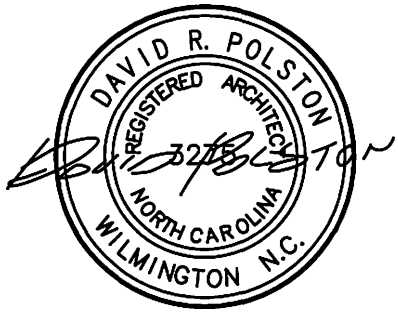
# PRUITTHEALTH
# FORSYTH COUNTY, L.L.C.

3560 Advantage Way
Winston–Salem, North Carolina

# 100 BED
# NURSING FACILITY

# SPECIFICATION MANUAL

## SEPTEMBER 28, 2026




**David R. Polston - Architect**
3806 Park Ave. Suite 2–L, Wilmington, NC 28403
Architecture Planning Design

PROJECT MANUAL

PRUITTHEALTH FORSYTH COUNTY, LLC
NEW 100 BED NURSING HOME
FORSYTH COUNTY

SEPTEMBER 28, 2026

**-ARCHITECT-**
DAVID R. POLSTON, ARCHITECT
3806 PARK AVENUE, SUITE 2L
WILMINGTON, NORTH CAROLINA 28403
(910) 350-8900

**-STRUCTURAL-**
ADRIAN L. CREECH, P.E.
4506 PEARCES ROAD
ZEBULON, NORTH CAROLINA 27597
(919) 817-7579

**-PLUMBING-**
JIM BENSON, P.E. PLUMBING ENGINEER
2246 YAUPON DRIVE
WILMINGTON, NORTH CAROLINA 28401
(910) 791-4000

**-MECHANICAL-**
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**-ELECTRICAL-**
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INVITATION FOR BIDS:

Sealed bids will be received by PruittHealth – Forsyth County, LLC in the conference room of David R. Polston, Architect, 3806 Park Avenue Suite C, Wilmington, North Carolina 28403 up until 2:00 P.M., October 27, 2026 for the construction of a 100 Bed Nursing Home in Winston Salem, North Carolina. Single prime bids for the complete construction of the project including general construction, site, plumbing, electrical, fire protection and HVAC systems will be taken only from the following general contractors:

John M. Campbell Company
102 Winchester Avenue
Monroe, North Carolina 28111
(704) 283-8191

Complete bidding documents may be examined at the following:

David R. Polston, Architect, 3806 Park Avenue, Suite C, Wilmington, N. C. 28403

Copies of the Contract Documents may be purchased from David R. Polston, Architect, 3806 Park Avenue, Suite C, Wilmington, N.C. 28403, upon payment of $500.00 for each set. **The purchase price is non-refundable.**

All bidders must hold all proper licenses to perform the work as required by the General Statutes of South Carolina and must comply with all other state and local regulations as necessary to complete the project.

A Performance Bond and a Laborers' and Materialmen's Bond for the full amount of the contract will be required.

Payments will be made on the basis of Ninety (90%) percent of the estimated payments until completion and acceptance of the work at which time complete payment will be made.

No bid may be withdrawn after the scheduled closing time for the receipt of bids for a period of 60 days.

The Owner reserves the right to reject all bids and to waive informalities. Contracts will be awarded as quickly as can be arranged.

1997 EDITION

# AIA DOCUMENT A701-1997

## *Instructions to Bidders*

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

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6 POST-BID INFORMATION

7 PERFORMANCE BOND AND PAYMENT BOND

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INSTRUCTIONS TO BIDDERS



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## ARTICLE 1 DEFINITIONS

1.1 Bidding Documents include the Bidding Requirements and the proposed Contract Documents. The Bidding Requirements consist of the Advertisement or Invitation to Bid, Instructions to Bidders, Supplementary Instructions to Bidders, the bid form, and other sample bidding and contract forms. The proposed Contract Documents consist of the form of Agreement between the Owner and Contractor, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications and all Addenda issued prior to execution of the Contract.

1.2 Definitions set forth in the General Conditions of the Contract for Construction, AIA Document A201, or in other Contract Documents are applicable to the Bidding Documents.

1.3 Addenda are written or graphic instruments issued by the Architect prior to the execution of the Contract which modify or interpret the Bidding Documents by additions, deletions, clarifications or corrections.

1.4 A Bid is a complete and properly executed proposal to do the Work for the sums stipulated therein, submitted in accordance with the Bidding Documents.

1.5 The Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents as the base, to which Work may be added or from which Work may be deleted for sums stated in Alternate Bids.

1.6 An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or deducted from the amount of the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted.

1.7 A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials, equipment or services or a portion of the Work as described in the Bidding Documents.

1.8 A Bidder is a person or entity who submits a Bid and who meets the requirements set forth in the Bidding Documents.

1.9 A Sub-bidder is a person or entity who submits a bid to a Bidder for materials, equipment or labor for a portion of the Work.

## ARTICLE 2 BIDDER'S REPRESENTATIONS

2.1 The Bidder by making a Bid represents that:

2.1.1 The Bidder has read and understands the Bidding Documents or Contract Documents, to the extent that such documentation relates to the Work for which the Bid is submitted, and for other portions of the Project, if any, being bid concurrently or presently under construction.

2.1.2 The Bid is made in compliance with the Bidding Documents.

2.1.3 The Bidder has visited the site, become familiar with local conditions under which the Work is to be performed and has correlated the Bidder's personal observations with the requirements of the proposed Contract Documents.

2.1.4 The Bid is based upon the materials, equipment and systems required by the Bidding Documents without exception.

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## ARTICLE 3 BIDDING DOCUMENTS

### 3.1 COPIES

3.1.1 Bidders may obtain complete sets of the Bidding Documents from the issuing office designated in the Advertisement or Invitation to Bid in the number and for the deposit sum, if any, stated therein. The deposit will be refunded to Bidders who submit a bona fide Bid and return the Bidding Documents in good condition within ten days after receipt of Bids. The cost of replacement of missing or damaged documents will be deducted from the deposit. A Bidder receiving a Contract award may retain the Bidding Documents and the Bidder's deposit will be refunded.

3.1.2 Bidding Documents will not be issued directly to Sub-bidders unless specifically offered in the Advertisement or Invitation to Bid, or in supplementary instructions to bidders.

