) The HAC shall be responsible to provide all necessary wiring diagrams, control devices, and work as required to perform the sequencing and automatic control functions specified herein and noted on the drawings.
 - (3) The HAC shall provide all necessary supervision and coordination to ensure the proper location, installation, and function of all controls.
 - (4) Refer to the electrical drawings for further clarification of the work provide by the ELC. All control-related wiring required shall be furnished and installed by the HAC, including 120-volt control power wiring, extension of 120-volt circuits for control power source, and wiring for 120 volt damper motors. Locate controls where indicated on the drawings.

- (5) After completion of the installation, the HAC shall be responsible to regulate and adjust all sensors thermostats, damper motors, switches, etc., and place them in complete operating condition subject to the approval of CASCO. Any service incidental with the proper performance of the temperature control system shall be furnished without charge for the guarantee period of one year.
 - (6) Wiring for controls shall be done in compliance with local codes and NFPA requirements. Wiring diagrams for all automatic control systems shall be submitted by the HAC to Engineer for review before installation. All exposed wiring and all 120-volt wiring for automatic controls and related wiring shall be in conduit.
 - (7) Provide Firestat assembly for all RTU's to shut down units and close O.A. dampers whenever return air temperature reaches an unsafe level. Firestat shall be of manual reset type and shall be factory installed in return air section of unit. When required by governing Codes, shut-down of units shall be actuated by smoke detectors applied in accordance with Code requirements. When applicable and required, smoke detectors shall be provided, mounted and wired by the Contractor to comply with governing Codes, and remote reset buttons shall be mounted in the electrical room.
- (B) Controls for Rooftop units
- (1) Provide all temperature controls modifications required for a complete and functioning control systems.
 - (2) Thermostat shall be LIGHTSTAT model E-STAT pre-mounted to cabinet. Pre-mounted E-STAT cabinets and sensors as manufactured by LIGHTSTAT, Inc. Cabinet shall be mounted where shown on plans. Contractor shall contact LIGHTSTAT to arrange payment and process order. Allow two weeks for delivery.
 - (3) Contractor shall provide and install LIGHTSTAT remote room temperature sensors where shown on plans.
 - (4) Contractor shall provide LIGHTSTAT supply air sensor, mount on discharge air duct with probe in discharge air stream.
 - (5) Where used to control both heating and cooling, thermostats shall provide a dead-band of at least 5° F within which the supply of heating and cooling energy to the zone is capable of being shut off or reduced to a minimum.
 - (6) For additional information contact:

LIGHTSTAT, Inc.
22 W. West Hill Road
Barkhamstead, CT 06063
Phone: 1-800-292-2444 ext. 222
Fax: 860/738-4123

5. IDENTIFICATION

- (A) All thermostats and each Rooftop Unit shall be provided with identification tags of black phenolic material with engraved white letters.
- (B) Identification tags for Rooftop Units shall have letters not less than 1" high and shall be attached to unit's sheet metal housing panel. Tags to read: RTU-1, RTU-2, etc. corresponding to the drawings.
- (C) Unit drops shall be labeled with their corresponding rooftop unit number at locations visible from the conditioned space below. Identification tags shall have letters not less than 2" high and shall be attached to the sheet metal drop. Tags to read: RTU-1, RTU-2, etc. corresponding to the drawings.

6. TEST REQUIREMENTS

- (A) Complete all requirements of the "Systems Start-Up Checklist" included in Section 15051 before the systems are tested and balanced by the Independent Testing Consultant. After the installation is complete the HAC shall perform the following tests to ensure the performance of the equipment:
- (1) Refer to Section 15051 for additional requirements.
 - (2) Refrigerant Piping: All field-installed refrigerant piping shall be tested with a halide torch. Any leaks shall be repaired and the system recharged.
 - (3) Performance Testing: The HAC shall operate all pieces of mechanical equipment to ensure satisfactory results. Ampere measurements shall be made of all motors to ensure that none of the motors are overloaded. All automatic controls shall be tested to ensure proper sequencing of operations as specified hereinbefore. Any equipment which is defective in either performance or operation, or excessively noisy shall be replaced at no cost to the Owner. Contractor shall remove all filters and shall install new filters throughout the system, one day prior to Testing and Balancing. Replacement filters shall be MERV 11 rated, Class 2 pleated filters, size and quantity per rooftop manufacturer's recommendations. Acceptable manufacturers and models are Flanders Precisionaire-Pre-Pleat 62RM11, Airguard-Powerguard and Airflow Incorporated-M11 Pleat High Capacity (3000 series).

7. SERVICE REQUIREMENTS

- (A) The Contractor shall warranty in writing all materials and workmanship for the period of one (1) year from date of final acceptance by Owner. This shall include an agreement to repair and make good or replace at no cost to Owner any and all defects of his work, equipment, apparatus, or materials during that period, which arise from incorrect workmanship, imperfect or inferior materials, or defective equipment. This warranty shall include replacement of all parts or basic components as required including labor.
- (B) Special Warranty: Manufacturer's standard form in which manufacturer agrees to replace components of rooftop air conditioners that fail materials or workmanship within specified warranty period.
- (1) Warranty Period for Compressors: Manufacturer's standard, but not less than five (5) years from date of Substantial Completion.
 - (2) Warranty Period for Heat Exchangers: Manufacturer's standard, but not less than ten (10) years from date of Substantial Completion.
 - (3) Warranty Period for Solid-State Ignition Modules: Manufacturer's standard, but not less than three (3) years from date of Substantial Completion.
- (C) When special guarantees covering installation, operation or performance of any systems or appliances furnished under the HVAC contract are herein required, the full responsibility for fulfillment of such guarantees must be assume by the HVAC Contractor, who shall obtain written guarantees in triplicate from any and all subcontractors with two (2) copies to be filed with the Project Manager prior to final acceptance.
- (D) The provisions of this paragraph shall not be interpreted as diminishing in any way the equipment warranties and/or Contractors' one (1) year warranty on the project; however, the beginning date for the serviced requirements specified above shall begin on the same date as the warranty covering that same portion of this project.

- END OF SECTION

DIVISION 15 - MECHANICAL WORK1. GENERAL

- (A) All work under this Section shall be governed by and subject to the provisions of the following:

Section 15051 - BASIC MATERIALS, METHODS, AND REQUIREMENTS

- (B) All work under this Section shall be the responsibility of the Heating and Air Conditioning Contractor (HAC), except as otherwise specified herein, noted on the drawings, or modified by the Contract Documents.

- (C) Shop Drawings

- (1) Prepare shop drawing submittals for the following:

- Ductwork Materials
- Diffusers and Grilles
- Dampers, Fittings, Flexible Duct, Duct Liner

- (2) Clearly mark the particular make, model number, accessories and options on all submittals. Capacities, rating and characteristics of the proposed equipment shall be based on conditions indicated or specified herein. Review of shop drawings is for general conformance with the design concept and contract documents.

- (3) All submittals required by this section shall be submitted in one package. Submittals shall be prepared in accordance with the requirements of Section 01021 of the specifications.

2. SHEET METAL WORK

- (A) General

- (1) Sheet metal work shall be performed by the HAC's own sheet metal shop, or at the HAC's option, may be subcontracted to a qualified Sheet Metal Subcontractor, hereinafter referred to as the SMS. If SMS is to be used, the HAC shall submit the name of the proposed SMS to the Owner's Representative.

- (2) Reference Manuals - Quality of workmanship, metal gauges, fabrication, construction and installation of sheet metal work shall comply with HVAC DUCT CONSTRUCTION STANDARDS - METAL & FLEXIBLE published by Sheet Metal and Air Conditioning Contractor's National Association, Inc. (herein referred to as SMACNA). All work and materials shall comply with NFPA Pamphlet 90A, latest edition.

- (B) Materials, Fabrication, and Installation

- (1) Ducts for heating, cooling, and exhaust systems shall be galvanized steel of commercial lock forming quality having a minimum galvanized coating of 1-1/4 ounces per square foot of sheet metal (total coating for both sides), unless otherwise noted on the drawings or specified herein.

- (2) Round spiral ductwork and fittings shall be provided in accordance with specifications on the drawings and the following:

Provide single wall, galvanized steel, spiral lockseam round ductwork. Fittings shall be single wall galvanized steel, standing seam or solid welded construction. Elbows shall be standing seam, gored elbows. Grille collars shall have 4-sided saddle taps and be attached to the ductwork with self-tapping sheet metal screws at 6" on center maximum and Ductmate neoprene gasket tape around full perimeter of collar: No substitutions. Duct-to-duct joints shall be made with the spiral seam rotated so that the standing seam forms a continuous helical pattern across the joint. Seal perimeter of duct-to-duct connections with

Ductmate neoprene gasket tape: No substitutions. Caulk is not allowed at any location along ductwork, take-offs, or grille connections. All ductwork and fittings shall be manufactured and installed in accordance with SMACNA's "HVAC Duct Construction Standards", latest edition.

Spiral ductwork shall be fabricated on machines which do not employ oil-based lubricants in the manufacturing process. All ductwork shall be cleaned prior to delivery per the manufacturer's instructions. If on-site cleaning is required, the ductwork shall be stood vertically with the open side of the lock seam facing down to dry. The ductwork shall be installed completely dry.