3.1.3 Bidders shall use complete sets of Bidding Documents in preparing Bids; neither the Owner nor Architect assumes responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

3.1.4 The Owner and Architect may make copies of the Bidding Documents available on the above terms for the purpose of obtaining Bids on the Work. No license or grant of use is conferred by issuance of copies of the Bidding Documents.

### 3.2 INTERPRETATION OR CORRECTION OF BIDDING DOCUMENTS

3.2.1 The Bidder shall carefully study and compare the Bidding Documents with each other, and with other work being bid concurrently or presently under construction to the extent that it relates to the Work for which the Bid is submitted, shall examine the site and local conditions, and shall at once report to the Architect errors, inconsistencies or ambiguities discovered.

3.2.2 Bidders and Sub-bidders requiring clarification or interpretation of the Bidding Documents shall make a written request which shall reach the Architect at least seven days prior to the date for receipt of Bids.

3.2.3 Interpretations, corrections and changes of the Bidding Documents will be made by Addendum. Interpretations, corrections and changes of the Bidding Documents made in any other manner will not be binding, and Bidders shall not rely upon them.

### 3.3 SUBSTITUTIONS

3.3.1 The materials, products and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitutions.

3.3.2 No substitution will be considered prior to receipt of Bids unless written request for approval has been received by the Architect at least ten days prior to the date for receipt of Bids. Such requests shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitution including drawings, performance and test data, and other information necessary for an evaluation. A statement setting forth changes in other materials, equipment or other portions of the Work, including changes in the work of other contracts that incorporation of the proposed substitution would require, shall be included. The burden of proof of the merit of the proposed substitution is upon the proposer. The Architect's decision of approval or disapproval of a proposed substitution shall be final.

3.3.3 If the Architect approves a proposed substitution prior to receipt of Bids, such approval will be set forth in an Addendum. Bidders shall not rely upon approvals made in any other manner.

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3.3.4 No substitutions will be considered after the Contract award unless specifically provided for in the Contract Documents.

### 3.4 ADDENDA

3.4.1 Addenda will be transmitted to all who are known by the issuing office to have received a complete set of Bidding Documents.

3.4.2 Copies of Addenda will be made available for inspection wherever Bidding Documents are on file for that purpose.

3.4.3 Addenda will be issued no later than four days prior to the date for receipt of Bids except an Addendum withdrawing the request for Bids or one which includes postponement of the date for receipt of Bids.

3.4.4 Each Bidder shall ascertain prior to submitting a Bid that the Bidder has received all Addenda issued, and the Bidder shall acknowledge their receipt in the Bid.

## ARTICLE 4 BIDDING PROCEDURES

### 4.1 PREPARATION OF BIDS

4.1.1 Bids shall be submitted on the forms included with the Bidding Documents.

4.1.2 All blanks on the bid form shall be legibly executed in a non-erasable medium.

4.1.3 Sums shall be expressed in both words and figures. In case of discrepancy, the amount written in words shall govern.

4.1.4 Interlineations, alterations and erasures must be initialed by the signer of the Bid.

4.1.5 All requested Alternates shall be bid. If no change in the Base Bid is required, enter "No Change."

4.1.6 Where two or more Bids for designated portions of the Work have been requested, the Bidder may, without forfeiture of the bid security, state the Bidder's refusal to accept award of less than the combination of Bids stipulated by the Bidder. The Bidder shall make no additional stipulations on the bid form nor qualify the Bid in any other manner.

4.1.7 Each copy of the Bid shall state the legal name of the Bidder and the nature of legal form of the Bidder. The Bidder shall provide evidence of legal authority to perform within the jurisdiction of the Work. Each copy shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid by a corporation shall further give the state of incorporation and have the corporate seal affixed. A Bid submitted by an agent shall have a current power of attorney attached certifying the agent's authority to bind the Bidder.

### 4.2 BID SECURITY

4.2.1 Each Bid shall be accompanied by a bid security in the form and amount required if so stipulated in the Instructions to Bidders. The Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid and will, if required, furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Should the Bidder refuse to enter into such Contract or fail to furnish such bonds if required, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty. The amount of the bid security shall not be forfeited to the Owner in the event the Owner fails to comply with Paragraph 6.2.

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4.2.2 If a surety bond is required, it shall be written on AIA Document A310, Bid Bond, unless otherwise provided in the Bidding Documents, and the attorney-in-fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of the power of attorney.

4.2.3 The Owner will have the right to retain the bid security of Bidders to whom an award is being considered until either (a) the Contract has been executed and bonds, if required, have been furnished, or (b) the specified time has elapsed so that Bids may be withdrawn or (c) all Bids have been rejected.

### 4.3 SUBMISSION OF BIDS

4.3.1 All copies of the Bid, the bid security, if any, and any other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope. The envelope shall be addressed to the party receiving the Bids and shall be identified with the Project name, the Bidder's name and address and, if applicable, the designated portion of the Work for which the Bid is submitted. If the Bid is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "SEALED BID ENCLOSED" on the face thereof.

4.3.2 Bids shall be deposited at the designated location prior to the time and date for receipt of Bids. Bids received after the time and date for receipt of Bids will be returned unopened.

4.3.3 The Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids.

4.3.4 Oral, telephonic, telegraphic, facsimile or other electronically transmitted bids will not be considered.

### 4.4 MODIFICATION OR WITHDRAWAL OF BID

4.4.1 A Bid may not be modified, withdrawn or canceled by the Bidder during the stipulated time period following the time and date designated for the receipt of Bids, and each Bidder so agrees in submitting a Bid.

4.4.2 Prior to the time and date designated for receipt of Bids, a Bid submitted may be modified or withdrawn by notice to the party receiving Bids at the place designated for receipt of Bids. Such notice shall be in writing over the signature of the Bidder. Written confirmation over the signature of the Bidder shall be received, and date- and time-stamped by the receiving party on or before the date and time set for receipt of Bids. A change shall be so worded as not to reveal the amount of the original Bid.

4.4.3 Withdrawn Bids may be resubmitted up to the date and time designated for the receipt of Bids provided that they are then fully in conformance with these Instructions to Bidders.

4.4.4 Bid security, if required, shall be in an amount sufficient for the Bid as resubmitted.

## ARTICLE 5 CONSIDERATION OF BIDS

### 5.1 OPENING OF BIDS

At the discretion of the Owner, if stipulated in the Advertisement or Invitation to Bid, the properly identified Bids received on time will be publicly opened and will be read aloud. An abstract of the Bids may be made available to Bidders.

### 5.2 REJECTION OF BIDS

The Owner shall have the right to reject any or all Bids. A Bid not accompanied by a required bid security or by other data required by the Bidding Documents, or a Bid which is in any way incomplete or irregular is subject to rejection.

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### 5.3 ACCEPTANCE OF BID (AWARD)

**5.3.1** It is the intent of the Owner to award a Contract to the lowest qualified Bidder provided the Bid has been submitted in accordance with the requirements of the Bidding Documents and does not exceed the funds available. The Owner shall have the right to waive informalities and irregularities in a Bid received and to accept the Bid which, in the Owner's judgment, is in the Owner's own best interests.

**5.3.2** The Owner shall have the right to accept Alternates in any order or combination, unless otherwise specifically provided in the Bidding Documents, and to determine the low Bidder on the basis of the sum of the Base Bid and Alternates accepted.

## ARTICLE 6 POST-BID INFORMATION

### 6.1 CONTRACTOR'S QUALIFICATION STATEMENT

Bidders to whom award of a Contract is under consideration shall submit to the Architect, upon request, a properly executed AIA Document A305, Contractor's Qualification Statement, unless such a Statement has been previously required and submitted as a prerequisite to the issuance of Bidding Documents.

### 6.2 OWNER'S FINANCIAL CAPABILITY

The Owner shall, at the request of the Bidder to whom award of a Contract is under consideration and no later than seven days prior to the expiration of the time for withdrawal of bids, furnish to the Bidder reasonable evidence that financial arrangements have been made to fulfill the Owner's obligations under the Contract. Unless such reasonable evidence is furnished, the Bidder will not be required to execute the Agreement between the Owner and Contractor.

### 6.3 SUBMITTALS

**6.3.1** The Bidder shall, as soon as practicable or as stipulated in the Bidding Documents, after notification of selection for the award of a Contract, furnish to the Owner through the Architect in writing:

.1 a designation of the Work to be performed with the Bidder's own forces;

.2 names of the manufacturers, products, and the suppliers of principal items or systems of materials and equipment proposed for the Work; and

.3 names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.

**6.3.2** The Bidder will be required to establish to the satisfaction of the Architect and Owner the reliability and responsibility of the persons or entities proposed to furnish and perform the Work described in the Bidding Documents.

**6.3.3** Prior to the execution of the Contract, the Architect will notify the Bidder in writing if either the Owner or Architect, after due investigation, has reasonable objection to a person or entity proposed by the Bidder. If the Owner or Architect has reasonable objection to a proposed person or entity, the Bidder may, at the Bidder's option, (1) withdraw the Bid or (2) submit an acceptable substitute person or entity with an adjustment in the Base Bid or Alternate Bid to cover the difference in cost occasioned by such substitution. The Owner may accept the adjusted bid price or disqualify the Bidder. In the event of either withdrawal or disqualification, bid security will not be forfeited.

**6.3.4** Persons and entities proposed by the Bidder and to whom the Owner and Architect have made no reasonable objection must be used on the Work for which they were proposed and shall not be changed except with the written consent of the Owner and Architect.

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## ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND

### 7.1 BOND REQUIREMENTS

7.1.1 If stipulated in the Bidding Documents, the Bidder shall furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Bonds may be secured through the Bidder's usual sources.

7.1.2 If the furnishing of such bonds is stipulated in the Bidding Documents, the cost shall be included in the Bid. If the furnishing of such bonds is required after receipt of bids and before execution of the Contract, the cost of such bonds shall be added to the Bid in determining the Contract Sum.

7.1.3 If the Owner requires that bonds be secured from other than the Bidder's usual sources, changes in cost will be adjusted as provided in the Contract Documents.

### 7.2 TIME OF DELIVERY AND FORM OF BONDS

7.2.1 The Bidder shall deliver the required bonds to the Owner not later than three days following the date of execution of the Contract. If the Work is to be commenced prior thereto in response to a letter of intent, the Bidder shall, prior to commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished and delivered in accordance with this Subparagraph 7.2.1.

7.2.2 Unless otherwise provided, the bonds shall be written on AIA Document A312, Performance Bond and Payment Bond. Both bonds shall be written in the amount of the Contract Sum.

7.2.3 The bonds shall be dated on or after the date of the Contract.

7.2.4 The Bidder shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the power of attorney.

## ARTICLE 8 FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

Unless otherwise required in the Bidding Documents, the Agreement for the Work will be written on AIA Document A101, Standard Form of Agreement Between Owner and Contractor Where the Basis of Payment Is a Stipulated Sum.

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SUPPLEMENTARY INSTRUCTIONS TO BIDDERS
GENERAL

A. The Instructions to Bidders are as provided by the American Institute of Architects Standard Document A701, May 1997 Edition, 8 Articles, 8 pages, a copy of which is bound herein.

B. These Supplementary Instructions to Bidders contain changes and additions to the AIA Instructions to Bidders. Where any article therein is supplemented or amended, unaltered provisions of such article shall remain in effect. Supplemental provisions shall be considered as added thereto. Provisions of articles not specifically amended where amendments are noted shall remain effective. In any case of conflict between Standard Document A701 and Supplementary Instructions to Bidders and Standard Documents A701 as amended, then the Supplementary Instructions to Bidders shall prevail.

C. ARTICLE 4 BIDDING PROCEDURES

(add) "4.3.5 A bid security of not less than five percent of the proposal is required. The bid deposit may be in the form of cash, cashier's check, certified check or a bid bond by a surety licensed in North Carolina. Cashier's check, certified check or bid bond shall be payable to PruittHealth – Forsyth County, LLC."

(add) "4.3.6 Bids must be enclosed in a sealed opaque envelope. The bidder's name must be designated on the outside of the sealed envelope along with the bidder's contractor license number."

(add) 4.3.7 All Bidders submitting a bid must identify on the bid form the subcontractors and their registration numbers for the plumbing, HVAC, fire protection and electrical trades which are part of the bid."

D. ARTICLE 5 CONSIDERATION OF BIDS

(add) "5.1.2 Opening of bids will be a private opening by the owner."