- (3) All exposed rectangular and round ductwork and fittings in the showroom shall be provided with a mill phosphitized finish ("paint grip", "zinc grip" or similar mill surface etch treatment) to allow the ductwork to be painted. Ductwork shall be painted by the General Contractor after installation.
- (4) Sheet metal work as shown on the drawings is, in general, schematic and based on the specified manufacturer's equipment and material dimensions. HAC shall make accurate measurements in the field prior to ductwork fabrication and shall provide all necessary offsets and transition pieces required to accommodate the actual structural and equipment variations and as required to clear piping and recessed lighting fixtures.
- (5) Duct Dimensions - Unless otherwise specified or noted on the drawings, duct sizes shown are OUTSIDE DIMENSIONS of the ducts. Contractor need not increase duct size to allow for the thickness of duct lining.
- (6) All rectangular ductwork shall be cross broken.
- (7) All ducts and ductwork shall be supported by hangers of the types and at the spacings as recommended by SMACNA. HAC shall provide additional steel angles, channels, Unistrut (no holes), etc., as required to span between bar joints or structural members in order to hang ducts at proper intervals and at necessary points. Hangers shall be provided at all elbows and at branch takeoffs on the main ducts.
- (8) No ducts shall be supported from the roof deck. No cutting or drilling of structural members is permitted unless written permission is obtained from CASCO. No ducts shall be supported from or rigidly attached to any interior partitions, except those of masonry or concrete construction.

(C) Turning Vanes and Radius Elbows

- (1) All changes in direction of supply, return, and exhaust ductwork made with square elbows shall have turning vanes. Turning vanes shall be provided in all square elbows whether shown on the drawings or not.
- (2) Turning vanes shall be single wall type as manufactured by Aero/Dyne Company or Tuttle & Bailey or may be shop fabricated in accordance with SMACNA. The number and spacing of vanes shall comply with the manufacturer's recommendations or, if shop fabricated, in accordance with SMACNA. In ducts with internal liner, the vanes shall be installed over the liner; the liner shall not be interrupted for vane installation.
- (3) At the Contractor's option, elbows may be "Standard Radius" type in accordance with SMACNA with the throat radius equal to the width of the duct in the plane of the radius. When space does not permit the use of "Standard Radius" elbows, a short radius elbow with turning vane complying with SMACNA may be used.

(D) Flexible Connections

- (1) Provide sound and vibration isolating flexible connections on all motorized equipment to which duct connections are made, at locations noted on the drawings, and as specified.

- (2) Connections on interior work shall be made with Ventglas Neoprene - coated glass fabric as furnished by Ventfabrics, Inc. Connections made on work exposed to weather and/or sunlight shall be made with Vention Hypalon - coated glass fabric as furnished by Ventfabrics, Inc.
- (3) An allowance of at least one-inch slack shall be made at each connection. The fabric shall be attached at equipment with metal collar frames and to ductwork by folding in with the sheet metal or with bands or frames as required to make leak proof joints.

3. VOLUME CONTROLS

- (A) Provide volume control dampers (do not provide air extractors) at all branch take-offs and other locations as shown on the drawings and as otherwise required for the proper balancing of the air distribution systems. The HAC and ITC shall be responsible for the proper balancing and volume control of all air distribution systems.

4. AIR DISTRIBUTION DEVICES

- (A) Provide air distribution devices complete with accessories in accordance with the Schedule on the drawings and the following.
- (B) The HAC shall verify ceiling construction to assure the suitability of each device, frame, and hardware for the respective application. Provide all mounting hardware required whether specified on the drawing schedule or not.
- (C) Air devices shall be as manufactured by Titus, Barber-Colman, Metal-aire, Tuttle and Bailey, Kueger, Carnes or Anemostat.

5. DUCT LINER

- (A) Low velocity rectangular duct systems shall be internally lined with acoustical liner in accordance with the following.
 - (1) Supply and return rectangular ducts concealed by hung ceilings shall have one-inch-thick liner.
 - (2) Return air ducts for units serving the general Sales Area shall have 1" thick liner.
 - (3) Supply spiral duct liner as indicated on drawings.
- (B) Duct liner shall be made of glass fiber material bonded with an inactive resin and having a density of not less than 2 pounds per cubic foot. The surface in contact with the air stream shall be factory coated with a suitable coating to prevent erosion and to meet the requirements of NFPA Pamphlet 90A. The surface in contact with the air stream shall be fire-resistant and contain an EPA registered anti-microbial agent that meets the requirements of ASTM C 1338, ASTM G21 (fungi test) and ASTM G22 (bacteria test). The material shall have the following ratings and characteristics.
 - (1) Thermal conductivity (k-factor) of 0.24 at 75 degrees F. mean.
 - (2) Flame spread - 25; Smoke developed - 50.
 - (3) Maximum air velocity of 4000 FPM in accordance with UL Standard 181.
 - (4) Maximum temperature of 250 degrees F.
 - (5) Noise reduction coefficient of 0.08. (Average of sound absorption coefficients at 250, 500, 1000 and 2000 cps)
- (C) All duct lining shall be installed in accordance with the manufacturer's recommendations and SMACNA Standards. Mechanical fasteners and adhesives shall be as recommended by the manufacturer.

- (D) Duct liner shall be as manufactured by Certaineed CGS Group-ToughGard R Duct Liner or Owens- Corning-QuietR AcousticR Duct Liner or product of equivalent quality, appearance and performance.

6. DUCT WRAP

- (A) Round ducts serving the office/ breakroom utility shall receive 1-1/2" of Owens-Corning vapor barrier faced duct wrap FRK-25, series ED-150, with a thermal conductivity of 0.24 at 75 degrees F. mean temperature, or equivalent by J-M or Certaineed. Insulation shall be adhered to metal at 8" o.c. with Foster's 85-15 bonding adhesive. Longitudinal and circumferential joints shall be secured with 9/16" flare-door staples at 6" o.c. and taped with 3" wide (min.) foil reinforced kraft tape. All penetrations of facing shall also be taped. Comply with manufacturer's recommendations for installation.

7. FLEXIBLE INSULATED DUCTS

- (A) Provide flexible ducts as manufactured by Certaineed CGS Group, Flexible Tubing Division of Automation Industries, Johns-Manville, or Wiremold as indicated on the drawings and in accordance with the following specifications.
- (B) Flexible ducts shall consist of an inner of helical wound spring steel coated with vinyl and covered with a vinyl coated fiberglass mesh permanently fused to form a continuous inner sleeve. The inner line shall be covered with fiberglass insulation jacketed with a reinforced, metalized plastic vapor barrier casing.
- (C) Flexible ducts shall be UL listed in accordance with UL Standard 181, Class 1 and shall have the following ratings and characteristics.
 - (1) Maximum thermal conductance (C) of 0.23 BTUH per square foot degree F. at 75 degrees F.
 - (2) Temperature range of 0 to 250 degrees F.
 - (3) Maximum vapor transmission rating of jacket of 0.03 Perm.
 - (4) Maximum internal pressures of 2" w.c. positive and 1-1/2" w.c. negative.
 - (5) Maximum velocity of 2400 FPM.
- (D) Duct sizes noted on the drawings refer to the inside duct diameter. Flexible ducts shall be installed to provide sweeping configurations without undue restrictions, but not creating unnecessary sags or curves. Flat banding material not less than 1-1/2" wide shall be used to suspend flexible ducting. Ducting furnished with factory installed grommets shall be suspended by wires attached to grommets.
- (E) Where ceiling plenum space is not sufficient to permit top connection to ceiling diffuser with proper bend radius for flexible duct, HAC shall fabricate and/or provide an adaptor box for diffuser to permit side connection of flexible duct.

8. PREFABRICATION ROOF CURBS AND EQUIPMENT SUPPORTS

- (A) Roof curbs for Rooftop Units (RTU's) shall be manufacturer's standard curbs. All other roof curbs shall comply with the following paragraphs.
- (B) Provide factory prefabricated roof curbs and equipment supports as indicated on the drawings and in accordance with the following specifications.
- (C) When available, roof curbs and equipment supports shall be furnished by the manufacturer of the respective equipment or item to be supported to assure a close and proper fit. All other curbs and supports shall be as manufactured by Vent Products Co., Inc., Louvers and Dampers, Inc., Penn Ventilator, The Pate Company, or Thybar Corporation, in accordance with the following:
- (D) Materials and Construction

- (1) Curbs and supports shall be constructed of not less than 18-gauge galvanized steel or 14-gauge (.064") aluminum. Material of curb shall match the equipment or item to be supported when required to prevent direct contact of dissimilar metals.
- (2) Curbs and supports shall be reinforced and/or constructed of heavier gauge materials as required to properly support the applied loads, including wind, snow, and dynamic with safety factor of 2 or greater.
- (3) All joints and seams shall be continuously welded to assure leak proof and weather tight construction.
- (4) All curbs shall be insulated with rigid fiberglass board, 3 lbs. per cubic foot minimum density. The thickness of insulation board shall be equal to the required nominal curb thickness: 1- 1/2 inches, minimum.
- (5) All curbs and supports installed on insulated roofs shall have an integral cant strip, 3" minimum. The cant shall be raised by an amount equal to the thickness of the roof insulation. The top of all curbs shall be not less than 11 inches above finished roof. The top of all equipment supports shall be not less than 9 inches above finished roof. The top of all curbs and supports shall be installed level with factory built-in pitch matching roof slope.
- (6) Top of all curbs and supports shall have a wood nailer of nominal 2-inch lumber, except where self-flashing curbs are approved. Provide cap flashing for all applications where the wood nailer would be exposed.