E. ARTICLE 7 PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND

(add) "7.1.4 Each Contractor is required, as a condition precedent to the execution of the Contract, to furnish bond in a penal sum of one hundred percent (100%) of the total amount payable by the terms of the Contract. Bonds shall be executed on an AIA approved form or an AIA Standard Form A311, 2 Part, Performance Bond and Labor & Material Payment Bond with amounts shown on each part equal to Contract. Surety company shall be licensed to do business in North Carolina. The Contractor shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix

thereto a certified and current copy of his Power of Attorney indicating the monetary limit, if any, of such power. Performance and Payment Bonds, if any, as required by Contractor from his subcontractors, are at the expense of the Contractor. Contractor shall deliver the required bonds to the Architect for conveyance to the Owner not later than the date of execution of the Contract or if the work is commenced prior thereto in response to a Notice to Proceed, submit evidence satisfactory to the owner that such bonds will be issued."

F. ARTLCLE 8 FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

(add) "8.1.2 Form of Agreement between Owner and Contractor shall be AIA Document A101, Standard Form of Agreement Between Owner and Contractor, 1997-Edition."

PRUITTHEALTH – FORSYTH COUNTY, LLC
100 BED NURSING HOME
WINSTON SALEM, NORTH CAROLINA

# BID FORM

_____

(Company Name)

To: PruittHealth – Forsyth County, LLC
Winston Salem, North Carolina

Gentlemen:

Base Bid:

The undersigned Bidder, having examined carefully, accepts and agrees to the Site, the requirements of the Invitation to Bidders, the Instructions to Bidders, Conditions of the Contract, the Drawings, the Specifications, the Supplementary Documents, the Subsequent Addenda (as acknowledged herein) for the construction of a 100 Bed Nursing Home in Winston Salem, North Carolina as prepared by David R. Polston, Architect hereby proposes to furnish all labor, materials, equipment, and services necessary to perform the work required in the aforementioned documents for the sum of :

Single Prime Base Bid for all trades (General, Site, Plumbing, Electrical, HVAC and Fire Protection)._____
_____
_____
_____ Dollars.
($_____)

Bidders must identify the subcontractors and their registration numbers for the plumbing, HVAC, fire protection and electrical trades which are part of the bid.

| Trade | Subcontractor | Registration Number |
|---|---|---|
| Plumbing | _____ | _____ |
| HVAC | _____ | _____ |
| Electrical | _____ | _____ |
| Fire Protection | _____ | _____ |

A. Contractors to identify their cost for a performance and payment bond: (cost of performance and payment bond to be included in Contractor's Base Bid).

Surety Name:_____ Cost of Bond: _____

B. ALLOWANCES: The Contractor shall include allowances listed in Section 010300. The Contractor shall include all labor necessary for installation of allowance items within his Base Bid and is not a part of the allowance for purchase. The actual cost of purchase of material and sales tax will be adjusted against the allowance amount to either add to or deduct from the contract amount.

C. TIME OF COMPLETION: If notified of acceptance of this proposal and contract award within thirty calendar days after receipt of bids, the undersigned agrees to execute a contract for the above-named project work and the above-stated consideration on the form required within fifteen (15) calendar days of such notification; to commence the work as soon as practical; and to complete the Base Bid Contract within 485 calendar days from the date of a written "Notice to Proceed" issued by the Owner. The undersigned hereby certifies that the office address stated in this proposal is the address to which a Notice of Award of this construction contract may be delivered.

D. LIQUIDATED DAMAGES: The Construction shall be completed within the Number of Construction Days given by the Contract. In the event the Contractor is unable to Substantially complete the required Construction within the prescribed time requirement, Contractor agrees to pay Owner one thousand dollars ($1,000.00) per day until such time that substantial completion has been achieved.

E. ACKNOWLEDGMENT/SIGNATURE BLOCKS:
Date: _____

Signed: _____

Bidder's Name (Printed): _____

Contractor's Registration No.: _____

Bidder's Business Name: _____

If a Corporation, Legal Nam: _____

Legal Signature & Title of
Corporation Authorizing Agent: _____

F. RECEIPT OF ADDENDA ACKNOWLEDGMENT: Receipt of the following Addenda to the Specifications and/or Drawings is hereby acknowledged and any costs of labor and materials required by same is included:

Addendum No. _____ Dated _____

Addendum No. _____ Dated _____

Addendum No. _____ Dated _____

Addendum No. _____ Dated _____

1997 EDITION

# AIA DOCUMENT A201-1997

## *General Conditions of the Contract for Construction*

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

This document has been approved and endorsed by The Associated General Contractors of America.

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## ARTICLE 1 GENERAL PROVISIONS

### 1.1 BASIC DEFINITIONS

#### 1.1.1 THE CONTRACT DOCUMENTS

The Contract Documents consist of the Agreement between Owner and Contractor (hereinafter the Agreement), Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. 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 Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include other documents such as bidding requirements (advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor's bid or portions of Addenda relating to bidding requirements).

#### 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 Architect and Contractor, (2) between the Owner and a Subcontractor or Sub-subcontractor, (3) between the Owner and Architect or (4) between any persons or entities other than the Owner and 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 to fulfill the Contractor's obligations. 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 or 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 THE PROJECT MANUAL

The Project Manual is a volume assembled for the Work which may include the bidding requirements, sample forms, Conditions of the Contract and Specifications.

### 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



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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.

**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 which have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

### 1.3 CAPITALIZATION

**1.3.1** Terms capitalized in these General Conditions include those which are (1) specifically defined, (2) the titles of numbered articles and identified references to Paragraphs, Subparagraphs and Clauses in the document or (3) the titles of other documents published by the American Institute of Architects.

### 1.4 INTERPRETATION

**1.4.1** 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 EXECUTION OF CONTRACT DOCUMENTS

**1.5.1** The Contract Documents shall be signed by the Owner and Contractor. If either the Owner or Contractor or both do not sign all the Contract Documents, the Architect shall identify such unsigned Documents upon request.

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

### 1.6 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE

**1.6.1** The Drawings, Specifications and other documents, including those in electronic form, prepared by the Architect and the Architect's consultants are Instruments of Service through which the Work to be executed by the Contractor is described. The Contractor may retain one record set. Neither the Contractor nor any Subcontractor, Sub-subcontractor or material or equipment supplier shall own or claim a copyright in the Drawings, Specifications and other documents prepared by the Architect or the Architect's consultants, and unless otherwise indicated the Architect and the Architect's consultants shall be deemed the authors of them and will retain all common law, statutory and other reserved rights, in addition to the copyrights. All copies of Instruments of Service, except the Contractor's record set, shall be returned or suitably accounted for to the Architect, on request, upon completion of the Work. The Drawings, Specifications and other documents prepared by the Architect and the Architect's consultants, and copies thereof furnished to the Contractor, are for use solely with respect to this Project. They are not to be used by the Contractor or any Subcontractor, Sub-subcontractor or material or equipment supplier on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect's consultants. The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce applicable portions of the Drawings, Specifications and other documents prepared by the Architect and the Architect's consultants appropriate to and for use in

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the execution of their Work under the Contract Documents. All copies made under this authorization shall bear the statutory copyright notice, if any, shown on the Drawings, Specifications and other documents prepared by the Architect and the Architect's consultants. 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' copyrights or other reserved rights.

## 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 Subparagraph 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** The Owner shall, at the written request of the Contractor, prior to commencement of the Work and thereafter, furnish to the Contractor reasonable evidence that financial arrangements have been made to fulfill the Owner's obligations under the Contract. Furnishing of such evidence shall be a condition precedent to commencement or continuation of the Work. After such evidence has been furnished, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

**2.2.2** Except for permits and fees, including those required under Subparagraph 3.7.1, which are the responsibility of the Contractor under the Contract Documents, 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.

**2.2.4** Information or services required of the Owner by the Contract Documents shall be furnished by the Owner with reasonable promptness. Any other information or services relevant to the Contractor's performance of the Work under the Owner's control shall be furnished by the Owner after receipt from the Contractor of a written request for such information or services.

**2.2.5** Unless otherwise provided in the Contract Documents, the Contractor will be furnished, free of charge, such copies of Drawings and Project Manuals as are reasonably necessary for execution of the Work.

### 2.3 OWNER'S RIGHT TO STOP THE WORK

**2.3.1** If the Contractor fails to correct Work which is not in accordance with the requirements of the Contract Documents as required by Paragraph 12.2 or persistently fails to carry out Work in

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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 Subparagraph 6.1.3.

### 2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

**2.4.1** If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a seven-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may after such seven-day period give the Contractor a second written notice to correct such deficiencies within a three-day period. If the Contractor within such three-day period after receipt of such second notice fails to commence and continue to correct any deficiencies, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. 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, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect or failure. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

## 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 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 Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons other than the Contractor.

### 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

**3.2.1** Since the Contract Documents are complementary, before starting each portion of the Work, the Contractor shall carefully study and compare the various Drawings and other Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Subparagraph 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 construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, any errors, inconsistencies or omissions discovered by the Contractor shall be reported promptly to the Architect as a request for information in such form as the Architect may require.

**3.2.2** Any design errors or omissions noted by the Contractor during this review shall be reported promptly to the Architect, but 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. The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, building codes, and rules and regulations, but any nonconformity discovered by or made known to the Contractor shall be reported promptly to the Architect.



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**3.2.3** If the Contractor believes that additional cost or time is involved because of clarifications or instructions issued by the Architect in response to the Contractor's notices or requests for information pursuant to Subparagraphs 3.2.1 and 3.2.2, the Contractor shall make Claims as provided in Subparagraphs 4.3.6 and 4.3.7. If the Contractor fails to perform the obligations of Subparagraphs 3.2.1 and 3.2.2, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. The Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents or for differences between field measurements or conditions and the Contract Documents unless the Contractor recognized such error, inconsistency, omission or difference and knowingly failed to report it to the Architect.

### 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 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 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 resulting loss or damage.

**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.

**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** The Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order.

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

### 3.5 WARRANTY

**3.5.1** The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted by the Contract Documents, that the Work will be free from defects not inherent in the quality required or permitted, and that the Work will conform to the requirements of the Contract



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Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, modifications not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

### 3.6 TAXES

**3.6.1** The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor which 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 AND NOTICES

**3.7.1** Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit and other permits and governmental fees, licenses and inspections necessary for proper execution and completion of the Work which are customarily secured after execution of the Contract and which are legally required when bids are received or negotiations concluded.

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

**3.7.3** It is not the Contractor's responsibility to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, building codes, and rules and regulations. However, if the Contractor observes that portions of the Contract Documents are at variance therewith, the Contractor shall promptly notify the Architect and Owner in writing, and necessary changes shall be accomplished by appropriate Modification.

**3.7.4** If the Contractor performs Work knowing it to be contrary to laws, statutes, ordinances, building codes, and rules and regulations without such notice to the Architect and Owner, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

### 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;

.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 Clause 3.8.2.1 and (2) changes in Contractor's costs under Clause 3.8.2.2.

**3.8.3** Materials and equipment under an allowance shall be selected by the Owner in sufficient time to avoid delay in the Work.

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### 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. Important communications shall be confirmed in writing. Other communications shall be similarly confirmed on written request in each case.

### 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

**3.10.1** The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, 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 and keep current, for the Architect's approval, a schedule of submittals which is coordinated with the Contractor's construction schedule and allows the Architect reasonable time to review submittals.

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

### 3.11 DOCUMENTS AND SAMPLES AT THE SITE

**3.11.1** The Contractor shall maintain at the site for the Owner one record copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to record field changes and selections made during construction, and one record 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 Architect for submittal to the Owner upon completion of the Work.

### 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 which 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. The purpose of their submittal is to demonstrate for those portions of the Work for which submittals are required by the Contract Documents the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents. Review by the Architect is subject to the limitations of Subparagraph 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 which 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

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the Contract Documents 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. Submittals which are not marked as reviewed for compliance with the Contract Documents and approved by the Contractor may be returned by the Architect without action.

**3.12.6** By approving and submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents that the Contractor has determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and has 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 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 Architect's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the 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 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 Architect on previous submittals. In the absence of such written notice the 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 which 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. The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed 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 Subparagraph 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 or design criteria required by the Contract Documents.

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### 3.13 USE OF SITE

**3.13.1** The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits 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.

**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 from and about the Project waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials.

**3.15.2** If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the cost thereof shall be charged to the Contractor.

### 3.16 ACCESS TO WORK

**3.16.1** The Contractor shall provide the Owner and Architect access to the Work in preparation and progress wherever located.

### 3.17 ROYALTIES, PATENTS AND COPYRIGHTS

**3.17.1** The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner or Architect. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a copyright or a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Architect.

### 3.18 INDEMNIFICATION

**3.18.1** To the fullest extent permitted by law and to the extent claims, damages, losses or expenses are not covered by Project Management Protective Liability insurance purchased by the Contractor in accordance with Paragraph 11.3, 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, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), 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

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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 Paragraph 3.18.