- END OF SECTION -

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DIVISION 16 - ELECTRICAL WORK1. GENERAL

- (A) This Section covers materials, methods and requirements common to all electrical work.
- (B) All electrical work shall be governed by and subject to the provisions of this Section and all Sections of Division 1.
- (C) Refer to Section 00011 for requirements relating to Base Bid Products, Substitutions and Alternates.
- (D) The General Contractor shall be responsible for providing a copy of Division 1 specifications to each subcontractor and for coordinating the work accordingly.
- (E) Submittal data, shop drawings and samples:
 - (1) Shall be submitted for review for the following equipment in accordance with the procedure set forth in Section 01021 of these specifications.
 - (a) Light Fixtures
 - (b) Site Lighting poles (if applicable).
 - (c) Electric Panels (if applicable)
 - (d) Distribution Equipment including Lighting Contactors
- (F) Contractor to provide select unit prices (See Section 00301 Proposal Form).

2. WORK INCLUDED

- (A) The work covered by this Section of the Specifications consists of providing all equipment, materials and labor, and performing all work as required for the complete execution of the Electrical Work as shown on the Drawings, herein specified, or both, and which without restricting the generality of the foregoing, shall include the following:
 - (1) General Requirements.
 - (2) Conduit and Fittings. Wire and Cable.
 - (3) Any primary and secondary service work as required by the Utility Company, or as shown on the drawings.
 - (4) Service entrance equipment and switchgear.
 - (5) Provision of lighting fixtures and lamps, including all hangers and supports.
 - (6) Site Lighting.
 - (7) Light and Power Panelboards.
 - (8) Light and Power Systems
 - (9) Mounting of starters and controls.
 - (10) Grounding.
 - (11) Telephone System: Work as required by the Telephone Company including service conduit requirements and grounding system.
 - (12) Power wiring for HVAC and Plumbing work.
 - (13) Provision of emergency lighting units and exit signs.

- (14) Temporary light and power as required by the General Contractor.
- (15) Excavation, trenching and backfill. Comply with applicable provisions of Division 2, Excavating, Grading and Backfilling.
- (16) Conduit and wire for automatic temperature controls as indicated on the drawings. (Low voltage wiring by HAC).

3. WORK SPECIFIED UNDER OTHER SECTIONS

- (A) The following items of work will be done in accordance with the appropriate Sections of the Specifications, or by the Utility Companies.
 - (1) Finished painting.
 - (2) Patching.
 - (3) Concrete work.
 - (4) Foundations.
 - (5) Furnishing and installing of all telephone equipment and low voltage wiring.
 - (6) Furnishing of automatic temperature controls (except as noted on the drawings), and electric heaters.
 - (7) Coordinate with utility company as to provision, setting and connection of transformer.

4. CONDUIT AND FITTINGS

- (A) Materials
 - (1) Except as otherwise noted, specified, or required, provide all conductors in rigid conduit, intermediate metal conduit (IMC), electrical metallic tubing (EMT), flexible conduit or schedule 40 PVC complying with the standards of the latest edition of the National Electrical Code (NEC) and the requirements of local authorities. Rigid conduit, or EMT shall be of the best quality hot-dipped galvanized or sherardized steel tubing, and of standard trade dimensions, smooth inside and out. Each length of conduit shall bear the marker's trademark or stamp. All conduit shall be approved by the Underwriter's Laboratories (UL).
 - (2) Conduit fittings and conduits shall be zinc-coated, threaded type for rigid conduit or intermediate metal conduit, set-screw or compression type below slab for EMT or match the conduit for plastic.
 - (3) Conduits shall be as manufactured by Southwire Co., Wheatland Tube Co., Allied Tube, Johns-Manville, Carlon, Triangle, or Robroy; fittings: Southwire Co., Johns-Manville, Carlon, Steel City, Thomas & Betts, Robroy, or Appleton, except as otherwise noted.
- (B) Applications
 - (1) Rigid conduit or IMC shall be used for all feeders and sub-feeders where exposed to possible physical damage. EMT shall be permitted for feeders in protected areas.
 - (2) Conduit embedded in concrete, which is in contact with earth, and conduit installed outside building below grade shall be rigid steel conduit, or schedule 40 PVC. Conduit elsewhere shall be EMT unless specified or noted otherwise. Schedule 40 PVC shall have rigid steel elbows at all bends. PVC conduit above grade (inside or outside the building) is not acceptable.
 - (3) Secondary electrical service duct banks shall be concrete encased galvanized rigid steel conduit, IMC or schedule 40 PVC.

- (4) Conduit run above grade, outside the building, not under solid canopy or structure shall be rigid steel.
 - (5) All PVC rigid conduit, fittings and cement shall be produced by the same manufacturer. All joints shall be solvent welded in accordance with manufacturer's recommendations. All PVC conduit shall be schedule 40.
 - (6) Where non-metallic conduit is used, install green grounding conductor.
 - (7) Conduits installed in concrete or in direct contact with earth, or in areas subject to acid soils, high ground water, or other severely corrosive influences, shall be protected with anti-corrosive compounds, which are UL approved for that particular application.
 - (8) Flexible steel conduit may be used in making short flexible connections from outlet boxes to recessed lighting fixtures, or other equipment or light fixtures that are concealed behind partition walls with access doors. Flexible steel conduit shall be as short as possible but shall have a minimum length of 12".
- (C) Installation
- (1) Conduits shall be continuous from outlet to outlet, from outlet to cabinets, pull or junction boxes and shall be secured to all boxes with locknuts and bushings in such manner that each system shall be electrically continuous throughout.
 - (2) Where conduits enter or leave all outlet boxes, cabinets, safety switches, tap boxes, motor controllers, etc., other than those having threaded hubs, a standard locknut shall be used on the outside of the box, and a locknut and bushing used on the inside. Bushings shall be of an approved insulated type.
 - (3) Under no circumstances shall conduits or fitting be supported from or anchored to the roof deck.
 - (4) All conduits shall be fastened securely in place with approved straps and hangers in sufficient number to prevent movement of any part of the conduit. This includes conduit installed in forms before concrete is poured. Where exposed conduits are suspended, the hangers shall be Caddy (Erico), Gateway, or Grinnell, steel band, adjustable hangers with rod suspension, having nut fitted in malleable iron or steel inserts. Inserts for hanger rods shall be installed in the slabs, and all hangers shall be installed at not more than 9'-0" centers.
 - (5) All concealed conduits installed above suspended ceiling shall be run above bottom of joists, or otherwise coordinated with the HAC and PBC so as to allow room for running ducts and piping.
 - (6) Expansion fittings shall be provided at all conduits across a building expansion joint. Fittings shall be type "AX", "EX" or "TX" as made by O.Z. Electrical Company. Provide copper bonding jumper at each expansion fitting.
 - (7) All conduit shall be run at right angles to and/or parallel to floors, perimeter walls and steel joist.
 - (8) Connection to Motorized Equipment - Connection to motorized equipment shall be made with flexible conduits having sufficient slack between rigid conduit and motor terminal in order to minimize vibration transmission. No rigid conduit shall be anchored to equipment which is subject to vibration transmission. Fittings shall be of the metallic ferrule, compression type. Minimum length of flexible conduit shall be 18 inches. Flexible metal conduit shall be Anaconda "Sealtite".
 - (9) Open ends of conduits shall be capped with plastic cap or corked during roughing-in so as to prevent the accumulation of dust and moisture condensation in conduit.
 - (10) When rigid metal conduit is joined, all conduit joints shall be made up tight and no running threads will be permitted.

- (11) All conduit shall have powdered soapstone or wire pulling lubricant blown through them before pulling of wires or wires shall be lubricated with soapstone paste or wire pulling lubricant.
- (12) When metal conduit is installed in direct contact with the earth, use "hot dipped" galvanized type and coat the conduit and the joints with asphaltum.
- (13) Conduits in hazardous areas, as identified on the drawings, shall be installed with seal fittings between hazardous and non-hazardous areas in compliance with NEC Class 1 installation. All fittings, etc., shall be specifically approved by the Underwriter's Laboratories for use in such areas.
- (14) All exposed horizontal conduit runs in Sales Area shall be attached to the underside of the top chord of the bar joist.
- (15) All conduit in finished areas shall be concealed.
- (16) Conduit runs shall be installed to avoid proximity to hot water pipes. Conduit shall be kept a minimum of 3" from such pipes, except where crossings are unavoidable. In such instances the conduit shall be kept at least 1" from the covering of the pipe.
- (17) Where conduit is to remain empty, install polypropylene (or nylon) pull-line from end to end with tag at each end designating opposite terminus.
- (18) **Conduit serving roof mounted equipment shall be routed up through roof curb to avoid roof penetration. Conduit serving receptacles mounted on rooftop HVAC units shall also be routed through roof curbs. If equipment curb is not available for conduit penetration through roof, the contractor shall provide pipe curb as manufactured by Pate, RPS or Thycurb.**
- (19) Conduits emerging from PVC runs below slab or grade to a panel, switchboard, or other device shall be rigid steel.

5. WIRE AND CABLE

(A) Types

- (1) Unless otherwise noted or specified, all power wiring shall be NEC approved type for 600 volt and shall be UL listed.
- (2) All wire #8 AWG and larger shall be stranded copper. All wire #10 AWG and smaller shall be solid, unless otherwise specified.
- (3) All stranded conductors shall be furnished with copper connecting lugs drilled or reamed the full diameter of the bar conductors. Main and feeders shall be run their entire length in continuous pieces without joints or splices.
- (4) Conductors shall be continuous from outlet to outlet and from outlet to junction box or pull box. All splices and joints shall be carefully and securely made to be mechanically and electrically solid with pressure type connectors, "SCOTCHLOK" or approved equal. Tape shall be "Scotch" No. 33+ for indoor and No. 88 for outdoor or approved equal. Where connection is made to any terminal, copper terminal lugs shall be bolted or compression fitted to the conductors. Where multiple connections are made to the same terminal, individual lugs for each conductor shall be used.
- (5) Conductors shall have insulating rating complying with the following:

<u>Application</u>	<u>Type or Letter (NEC)</u>	<u>Max. Operating Temp. Deg. C</u>
Branch Circuits (No. 12 thru No. 10 AWG)	THHN OR THWN	60
Feeder Circuits	THHN THWN OR XHHW	75

(No. 8 AWG and larger)
 Branch Circuits THHN OR XHHW 90
 (within 3" of ballasts in fixtures)

Unless a circuit breaker, switch, contractor, motor starter, etc., is marked otherwise, circuit conductors connected to the terminals must not operate at more than a 60-degree C. ampacity for a breaker, switch, etc., rated 100 amps or less and must not operate at more than a 75 degree C. ampacity for a breaker, switch, etc., rated over 100 amps.

(B) Wire Sizes

- (1) Minimum wire size for branch circuits shall be #12 AWG except that home runs longer than 100 feet in actual wire length from panel to load shall be minimum #10 AWG.
- (2) Size of wires larger than #12 AWG shall be as specified on plans or riser diagram.

(C) Color Coding

- (1) All branch circuit wire shall be color coded as follows:

<u>Lines (Phase)</u>	<u>208Y/120 Volt</u>
A	Black
B	Red
C	Blue
Neutral	White
Grounding Wire	Green
Neutral (for I.G. circuit)	White with Yellow stripe
Isolated Ground Wire	Green with Yellow stripe

- (2) Feeder cables need not be color coded throughout the length but may instead be identified by colored tapes at each end corresponding to the colors scheduled above.
- (3) Wiring for auxiliary systems and control wires shall be color coded by means of colored stripes or tracers.

(D) Direct burial cable shall be unreeled into trench (not dragged) after all course stones have been removed from base of trench and sand fill laid down. Cables should be snaked slightly to allow for movement and settlement.

(E) Romex, and/or BX cables not permitted to be used in the facility.

(F) MC (Metal Clad) Cable: NEC standard, UL approved may be only used for wiring above suspended ceiling, behind partition walls, crawl spaces, etc., if allowable by the local jurisdiction. Minimum wire size conductor #12 AWG copper, including green insulated equipment ground, galvanized steel or aluminum interlocking cladding, sized in accordance with the NEC. Verify/confirm use of MC cable with Owner Representative prior to any work. Use of MC cable for other specific applications shall be approved by Owner only.

(G) Installation of SJ or SO cord will be allowed for vertical drops from sales ceiling space only, if acceptable by the local code authority. SJ/SO cord length shall be limited to the vertical drop only from the j-box into the luminaire or track fixture, be minimum #12 AWG, and installed in accordance with applicable NEC articles. All terminations at luminaire or track fixture shall be UL listed and labeled for the termination of SJ/SO cord with proper strain relief.

(H) Manufacturers - All wires and cables shall be the products of American, Southwire Co, General Cable, Okonite or General Electric Company.

6. OUTLET AND SWITCH BOXES

(A) All outlet and switch boxes shall be NEC approved type and shall be sized to provide ample space for wiring devices and conductors. Where the number of conductors and

connections exceeds NEC limitations, box extensions shall be used. All boxes shall be standard galvanized or sherardized sheet steel as manufactured by Steel City Electric Company or National Electrical Products Corporation.

- (B) All ceiling outlet boxes for exposed work, acoustical tile ceilings, and furred plaster ceilings shall be 4-inch octagonal, 2-1/8" deep. Provide plaster rings and/or fixture studs as required.
- (C) All boxes for concrete work shall be especially designed for this construction and shall be 3" deep for concrete thickness of 4" or more. Minimum concrete cover shall be 3/4".
- (D) Flush mounted wall outlets shall be 4-inch square boxes or gang boxes, 1-1/2" deep, and shall be provided with suitable extension rings and covers. Outlets shall be carefully aligned so that cover plates will be truly vertical and horizontal.
- (E) Exposed wall or column mounted outlet boxes for convenience receptacles and lighting switches shall be standard, single gang (minimum) utility conduit boxes.
- (F) All boxes shall be rigidly mounted and shall be equipped with suitable screw fastened covers. All raceways entering boxes shall be mechanically and electrically secure. Open knockouts or holes in boxes will not be tolerated but shall be plugged with suitable blanking devices. Boxes shall be cleared of all plaster, dirt, trash, etc. before the installation of any wiring devices and/or before the installation of cover plates.
- (G) All boxes for conduit system shall be installed flush with finished surface with allowable recess for adaptors so that coverplates may be pulled tight against the finished surface.
- (H) Outlet boxes or switch boxes in finished areas shall be mounted flush with wall surface.
- (I) All exposed boxes for conduit system in Sales Area shall be installed above bottom chord of the bar joist as close to the roof deck as possible, unless otherwise noted in plans.

7. TAP OR PULL BOXES

- (A) Pull boxes shall be constructed of code gauge, welded and galvanized sheet steel. Boxes shall be sized in accordance with NEC requirements, and shall be furnished without knockouts; holes for raceways shall be drilled on the job. Where necessary for boxes to be supported away from ceilings or beams, structural steel members shall be provided for supports.
- (B) Where weatherproof sheet steel boxes as called for, the ELC shall furnish and installed code gauge, welded and galvanized sheet steel boxes with cover and all flanges designed to resist the entrance of rainwater. Conduit entrances shall be made by means of threaded hubs mounted by continuous weld on the boxes before galvanizing. Boxes in or below grade or ground floor shall be cast type boxes.

8. WIREWAYS AND TROUGHS

- (A) Underwriters approved metal raceways shall be furnished and installed complete with necessary complement of fittings, connectors and accessory parts. Wireway shall be of the "lay-in" type without standard knockouts and with screw covers for full channel access as manufactured by Square D, Cutler Hammer, Hoffman or Columbia.
- (B) Wireways shall be securely supported by approved methods at 4 ft. intervals. Number of conductors per wireway shall conform to the latest NEC requirements.

9. WIRING DEVICES

- (A) General - All wiring devices shall be of the type indicated below. Color of devices shall be white.
- (B) Switches
 - (1) Toggle, single pole, Hubbell 1221-WHI.

- (2) Toggle, 3-way, Hubbell 1223-WHI.
 - (3) Pilot Light - Neon lights and red jewel, Hubbell 1221PLC.
 - (4) SPST, SPDT, DPST, & DPDT switches as required for special applications shall be of the corresponding model switches as specified above.
- (C) Convenience Outlets
- (1) Duplex Hubbell HBL5352W, 125 volt, NEMA 5-20R.
- (D) Special Purpose Outlets
- As scheduled on drawings.
- (E) Coverplates
- All coverplates in finished areas shall be white colored nylon unless otherwise noted in plans. Coverplates in unfinished areas shall be galvanized steel. Coverplates for outlets in mirrored walls shall be glass mirror type. Coverplates for outlets in simulated stone veneer walls, wood stained surfaces and brick walls shall be brown.
- (F) All wiring devices shall be as specified by Hubbell or equal by Arrow-Hart, Eagle, GE, Leviton, Pass & Seymour or Woodhead.

10. FUSES

- (A) When the feeders or equipment are to be protected with fusible devices, the fuses shall be furnished and installed by the ELC.
- (B) Type of fuses to be used shall comply with the following except as otherwise noted:
- (1) 601 Ampere and Above - Bussmann Type KRP-C, Class L (600V).
 - (2) 0 to 600A - Type LPN-RK (250V) or LPS-RK (600V) Class RK1, or Type LPJ (600V) Class J.
- (C) Ten percent (10%) or a minimum of three (3) spare fuses shall be supplied for each type and ampere rating used for this project. Fuses shall be placed on a fuse clip board or in a fuse box (Bussmann #SFC or equal) to be mounted at the main service panel as directed by Owner's Representative.
- (D) All fuses for the distribution system shall be of the same manufacturer to ensure selective coordination and shall be made by Bussmann Manufacturing Company, GEC-Alsthom, Gould-Shawmut or Littlefuse.

11. MAGNETIC MOTOR STARTERS AND COMBINATION SWITCH-STARTERS

- (A) Except as otherwise noted on the drawings, or specified herein, all magnetic motor starters and combination switch-starters shall be provided by the ELC. The ELC shall install all power wiring from the panel or disconnect switch, through the starter and including final connections at the motor.
- (B) Magnetic starters shall be made by Square D, ITE or Cutler Hammer.
- (1) Type - Full-voltage, non-reversing, across-the-line type, unless otherwise noted.
 - (2) Overload Relays - Three (3) overload protection on all 3-phase motors.
 - (3) Voltage of Holding Coils - Unless factory pre-wired for internal controls and interlock, all motor starters furnished by contractor shall have 120 volt or less holding coils with individual control transformer built within each starter.
- (C) Enclosure - Of the proper type for indoor, outdoor, hazardous, dust tight, watertight applications.

- (D) For accessory motor control devices see control diagrams on the drawings.
- (E) All starters shall be furnished with hand-off-auto control station and pilot light. If not indicated as being remote from the starter, control station and pilot light shall be furnished with starter, mounted in starter cover.
- (F) Fused and non-fused disconnect switches for combination switch-starters shall comply with specifications below.
- (G) Auxiliary contacts and devices required for interlock and temperature control work shall be provided by the ELC in accordance with the control requirements. Coordinate with HAC.