**3.18.2** In claims against any person or entity indemnified under this Paragraph 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 Subparagraph 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.

## ARTICLE 4 ADMINISTRATION OF THE CONTRACT

### 4.1 ARCHITECT

**4.1.1** The Architect is the person lawfully licensed to practice architecture or an entity lawfully practicing architecture identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term "Architect" means the Architect or the Architect's authorized representative.

**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, Contractor and Architect. Consent shall not be unreasonably withheld.

**4.1.3** If the employment of the Architect is terminated, the Owner shall employ a new Architect against whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the former Architect.

### 4.2 ARCHITECT'S ADMINISTRATION OF THE CONTRACT

**4.2.1** The Architect will provide administration of the Contract as described in the Contract Documents, and will be an Owner's representative (1) during construction, (2) until final payment is due and (3) with the Owner's concurrence, from time to time during the one-year period for correction of Work described in Paragraph 12.2. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents, unless otherwise modified in writing in accordance with other provisions of the Contract.

**4.2.2** The Architect, as a representative of the Owner, will visit the site at intervals appropriate to the stage of the Contractor's operations (1) to become generally familiar with and to keep the Owner informed about the progress and quality of the portion of the Work completed, (2) to endeavor to guard the Owner against defects and deficiencies in the Work, and (3) to determine in general if the Work is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will neither have control over or charge of, nor be responsible 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 Subparagraph 3.3.1.

**4.2.3** The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The 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.

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**4.2.4** Communications Facilitating Contract Administration. Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Architect about matters arising out of or relating to the Contract. 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 Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

**4.2.6** The Architect will have authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Subparagraphs 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed. However, neither this authority of the 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 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 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 Architect's action will be taken with such reasonable promptness as to cause no delay in the Work or in the activities of the Owner, Contractor or separate contractors, while allowing sufficient time in the Architect's professional 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 Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Paragraphs 3.3, 3.5 and 3.12. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences or procedures. The 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 Architect will prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in Paragraph 7.4.

**4.2.9** The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion, will receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor, and will issue a final Certificate for Payment upon compliance with the requirements of the Contract Documents.

**4.2.10** If the Owner and Architect agree, the Architect will provide one or more project representatives to assist in carrying out the Architect's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

**4.2.11** The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor.

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The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If no agreement is made concerning the time within which interpretations required of the Architect shall be furnished in compliance with this Paragraph 4.2, then delay shall not be recognized on account of failure by the Architect to furnish such interpretations until 15 days after written request is made for them.

**4.2.12** Interpretations and decisions of the Architect 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 initial decisions, the Architect 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 so rendered in good faith.

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

### 4.3 CLAIMS AND DISPUTES

**4.3.1** Definition. A Claim is a demand or assertion by one of the parties seeking, as a matter of right, adjustment or interpretation of Contract terms, payment of money, extension of time 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. Claims must be initiated by written notice. The responsibility to substantiate Claims shall rest with the party making the Claim.

**4.3.2** Time Limits on Claims. 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. Claims must be initiated by written notice to the Architect and the other party.

**4.3.3** Continuing Contract Performance. Pending final resolution of a Claim except as otherwise agreed in writing or as provided in Subparagraph 9.7.1 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.

**4.3.4** Claims for Concealed or Unknown Conditions. If conditions are encountered at the site which are (1) subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, which 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, then notice by the observing party shall be given to the other party promptly before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if 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 recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect 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 Architect shall so notify the Owner and Contractor in writing, stating the reasons. Claims by either party in opposition to such determination must be made within 21 days after the Architect has given notice of the decision. If the conditions encountered are materially different, the Contract Sum and Contract Time shall be equitably adjusted, but if the Owner and Contractor cannot agree on an adjustment in the Contract Sum or Contract Time, the adjustment shall be referred to the Architect for initial determination, subject to further proceedings pursuant to Paragraph 4.4.

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**4.3.5** Claims for Additional Cost. If the Contractor wishes to make 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 Paragraph 10.6.

**4.3.6** If the Contractor believes additional cost is involved for reasons including but not limited to (1) a written interpretation from the Architect, (2) an order by the Owner to stop the Work where the Contractor was not at fault, (3) a written order for a minor change in the Work issued by the Architect, (4) failure of payment by the Owner, (5) termination of the Contract by the Owner, (6) Owner's suspension or (7) other reasonable grounds, Claim shall be filed in accordance with this Paragraph 4.3.

**4.3.7 CLAIMS FOR ADDITIONAL TIME**

**4.3.7.1** If the Contractor wishes to make Claim for an increase in the Contract Time, written notice as provided herein shall be given. 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.

**4.3.7.2** 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.

**4.3.8** Injury or Damage to Person or Property. If either party to the Contract 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.

**4.3.9** 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 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.

**4.3.10** Claims for Consequential Damages. The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes:

.1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and

.2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Subparagraph 4.3.10 shall be deemed to preclude an award of liquidated direct damages, when applicable, in accordance with the requirements of the Contract Documents.

**4.4 RESOLUTION OF CLAIMS AND DISPUTES**

**4.4.1** Decision of Architect. Claims, including those alleging an error or omission by the Architect but excluding those arising under Paragraphs 10.3 through 10.5, shall be referred initially to the Architect for decision. An initial decision by the Architect shall be required as a

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condition precedent to mediation, arbitration or litigation of all Claims between the Contractor and Owner arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Architect with no decision having been rendered by the Architect. The Architect will not decide disputes between the Contractor and persons or entities other than the Owner.

**4.4.2** The Architect will review Claims and within ten days of the receipt of the Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Architect is unable to resolve the Claim if the Architect lacks sufficient information to evaluate the merits of the Claim or if the Architect concludes that, in the Architect's sole discretion, it would be inappropriate for the Architect to resolve the Claim.

**4.4.3** In evaluating Claims, the Architect may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Architect in rendering a decision. The Architect may request the Owner to authorize retention of such persons at the Owner's expense.

**4.4.4** If the Architect requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of such request, and shall either provide a response on the requested supporting data, advise the Architect when the response or supporting data will be furnished or advise the Architect that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Architect will either reject or approve the Claim in whole or in part.

**4.4.5** The Architect will approve or reject Claims by written decision, which shall state the reasons therefor and which shall notify the parties of any change in the Contract Sum or Contract Time or both. The approval or rejection of a Claim by the Architect shall be final and binding on the parties but subject to mediation and arbitration.

**4.4.6** When a written decision of the Architect states that (1) the decision is final but subject to mediation and arbitration and (2) a demand for arbitration of a Claim covered by such decision must be made within 30 days after the date on which the party making the demand receives the final written decision, then failure to demand arbitration within said 30 days' period shall result in the Architect's decision becoming final and binding upon the Owner and Contractor. If the Architect renders a decision after arbitration proceedings have been initiated, such decision may be entered as evidence, but shall not supersede arbitration proceedings unless the decision is acceptable to all parties concerned.

**4.4.7** Upon receipt of a Claim against the Contractor or at any time thereafter, the Architect or the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Architect or the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

**4.4.8** If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines prior to resolution of the Claim by the Architect, by mediation or by arbitration.

### 4.5 MEDIATION

**4.5.1** Any Claim arising out of or related to the Contract, except Claims relating to aesthetic effect and except those waived as provided for in Subparagraphs 4.3.10, 9.10.4 and 9.10.5 shall, after initial decision by the Architect or 30 days after submission of the Claim to the Architect, be

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subject to mediation as a condition precedent to arbitration or the institution of legal or equitable proceedings by either party.

**4.5.2** The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be in accordance with the Construction Industry Mediation Rules of the American Arbitration Association currently in effect. Request for mediation shall be filed in writing with the other party to the Contract and with the American Arbitration Association. The request may be made concurrently with the filing of a demand for arbitration but, in such event, mediation shall proceed in advance of arbitration or legal or equitable proceedings, 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.

**4.5.3** 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.

### 4.6 ARBITRATION

**4.6.1** Any Claim arising out of or related to the Contract, except Claims relating to aesthetic effect and except those waived as provided for in Subparagraphs 4.3.10, 9.10.4 and 9.10.5, shall, after decision by the Architect or 30 days after submission of the Claim to the Architect, be subject to arbitration. Prior to arbitration, the parties shall endeavor to resolve disputes by mediation in accordance with the provisions of Paragraph 4.5.

**4.6.2** Claims not resolved by mediation shall be decided by arbitration which, unless the parties mutually agree otherwise, shall be in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association currently in effect. The demand for arbitration shall be filed in writing with the other party to the Contract and with the American Arbitration Association, and a copy shall be filed with the Architect.

**4.6.3** A demand for arbitration shall be made within the time limits specified in Subparagraphs 4.4.6 and 4.6.1 as applicable, and in other cases within a reasonable time after the Claim has arisen, and in no event shall it be made after the date when institution of legal or equitable proceedings based on such Claim would be barred by the applicable statute of limitations as determined pursuant to Paragraph 13.7.

**4.6.4** Limitation on Consolidation or Joinder. No arbitration arising out of or relating to the Contract shall include, by consolidation or joinder or in any other manner, the Architect, the Architect's employees or consultants, except by written consent containing specific reference to the Agreement and signed by the Architect, Owner, Contractor and any other person or entity sought to be joined. No arbitration shall include, by consolidation or joinder or in any other manner, parties other than the Owner, Contractor, a separate contractor as described in Article 6 and other persons substantially involved in a common question of fact or law whose presence is required if complete relief is to be accorded in arbitration. No person or entity other than the Owner, Contractor or a separate contractor as described in Article 6 shall be included as an original third party or additional third party to an arbitration whose interest or responsibility is insubstantial. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of a Claim not described therein or with a person or entity not named or described therein. The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement shall be specifically enforceable under applicable law in any court having jurisdiction thereof.



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**4.6.5** Claims and Timely Assertion of Claims. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

**4.6.6** Judgment on Final Award. The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

## 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 Architect will promptly reply to the Contractor in writing stating whether or not the Owner or the Architect, after due investigation, has reasonable objection to any such proposed person or entity. Failure of the Owner or Architect to reply promptly 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 change a Subcontractor, person or entity previously selected if the Owner or Architect makes reasonable objection to such substitute.

### 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

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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 which 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.

### 5.4 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 Paragraph 14.2 and only for those subcontract agreements which 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.

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

## 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 Paragraph 4.3.

**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 when directed to do so. 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 which apply to the

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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 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 Owner shall be reimbursed by the Contractor for costs incurred by the Owner which are payable to a separate contractor because of delays, improperly timed activities or defective construction of the Contractor. The Owner shall be responsible to the Contractor for costs incurred by the Contractor because of delays, improperly timed activities, damage to the Work or defective construction of a separate contractor.

**6.2.4** The Contractor shall promptly remedy damage wrongfully caused by the Contractor to completed or partially completed construction or to property of the Owner or separate contractors as provided in Subparagraph 10.2.5.

**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 Subparagraph 3.14.

### 6.3 OWNER'S RIGHT TO CLEAN UP

**6.3.1** 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 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, Contractor and Architect; a Construction Change Directive requires agreement by the Owner and Architect 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.

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## 7.2 CHANGE ORDERS

**7.2.1** A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor and Architect, stating their agreement upon all of the following:

.1 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** Methods used in determining adjustments to the Contract Sum may include those listed in Subparagraph 7.3.3.

## 7.3 CONSTRUCTION CHANGE DIRECTIVES

**7.3.1** A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and 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 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.

**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 Subparagraph 7.3.6.

**7.3.4** Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect 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 or Contract Time.

**7.3.5** A Construction Change Directive signed by the Contractor indicates the agreement of the Contractor 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.

**7.3.6** If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the method and the adjustment shall be determined by the Architect 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, a reasonable allowance for overhead and profit. In such case, and also under Clause 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Subparagraph 7.3.6 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;



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.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.

**7.3.7.** The amount of credit to be allowed by the Contractor to the Owner for a deletion or change which results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the 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.

**7.3.8** Pending final determination of the total cost of a Construction Change Directive to the Owner, amounts not in dispute for such changes in the Work shall be included in Applications for Payment accompanied by a Change Order indicating the parties' agreement with part or all of such costs. For any portion of such cost that remains in dispute, the Architect will make an interim determination for purposes of monthly certification for payment for those costs. That 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 4.

**7.3.9** When the Owner and Contractor agree with the determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and shall be recorded by preparation and execution of an appropriate Change Order.

### 7.4 MINOR CHANGES IN THE WORK

**7.4.1** The Architect will 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 shall be effected by written order and shall be binding on the Owner and Contractor. The Contractor shall carry out such written orders promptly.