12. STARTER AND CONTROLLER PROTECTION

- (A) Starters or controllers, whether furnished with the equipment or by ELC, specifically requiring a certain type or size of overcurrent protection device shall be so furnished with such protection by the ELC.

13. PUSH BUTTON STATIONS

- (A) Push button stations for control of motors shall be heavy-duty industrial type in NEMA type 1 surface enclosure. Pilot lights shall be complete with suitable jewels and, where control voltage requires, shall be equipped with transformer. Push button stations shall be Square D, ITE or Cutler Hammer.
- (B) Push buttons shall be either momentary, maintained contact, or selector switch type as required. ELC shall verify with HAC for the proper type desired prior to installation for these push buttons.
- (C) Unless otherwise noted or specified, all push button stations shall be provided by the ELC.

14. FUSIBLE AND NON-FUSIBLE DISCONNECT SWITCHES

- (A) Unless otherwise indicated, all manual operating and disconnect switches for motors and power equipment installed for this project shall be furnished and installed by the ELC.
- (B) For single phase, 1 HP or smaller motor, use Square D ITE Class 2510, or Cutler Hammer 9101, manual motor switch with pilot light where indicated.
- (C) For motor load larger than 1 HP, use Square D, ITE or Cutler Hammer horsepower rated switch. Switches shall be heavy duty, industrial type in NEMA type 1 general purpose enclosure, except as otherwise noted or required. Cover shall be interlocked with mechanism to prevent opening unless switch is in "off" position. Switches exposed to weather shall be raintight type.
- (D) For power load other than motor load, use 15A, AC switch up to 1000 watts, and safety switch, thereafter, made by same manufacturer as in subparagraph (C).
- (E) Refer to control diagrams on the drawings for accessory devices and additional data.

15. DEVICE AND EQUIPMENT MOUNTING

- (A) Location of Outlets - Unless otherwise specifically dimensioned on the drawings, the location for lighting fixtures and outlets shown on drawings is only schematic. ELC shall exercise great care in locating the outlets during roughing-in period. When the locations of outlets are shown in the detailed drawings on architectural elevations and details, these shall be followed. Device locations in showroom/sales area to be confirmed with owner representative prior to installation. When in doubt, check with Owner's Representative for instructions prior to roughing-in.
- (B) Mounting
 - (1) Unless otherwise indicated, protective devices shall be mounted with top of power panel or enclosure 94 inches above finished floor, shall be properly aligned, and shall be adequately supported independently of the connecting raceways.

- (2) Flush mounted switch outlets shall be mounted 4'-0" above floor. Flush mounted receptacle shall be mounted 1'-6" above the finished floor except as otherwise indicated on drawings. Flush mounted telephone and computer outlets heights vary. Refer to drawings for exact mounting heights.
 - (3) RTU sensor J-boxes shall be mounted at 7'-0" above floor, 1'-0" off end of partitions. RTU duct smoke detector remote test switches shall be mounted at fire alarm panel in Electrical room.
 - (4) Motor controllers shall be mounted with centerline of operating lever 6'-6" maximum above floor.
 - (5) All devices or equipment mounted on steel columns shall be mounted on the column web (between flanges) for protection.
 - (6) Lighting and receptacle panelboards shall be mounted with center of panel 4'-6" above finished floor, except that topmost circuit operating handle shall not be more than 6'-6" above floor. Adjust as required.
 - (7) All wiring devices, electrical enclosures and panels in finished areas shall be flush mounted.
- (C) Perform following tests and inspections and prepare test reports:
- (1) Upon completion of the ground rod installation, the Electrical Contractor shall perform test by fall-of-potential method according to IEEE 81. Grounding resistance reading shall be taken before connection is made to the building cold water piping system. Ground resistance readings shall not be taken within forty-eight hours of rainfall and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other means of reducing natural ground resistance.
 - (2) If the resistance to ground exceeds 6 ohms, additional rods shall be driven and bonded together, until a reading of 6 ohms or less to ground is obtained. Submit directly to the Project Manager two (2) copies of each test report certified by the testing Technician and the Electrical Contractor.
- (D) All applicable codes, regulations, etc. shall take precedent over the above mounting heights in the event of a conflict. Mount per applicable requirements.
- (E) Access to and workspace around panels and equipment shall be in accordance with the latest edition of the NEC.

16. VIBRATION CONTROLS

- (A) General - It shall be the responsibility of the ELC to install all conduits and boxes avoiding direct contact with any piping or mechanical equipment which is the source of vibration or the cause of vibration transmission. Any installation by ELC which does not comply with this general principle shall be corrected at Contractor's expense.
- (B) Transformers
- (1) When connection is made with conduits and wires a minimum of 18 inches of flexible conduit shall be used.
 - (2) All floor-mounted transformers shall be supported on rubber-in-shear mounts capable of providing approximately 0.25 inch of static deflection when loaded.
 - (3) Small column or wall mounted power transformers shall be bolted to steel channels through rubber grommets.
- (C) Conduit Connection to Equipment
- (1) In general, all conduit connections to air conditioning, plumbing or building, or any rotating or oscillating equipment requiring electric motors, shall be made with

flexible conduits. All flexible conduits shall be Anaconda "Sealtite".

- (2) The length of flexible conduit required for each motor shall be based upon the requirements for a 360-degree loop in the conduit between the electrical motor and electrical box. When flexible conduit is not use, a neoprene or rubber bushing between the conduit and the electric motor to break the metal-to-metal contact shall be installed. A flexible ground strap shall be provided to complete the electrical ground where required.
- (D) Holes and Openings - Openings around conduits, wireways, etc., where walls or floors are pierced shall be wrapped with fiberglass insulation and shall be grouted on both sides of the opening. Grouting shall be made flush with finished surfaces.
- (E) Isolator Description and Manufacturers
 - (1) Type of Isolators
 - (a) To be used for isolation of transformers.

Molded neoprene units equipped with leveling bolts. Units shall be Mason Industries Type "ND", Amber Booth or Consolidated Kinetics Corporation sized for .35-inch static deflection.
 - (b) Type W - To be used for isolation of switchboards or control cabinets.

Loading of molded neoprene pads shall be limited to a static deflection of 0.03 to 0.06 inch. The area of pad shall be selected to match the load with manufacturer's recommended unit loading. An auxiliary steel plate may be required to distribute the load uniformly over the pad area.

17. EQUIPMENT, RACEWAY AND WIRING IDENTIFICATION

- (A) General - All interior exposed raceways, wiring and equipment shall be suitably identified by the ELC. The ELC shall provide access to and shall open boxes, etc., as required, at time of final inspection to satisfy Owner's Representative that the proper identification procedures for conductors, etc., have been adhered to.
- (B) Conductors
 - (1) All conductors on circuits 600 volts and below shall be color coded as specified hereinafter. Color coding shall be by means of colored insulating material, colored braid or jacket over the insulation, or by means of suitable colored permanent, non-aging, insulating tape equal to Scotch #471 to "Texcel 98" applied to conductors at each outlet, cabinet or junction point.
 - (2) Wire markers shall be applied to each conductor or cable within panelboards, motor starter enclosures, circuit breaker enclosures, disconnect switches, cabinets, junction boxes, pull boxes, and other similar equipment identifying the serving equipment and feeder or branch circuit from which the conductors originate.
- (C) Equipment
 - (1) The ELC shall furnish and install engraved laminated micarta nameplates for electrical equipment as specified hereinafter. Lettering shall be approximately 1/8 to 3/16 inch in size. Plates shall be black surface and white core to produce white letters. Where equipment is not suitable for mounting the nameplate thereon, by bolting or riveting, the Contractor shall furnish a No. 14 gauge steel plate, painted black, to which the nameplate shall be bolted or riveted and which shall be suitably fastened to the equipment or mounted immediately adjacent thereto.
 - (2) All push button stations, control switches, selector switches, motor controllers, air circuit breakers or safety switches, etc., shall be provided with nameplates as described in the previous paragraph. Such nameplates shall clearly identify by name the equipment controlled and shall state any special operating instructions which may be indicated on the drawings. All nameplate designations shall be

subject to the approval of Owner's Representative.

- (3) All switchboard equipment, factory-built control panels, breaker panels, etc., shall be equipped with suitable nameplates as specified under these individual headings.

18. TEST

- (A) Prior to the start-up of any systems, ELC shall carefully check all devices and manufacturer's instructions for the proper procedure of start-up.
- (B) Check service entrance voltages and inform electric utility of any over-voltage or under-voltage conditions. Check ground conditions and grounding resistance. Check system for proper phasing.
- (C) Balance all single-phase loads at panelboards. The total connected load on each leg of the panel shall not vary more than 10 percent. If they vary more than 10 percent, the branch circuit connections shall be redistributed at the panels by exchanging the circuit wires from the branch circuit protective devices until the above conditions are satisfied.
- (D) Replace all burned out lamps at the completion of work.
- (E) Check all auxiliary systems in accordance with manufacturers' instructions prior to operating in systems.
- (F) Make all necessary field adjustments and set all protective relays and devices in accordance with instructions provided by the Owner. Fully coordinate all external connections to the equipment with the equipment manufacturer.
- (G) ELC shall megger each motor winding before energizing the motor. The insulation resistance shall be recorded based on winding temperatures and voltage information furnished by Owner. ELC shall submit recorded insulation resistance and notify Owner of all motors with low insulation resistance in order that these motors may be replaced.
- (H) ELC shall perform such test as are required by utility on service entrance cables.

19. OPERATING TESTS

- (A) In addition to any other tests herein specified, the systems, after completion, shall be tested in operation for at least fifteen (15) days and shown to be in satisfactory operating condition.
- (B) Should any of the equipment or apparatus, furnished by the Contractor, require the service of a Factory Representative for installation or placing in proper service and/or adjustment, the Contractor shall provide same without additional cost to the Owner. Refer to Division 1 of these specifications.
- (C) The Contractor shall furnish to the Owner two (2) sets of instruction books and spare parts lists, bound in brochure form, covering each item of equipment furnished under the contract.

20. CLEANING

- (A) During construction, for all work furnished and/or installed under his contract, ELC shall clean and/or protect interiors of all equipment devices, raceways, etc., from dust, dirt, cuttings or other foreign matter before closing of finished work.

21. TEMPORARY LIGHT AND POWER

- (A) If required, the GC shall arrange with the utility company to provide a temporary construction service for temporary light and power. Location to be at the GC's field office remote from the building.
- (B) The GC shall furnish and install a temporary panel at the above location. Temporary light stringers with double pigtail sockets and temporary power stringers and outlets shall be installed by the ELC as required by the GC for the various trades.

- (C) The ELC shall lamp all sockets originally and shall maintain system during working of all trades. Subsequent lamping and fuses shall be furnished by the GC.
- (D) The GC shall pay for all energy consumed and any other charges by the Utility Company.
- (E) The ELC shall remove all temporary equipment and wiring when it is no longer required and when directed to do so by the GC.

22. PROTECTION AND INSTALLATION

- (A) All electrical equipment and materials stored on the site shall be suitably sheltered from the elements. All materials and items subject to moisture damage shall be stored in dry, heated spaces. All equipment shall be protected against dirt, water, and corrosive or mechanical damage and theft.
- (B) All electrical systems and equipment shall be stored, protected, installed, tested, adjusted and started up in strict accordance with the manufacturer's directions and instructions. Each Contractor shall promptly notify the Engineer of any conflict between any requirement of the Contract Documents and the manufacturer's instructions and shall receive the Engineer's written instructions before proceeding with the work. Any work that does not comply with the manufacturer's instructions or such written instructions from the Engineer shall be corrected by the Contractor at no increase in the contract amount of additional cost to other trades.
- (C) If the size of any conduit, conductor, switch, breaker, enclosure or related accessories or the location of any fixture or device is not clearly evident on the Drawings, the Contractor shall request clarification from the Engineer prior to proceeding with the work.
- (D) All electrical equipment shall be installed in a rigid and secure manner and shall be installed plumb, level, and square with the building, unless otherwise indicated on the drawings or specified herein.
- (E) All penetrations through fire rated walls, ceilings, floors, etc. shall be sealed with an approved material which is listed for the application and fire rating.

-END OF SECTION

DIVISION 16 – ELECTRICAL WORK1. GENERAL

- (A) This Section covers materials, methods and requirements common to all low voltage electrical work, excluding telephone, computer, and intercom paging wiring, devices and equipment, and HVAC control wiring.
- (B) All low voltage electrical work shall be governed by and subject to the provisions of this Section and all Sections of Division 1.
- (C) Refer to Section 00011 for requirements relating to Base Bid Products, Substitutions and Alternates.
- (D) The General Contractor shall be responsible for providing a copy of Division 1 specifications to each subcontractor and for coordinating the work accordingly.
- (E) Submittal data, shop drawings and samples:
 - (1) No review will be required for work covered by this specification section, except for Security and Fire Alarm Systems as specified in the drawings.

2. WORK INCLUDED

- (A) When separate permits are required for work specified on this section, Contractor shall apply for and secure such permits. Contractor shall prepare and produce or secure the services of others as required to cause the preparation and production of any required for the release of such permit and shall provide registered seals on such work when required to secure said permit
- (B) The work covered by this Section of the Specifications consists of providing all equipment, materials and labor, and performing all work as required for the complete execution of the Low Voltage Electrical Work as shown on the Drawings, herein specified, or both, and which without restricting the generality of the foregoing, shall include the following:
 - (1) General Requirements.
 - (2) Conduit, Boxes, Fittings, Supports, Pull-Lines, Bushings, etc. (where / when required).
 - (3) Wire and Cable for Security and Fire Alarm Systems only.
 - (4) Security and Fire Alarm Systems Devices and Equipment.

3. WORK SPECIFIED UNDER OTHER SECTIONS

- (A) The following items of work will be done in accordance with the appropriate Sections of the Specifications, by the Owner, or by the Utility Companies.
 - (1) Finished painting.
 - (2) Patching.
 - (3) Concrete work.
 - (4) Foundations.
 - (5) Furnishing and installing of all telephone, computer, and intercom paging equipment and wiring (by others).
 - (6) HVAC control wiring.
 - (7) TV/VCR, Audio/Video equipment (by others).

4. CONDUIT AND FITTINGS

- (A) Materials – In accordance with Section 16051 of these specifications.
- (B) Applications
 - (1) Where required by code, conduit for low voltage electrical systems shall be installed in accordance with the general requirements of Section 16050 or 16051 of these specifications.
- (C) Installation
 - (1) When utilized for low voltage electrical system installations, conduit shall be installed in accordance with the general requirements of Section 16050 or 16051 of these specifications.
 - (2) All conduit shall be run at right angles to and/or parallel to floors and walls.
 - (3) All conduit in finished areas shall be concealed.

5. WIRE AND CABLE

- (A) Types: Wire selected for low voltage electrical systems shall be appropriate for the intended use and approved by codes in force at the project location. All exposed wire and cable in open ceilings shall follow the building steel and be tied to building structure. Tie wraps shall be spaced not more than four (4) feet on center. When required by code, wire shall be plenum rated or installed in conduit.

6. OUTLET AND SWITCH BOXES

- (A) When required, all outlet and switch boxes shall be in accordance with drawings and Section 16050 or 16051 of this specification.

7. DEVICE AND EQUIPMENT MOUNTING

- (A) Unless otherwise specifically dimensioned on the drawings, the location for device and equipment outlets shown on drawings are only schematic. The Contractor shall exercise great care in locating the device and equipment outlets during roughing-in period. When the locations of device and equipment outlets are shown in the detailed drawings on architectural elevations and details, these shall be followed. All non-dimensioned outlet/devices in the showroom require Owner approval. When in doubt, check with Owner's Representative for instructions prior to roughing-in.
- (B) All applicable codes, regulations, etc. shall take precedent. Mount per applicable requirements.
- (C) Confirm all device and equipment mounting locations in the Sales Area review with Owner Representative prior to installation.
- (D) Provide Fire Alarm Control Panel, Annunciator Panel, Devices and Equipment (when required) as specified in the drawings – NO SUBSTITUTIONS.
- (E) Provide Security System Control Panel, Keypad, Devices and Equipment as specified in the drawings – NO SUBSTITUTIONS.

8. TEST

- (A) Prior to the start-up of any systems, the Contractor shall carefully check all devices and manufacturer's instructions for the proper procedure of start-up.
- (B) Check all auxiliary systems in accordance with manufacturers' instructions prior to operating systems.
- (C) Make all necessary field adjustments and or equipment manufacturer in accordance with instructions provided by the Owner. Fully coordinate all external connections to the equipment with the equipment manufacturer.

9. PROTECTION AND INSTALLATION

- (A) All low voltage electrical equipment and materials stored on the site shall be suitably sheltered from the elements. All materials and items subject to moisture damage shall be stored in dry, heated spaces. All equipment shall be protected against dirt, water, and corrosive or mechanical damage and theft.
- (B) All electrical systems and equipment shall be stored, protected, installed, tested, adjusted and started up in strict accordance with the manufacturer's directions and instructions. Each Contractor shall promptly notify CASCO or the Owner of any conflict between any requirement of the Contract Documents and the manufacturer's instructions and shall receive CASCO or the Owner's written instructions before proceeding with the work. Any work that does not comply with the manufacturer's instructions or such written instructions from CASCO or the Owner shall be corrected by the Contractor at no increase in the contract amount of additional cost to other trades.
- (C) All electrical equipment shall be installed in a rigid and secure manner and shall be installed plumb, level, and square with the building, unless otherwise indicated on the drawings or specified herein.
- (D) All penetrations through fire rated walls, ceilings, floors, etc. shall be sealed with an approved material which is listed for the application and fire rating.
- (E) When permitted to be exposed to view, low voltage electrical system wiring shall be: tied to the structure of the building with suitable permanent tie wraps spaced not more than four (4) feet on center; installed immediately adjacent to the roof or floor deck above the space being served (attached at the top of the structural support); routed along the support between points of change in direction; routed perpendicular to the supporting structure (not at angles with the structure) where changes in direction are required, and; installed in a manner demonstrating good workmanship.
- (F) When installed in concealed locations, low voltage electrical system wiring shall be: supported from the structure of the building (not by the suspended ceiling grid or other secondary portions of the building); tied to the supporting element as described above, and; installed above the bottom of supporting members so as to provide the maximum clearance in the concealed space for work of other trades.

10. FIRE ALARM SYSTEM

- (A) This section of the specification includes the provisions and installation of the Fire Alarm System. The Contractor shall include in his bid all moneys required to design, furnish and install a functional Fire Alarm system. The work covered by this Section of the Specification shall include all labor, equipment, materials and services to furnish and install a complete Fire Alarm System as described in the Drawings and Specifications.
- (B) The Contractor shall be licensed in the field of the Fire Alarm System installation meeting all local, state and national requirements.
- (C) The Contractor is responsible for contracting of the Fire Alarm System Supplier.
- (D) The Contractor will provide all materials and labor to install all System components. This installation will reflect the Fire Alarm System Supplier's approved shop drawings as much as practically possible.
- (E) The Contractor or Fire Alarm System Supplier shall contact CASCO or the Owner with any comments, exceptions, and/or reservations to the drawings and specification prior to bid. By not identifying any differences prior to bid, the Contractor is not entitled to any additional money.
- (F) All conduit, boxes, fittings, couplings, connectors, straps, supports, bushings, etc. shall be provided by the Contractor.
- (G) The Contractor shall provide line voltage (120V) and low-voltage circuiting in separate conduit as described in this section of the Specifications.

- (H) System operation, testing, turn over, warranty, compliance, and after market service shall be provide by the Contractor or Fire Alarm Supplier.
- (I) Any item that is identified during electrical walkthrough inspection must be corrected and the system must be fully operable prior to the date of the final building Certificate of Occupancy Inspection.
- (J) The Fire Alarm System Supplier shall submit through the Contractor, the Fire Alarm shop drawings to CASCO. The shop drawings shall provide the following as minimum:
 - (1) A complete Fire Alarm One Line Diagram indicating components, devices, conductors, conductor sizes, and end-of-line resistors.
 - (2) Scaled floor plans showing all device locations, interconnecting wiring, and device legend. All device locations require Owner approval prior to installation.
 - (3) Material lists and cut sheets describing all major System components and quantities to be supplied.
 - (4) Shop drawings and equipment submittals must reflect the above criteria as minimum. Incomplete submissions will be rejected.
- (K) Applicable Installation Codes and Standards:
 - (1) All equipment shall be UL listed for its intended use.
 - (2) NFPA Standards 72.
 - (3) The National Electric Code.
 - (4) All other applicable local and national codes/standards and authorities having jurisdiction.
 - (5) Americans with Disabilities Act Accessibilities Guidelines (ADA(AG)).
- (L) Related Documents:
 - (1) Secure permits and approvals prior to installation.
 - (2) Prior to commencement and after completion of work, notify Authorities Having Jurisdiction.
 - (3) Submit letter of approval for installation before requesting acceptance of system.
- (M) The Contractor shall coordinate work in this Section with all related trades. Work and/or equipment provided in other Sections and related to the Fire Alarm System shall include, but not be limited to:
 - (1) Sprinkler waterflow and supervisory switches shall be furnished and installed by the Fire Sprinkler Contractor. The Electrical Contractor is responsible for piping to an accessible junction box, wiring, providing a flexible raceway to the final termination at the device and final terminations.
 - (2) The Contractor shall be responsible for providing duct smoke detectors and all wiring to the detector and from the Fire Alarm System dry N.O. contacts (i.e. addressable control relay module) to respective HVAC unit fan motor starter control circuit terminations. The duct detector housing and sampling tube shall be installed by the Contractor.
 - (3) The Contractor shall connect Fire Alarm System to telephone line(s) as required. The Owner will provide required telephone line(s) to the equipment room.
- (N) Digital Alarm Communicator Transmitter

- (1) Provide an approved digital alarm communicator transmitter (DACT) to transmit general fire alarm, supervisory and trouble signals to an approved UL Listed Central Station. The DACT shall be UL listed for commercial fire reporting to an approved UL Listed Central Station and shall conform to the requirements of NFPA 72.
 - (2) The DACT shall operate from a dedicated 120-volt AC or 24 volt DC source with a listed secondary power source conforming to the same alarm/standby time requirements as the FACP.
 - (3) The DACT shall have the capability to supervise two (2) telephone lines, seize the phone line and send the signal on one or both lines without any additional equipment. The unit shall have the ability to test each telephone line by sending a test signal to the UL Listed Central Station on 24-hour intervals and report the loss of either phone line. The communicator shall be able to transmit all signals in the Standard SIA (Security Industry Association) format.
 - (4) **The primary means of transmission shall be wireless, utilizing a dual path commercial fire communicator, as specified in plans. The communicator shall have three selectable reporting paths including LTE cellular only, IP only, or IP primary with LTE cellular backup. The communicator shall be connected directly to the primary and secondary communication ports of the control panel digital alarm communicator transmitter (DACT).**
- (O) The Contractor/Fire Alarm System Supplier shall guarantee the system equipment for a period of one (1) year from date of final acceptance of the system. The Electrical Contractor shall guarantee all wiring and raceways to be free from inherent mechanical or electrical defects for one (1) year from date of final acceptance of the system. As-builts shall be submitted to Owner in warranty manual.

11. FIRE ALARM SYSTEM MONITORING

Fire Alarm System shall transmit to UL listed central station. The Installing Contractor is responsible for the monitoring of the Fire Alarm System for up to 60 calendar days after activation of the Fire Alarm System.

- (A) Contractor to provide to Rooms To Go the monitoring forms with the following information:
- (1) Monitoring company's name.
 - (2) Monitoring company's contact telephone numbers.
 - (3) Monitoring account number for this facility.
 - (4) Call list that includes the Store Manager and any other contact designated by Rooms To Go. Rooms To Go to provide the appropriate contact information to the contractor for completion of this form.
- (B) Provide a minimum of four (4) hours training for staff personnel, in the operation and use of the system.
- (C) The alarm contractor shall provide a professionally operated guard service / fire watch, if system is not complete prior to turnover, tested and approved by the Authority Having Jurisdiction. The guard service / fire watch shall be provided until such systems are found acceptable and approved by the Authority Having Jurisdiction. The alarm contractor shall be responsible for all costs incurred by not meeting these requirements.

-END OF SECTION-

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DIVISION 16 - ELECTRICAL WORK1. GENERAL

- (A) The work under this Section shall be governed by and subject to the provisions of the following:
Section 16051 BASIC MATERIALS, METHODS, AND REQUIREMENTS.
- (B) All work covered in this section of the specifications shall be the responsibility of the Electrical Contractor (ELC), with the exceptions of notations on the drawings.
- (C) Refer to Civil Drawing for site utilities, miscellaneous work and coordination with the exterior work of other contractors.
- (D) Contractor to provide select unit prices (See Section 00301 Proposal Form).

2. SYSTEM VOLTAGES

- (A) Incoming service and interior power distribution shall be 3 phase, 4 wire, 120/208 volts.
- (B) The majority of interior and exterior lighting shall be wired from 3 phase, 4 wire, 120/208 lighting panels.
- (C) The major HVAC equipment shall be wired 3-phase, 3 wire, 208 volts.
- (D) Convenience receptacles and miscellaneous lighting and power shall be wired 3 phase, 4 wire, 120/208 volts.
- (E) All signage shall be wired at 120 volts.
- (F) All controls shall be wired at 120 volts, or less.

3. ELECTRICAL SERVICE

- (A) Incoming service shall be fed from the Utility Company's transformer as shown on the drawings.
- (B) ELC shall coordinate with the Utility Company and Landlord any issues during construction.
- (C) All work shall comply with the rules and regulations of the Utility Company. ELC shall be responsible for all coordination with the Utility Company, if required.

4. GROUNDING

- (A) System Grounding - -- Existing to remain.
- (B) Transformers - Ground neutral of transformer secondary to nearest suitable grounding electrode as defined by the inspection authority and the NEC. Provide bonding jumper to connect the neutral of transformer secondary to metal case enclosure to the transformer.
- (C) Equipment (Static) Grounding
 - (1) The entire conduit network shall be electrically continuous throughout; use as the grounding system, except as otherwise specified, indicated on the drawings or required by Codes.
 - (2) Panel Boxes, Motor Frames, and other electrically operated equipment shall be grounded per Code requirements and in accordance with equipment manufacturer's instructions.
 - (3) Install a green grounding conductor inside all flexible conduit, EMT and PVC conduit connected to the equipment served and to the nearest outlet or junction box.
 - (4) All convenience receptacles shall be of the grounding type; ground to conduit network and grounding conductor.

- (D) Grounding Conductors - size per NEC and/or local code.
 - (E) Grounding of lighting fixtures - Incandescent lighting fixtures must be installed in accordance with the grounding requirements of the National Electric Code.
 - (F) Lighting poles shall be grounded per provided details in the drawings.
 - (G) Grounding system as required by the Telephone Company.
5. MAIN DISTRIBUTION PANEL (MDP)
- (A) The MDP shall be circuit breaker construction with characteristics as shown on the drawings.
 - (B) The MDP shall be dead front construction, fabricated from code gauge galvanized steel with medium gray baked enamel finish. All switch units shall be front connected, front accessible.
 - (C) The MDP shall have a permanent metal nameplate with the following information:
 - (1) Manufacturer and model number;
 - (2) Manufacturer's shop order number and date;
 - (3) Ampacity;
 - (4) System voltage;
 - (5) UL listing number.
 - (6) Service entrance label, if required.
6. PANELBOARDS
- (A) Lighting and receptacle Panels (A, B, C, etc.) - Type NQ by Square D, characteristics as scheduled on the drawings, with bolted type circuit breakers having an interrupting capacity of not less than 10,000 ampere RMS symmetrical, or as noted on the plans. All bus bars shall be copper or plated aluminum. Equal panels by Cutler-Hammer, Siemens, ITE, Westinghouse, or GE will be considered for approval.
 - (B) Lighting and receptacle panelboards shall be dead front construction with galvanized steel cabinets and steel front with beige baked-enamel finish. Doors shall have concealed hinges with locking self-catching latch, all keyed alike, and directory card holder on the inside. Single pole circuits shall be numbered per pole from the top, odd numbers on the left and even numbers on the right. Multiple pole circuits shall be numbered with the lowest pole position (e.g. a 3-pole breaker on poles 8, 10 and 12 would be circuit #8). Lock-on devices shall be furnished on all nightlight circuits, timer circuits and any other circuits so indicated on drawings.
 - (C) ELC shall fill in the directory card with a typewritten description of each circuit and install the directory in the panel behind a clear plastic cover. Two (2) copies of each panel directory shall be furnished to the Owner's Representative at the completion of the work.
 - (D) Each lighting and receptacle panelboard that is flush mounted shall be provided with three (3) one-inch empty conduits carried to a point above suspended ceiling and capped for future use.
7. ELECTRICAL WORK FOR PLUMBING AND FIRE PROTECTION
- (A) Electric Water Coolers: Furnish convenience outlet as indicated on drawings.
 - (B) Electric Hot Water Heaters: Wire units in accordance with manufacturer's wiring diagrams and recommendations; provide equipment grounding.

8. ELECTRICAL WORK FOR HVAC SYSTEMS

- (A) Provide electrical work as shown on the drawings for rooftop units, unit heaters, exhaust fans, etc.
- (B) Temperature control work shall be as indicated on the drawings. ELC shall refer to Division 15 for clarifications and coordination with HAC.

9. SURGE PROTECTION

- (A) Provide surge protection at main panel as shown on the drawings. Mount surge protector as close to main panel as possible to keep conductor length to a minimum. Surge protector at main panel shall be ASCO #460120YP20ACCE20, or Joslyn Model 1455-45, or Leviton 57120-7C3. No substitutions.

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END OF SECTION-

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DIVISION 16 - ELECTRICAL WORK1. GENERAL REQUIREMENTS

(A) Products

- (1) Luminaires shall be furnished by ELC except where designated otherwise on the luminaire schedule. ELC shall receive, unload, store, protect from damage, uncrate, and install all luminaires. ELC shall provide luminaires for temporary construction service lighting.
- (2) The luminaire schedule on the drawings includes type designation, lamp data, mounting, catalog number and special features required. The catalog numbers specified in the schedule are for identification of luminaire design only and do not necessarily describe the special or optional feature required. All special or optional features shall be provided as called for in the schedule or required for the application.
- (3) For uniformity in comparing bids, each Contractor's bid shall be based on the luminaires specified on the luminaire schedule. Equivalent luminaire by other manufacturers will be considered for approval only at the time of bidding. Refer to the General Requirements article regarding brands and substitutions.

(B) LED Luminaires

- (1) Luminaires shall be fully assembled and individually electrically tested prior to shipment. Each Luminaire shall consist of an assembly that utilizes LEDs as the light source. In addition, a complete luminaire shall consist of a housing, LED array, and electronic driver (power supply). Remote power supply where required will be shown on drawings.
- (2) Manufacturers of LED luminaires shall demonstrate a suitable testing program incorporating high heat, high humidity and thermal shock test regimens to ensure system reliability and to substantiate lifetime claims, LED Luminaires shall be tested and manufactured in accordance with latest performance and safety standards & guidelines applicable to Solid State Lighting (SSL), including ANSI, IESNA, NEMA & UL.
- (3) At time of manufacture, electrical and light technical properties shall be recorded for each luminaire. At a minimum, this should include lumen output, CCT, and CRI. Each luminaire shall utilize a unique serial numbering scheme. Technical properties must be made available for a minimum of 5 years after the date of manufacture. Luminaires shall be provided with a comprehensive 5-year warranty covering, LEDs, drivers, electronic connections, paint finish and mounting hardware.
- (4) Each luminaire shall be rated for a minimum operational life of 50,000 hours or greater. Reported lumen maintenance shall be greater than 70%, with no more than 10% failure per TM-21 after 50,000 hours of luminaire operation in an ambient environment from 15°C (59°F) to 40°C (104°F).
- (5) Luminaire shall be constructed such that LED modules may be replaced or repaired without replacement of whole luminaire.
- (6) Luminaire shall have a minimum efficacy of 110 lumens per watt, or as specified in plans. The luminaire shall not consume power in the off state. The luminaire shall have a power factor of 0.9 or greater and total harmonic distortion (current and voltage) induced into an AC power line by a luminaire shall not exceed 20 percent.
- (7) LED Drivers must meet Class A emission limits referred in Federal Communications Commission (FCC) Title 47, Subpart B, Section 15 regulations concerning the emission of electronic noise.

- (8) The thermal management (of the heat generated by the LEDs) shall be of sufficient capacity to assure proper operation of the luminaire over the expected useful life. The LED manufacturer's maximum thermal pad temperature for the expected life shall not be exceeded. Thermal management shall be passive by design. The use of fans or other mechanical devices shall not be allowed. The luminaire shall have a minimum heat sink surface such that LED manufacturer's maximum junction temperature is not exceeded at maximum rated ambient temperature.
- (C) Luminaire Installation
- (1) Luminaires shall be installed at mounting heights indicated and as detailed on the drawings and shall be complete with all lamps, fittings, accessories, etc., for a complete finished installation.
 - (2) Luminaires and/or luminaires outlet boxes shall be provided with hangers to adequately support the complete weight of the luminaire. Design of hangers and method of fastening other than shown on the drawings or herein specified shall be submitted to the Owner's Representative for approval. Neither luminaires nor conduit shall be supported from roof deck. ELC shall provide supplemental rigid structural members as required to span between roof framing members for support of luminaires and/or outlet boxes. Exposed Unistrut support in finished areas shall be solid.
 - (3) Luminaires mounted on outlet boxes shall be rigidly secured to a stud in the outlet box. Hickies or extension pieces shall be installed where required to facilitate proper installation.
 - (4) Pendant luminaires within the same room or area shall be installed plumb and at a uniform height from the finished floor. Adjustment of height shall be made during installation.
 - (5) Flush mounted recessed luminaires shall be installed so as to completely eliminate light leakage between the frame and the finished surface.
 - (6) Luminaire housing, frame or canopy shall provide a suitable cover for the luminaire outlet box or luminaire opening.
 - (7) Luminaires located on the exterior of the building shall be installed with nonferrous metal screws finished to match the fixtures.
 - (8) Surface mounted luminaires longer than two (2) feet shall have one (1) additional point of support besides the outlet box stud when installed individually.
 - (9) Luminaires designed for use in conjunction with the inverted T-bar ceiling suspension systems shall be of the lay-in type supported entirely by the T-bars and retained by suitable hold-down clips. Where required by seismic or other codes, ELC shall provide for luminaire a slack wire at each of two diagonal corners. When installing luminaires, the ELC shall notify the Ceiling Contractor should it appear that additional T-bar support will be required to prevent sag or damage.
- (D) Ballasts - All ballasts for fluorescent and high intensity discharge lamps shall be factory pre-wired and shall comply with the following minimum standards, unless otherwise noted on the drawings or specified in the schedule.
- (1) High power factor - minimum 90%.
 - (2) UL labeled and CBM certified.
 - (3) Class "P", with built-in automatically resetting thermal protector.
 - (4) Casing constructed with positive prevention of dripping compound.
 - (5) Lowest manufacturer's sound level and case temperature rise rating.
 - (6) Manufacturers: General Electric, Universal, Jefferson, Advance.

- (E) Lamps
 - (1) Lamps shall be furnished by ELC except where designated otherwise on the luminaire schedule. ELC shall receive, unload, store, protect from damage, uncrate, and install all lamps. ELC shall provide lamps for temporary construction service lighting.
 - (2) Install lamps at the time of luminaire installation, at the appropriate time when the building is enclosed for finishing work, or as otherwise directed by the Owner's Representative.
 - (3) Replace all burnt-out lamps, or nonfunctional drivers, engines and luminaires when the building, or any portion thereof, is turned over to the Owner for occupancy.
- (F) Concrete bases for exterior lighting standards, where indicated on the drawings, shall be provided in accordance with the technical provisions of Division 3 of these specifications.
- (G) ELC shall receive, store, secure, uncrate and install all Owner-furnished luminaires and lamps. Date and location of shipment of luminaires and lamps shall be coordinated with Owner Representative. When luminaires/lamps arrive at the job site or designated receiving location, the ELC will be responsible for the unloading and "checking-in" of all materials. Goods must be checked for damages and counts verified. All packing slips and related paperwork must be held for Owner Representative. In the event of damages or discrepancies, the Owner's Owner Representative must be notified at once. Do not sign for obvious damages - note them on bill of lading at time of delivery for missing or damaged items. Contractor will be responsible for all shortages and damages after date of arrival, no exceptions.
- (H) See drawings for Owner-furnished light track, heads, chandeliers, lamps and accessories.

2. LIGHTING CONTROLS

- (A) Exterior Lighting - Site lighting and exterior building lighting shall be wired through photocells (if applicable), timers, and lighting contactors as diagramed on the drawings for photocell or timer "on" and timer "off" control. Set timers as directed by the Owner's Representative.
- (B) Interior Lighting – Interior lighting shall be wired through contactors controlled by timers or specified controllers, or by occupancy or vacancy sensors. Provide manual switching or dimming controls as required. Refer to schedules and diagrams on the drawings. Set timers as directed by the Owner's Representative.

END OF SECTION

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