## ARTICLE 8 TIME

### 8.1 DEFINITIONS

**8.1.1** Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, 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 certified by the Architect in accordance with Paragraph 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.

**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. Unless the date of commencement is established by the Contract Documents or a notice to proceed given

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by the Owner, the Contractor shall notify the Owner in writing not less than five days or other agreed period before commencing the Work to permit the timely filing of morgages, mechanic's liens and other security interests.

**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 Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect 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, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control, or by delay authorized by the Owner pending mediation and arbitration, or by other causes which the Architect determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine.

**8.3.2** Claims relating to time shall be made in accordance with applicable provisions of Paragraph 4.3.

**8.3.3** This Paragraph 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

**9.1.1** 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

**9.2.1** Before the first Application for Payment, the Contractor shall submit to the Architect a schedule of values allocated to various portions of the Work, prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

### 9.3 APPLICATIONS FOR PAYMENT

**9.3.1** At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment for operations completed in accordance with the schedule of values. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner or Architect may require, such as copies of requisitions from Subcontractors and material suppliers, and reflecting retainage if provided for in the Contract Documents.

**9.3.1.1** As provided in Subparagraph 7.3.8, such applications may include requests for payment on account of changes in the Work which 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** Such applications may not include requests for payment for portions of the Work for which the Contractor does not intend to pay to a Subcontractor or material supplier, unless such Work has been performed by others whom the Contractor intends to pay.



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**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 Certificates for Payment have been previously issued and payments 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.

### 9.4 CERTIFICATES FOR PAYMENT

**9.4.1** The Architect will, within seven days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Architect determines is properly due, or notify the Contractor and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Subparagraph 9.5.1.

**9.4.2** The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data comprising the Application for Payment, that the Work has progressed to the point indicated and that, to the best of the Architect's knowledge, information and belief, the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Architect. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment, or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

### 9.5 DECISIONS TO WITHHOLD CERTIFICATION

**9.5.1** The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Subparagraph 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Subparagraph 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's

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opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Subparagraph 3.3.2, 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;

.4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;

.5 damage to the Owner or another 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 persistent failure to carry out the Work in accordance with the Contract Documents.

**9.5.2** When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

### 9.6 PROGRESS PAYMENTS

**9.6.1** After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

**9.6.2** The Contractor shall promptly pay each Subcontractor, upon receipt of payment from the Owner, out of the amount paid to the Contractor on account of such Subcontractor's portion of the Work, the amount to which said Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of such 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 Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

**9.6.4** 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** Payment to material suppliers shall be treated in a manner similar to that provided in Subparagraphs 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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### 9.7 FAILURE OF PAYMENT

**9.7.1** If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents the amount certified by the Architect or awarded by arbitration, then the Contractor may, upon seven additional days' written notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up, plus interest as provided for in the Contract Documents.

### 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.

**9.8.2** When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. 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.

**9.8.3** Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

**9.8.4** When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion which shall establish the date of Substantial Completion, 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 or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

**9.8.5** The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon such acceptance and consent of surety, if any, 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 Clause 11.4.1.5 and authorized by public authorities having jurisdiction over the Work. 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, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and

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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 Architect as provided under Subparagraph 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, Contractor and Architect 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 written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Subparagraph 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

**9.10.2** Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (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 and (5), if required by the Owner, 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 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, the Contractor shall refund 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, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. 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



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portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of 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 special 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

**10.1.1** 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 give notices and comply with applicable laws, ordinances, rules, 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 Clauses 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 Clauses 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 Paragraph 3.18.

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**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 and Architect.

**10.2.7** The Contractor shall not load or permit any part of the construction or site to be loaded so as to endanger its safety.

### 10.3 HAZARDOUS MATERIALS

**10.3.1** 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** 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 verify that it has been 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. 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, which adjustments shall be accomplished as provided in Article 7.

**10.3.3** To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, 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 in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Subparagraph 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) and provided that such damage, loss or expense is not due to the sole negligence of a party seeking indemnity.

**10.4** The Owner shall not be responsible under Paragraph 10.3 for materials and substances brought to the site by the Contractor unless such materials or substances were required by the Contract Documents.

**10.5** If, without negligence on the part of the Contractor, the Contractor is held liable 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.

### 10.6 EMERGENCIES

**10.6.1** 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

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extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Paragraph 4.3 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 lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's 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 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 which 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 Paragraph 3.18.

**11.1.2** The insurance required by Subparagraph 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from date of commencement of the Work until date of final payment and termination of any coverage required to be maintained after final payment.

**11.1.3** Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work. These certificates and the insurance policies required by this Paragraph 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. If any of the foregoing insurance coverages are required to remain in force after final payment and are reasonably available, an additional certificate evidencing continuation of such coverage shall be submitted with the final Application for Payment as required by Subparagraph 9.10.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness in accordance with the Contractor's information and belief.

### 11.2 OWNER'S LIABILITY INSURANCE

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

### 11.3 PROJECT MANAGEMENT PROTECTIVE LIABILITY INSURANCE

**11.3.1** Optionally, the Owner may require the Contractor to purchase and maintain Project Management Protective Liability insurance from the Contractor's usual sources as primary coverage for the Owner's, Contractor's and Architect's vicarious liability for construction operations under the Contract. Unless otherwise required by the Contract Documents, the Owner

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shall reimburse the Contractor by increasing the Contract Sum to pay the cost of purchasing and maintaining such optional insurance coverage, and the Contractor shall not be responsible for purchasing any other liability insurance on behalf of the Owner. The minimum limits of liability purchased with such coverage shall be equal to the aggregate of the limits required for Contractor's Liability Insurance under Clauses 11.1.1.2 through 11.1.1.5.

**11.3.2** To the extent damages are covered by Project Management Protective Liability insurance, the Owner, Contractor and Architect waive all rights against each other for damages, except such rights as they may have to the proceeds of such insurance. The policy shall provide for such waivers of subrogation by endorsement or otherwise.

**11.3.3** The Owner shall not require the Contractor to include the Owner, Architect or other persons or entities as additional insureds on the Contractor's Liability Insurance coverage under Paragraph 11.1.

**11.4 PROPERTY INSURANCE**

**11.4.1** Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Paragraph 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Paragraph 11.4 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

**11.4.1.1** 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.

**11.4.1.2** 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 which 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.

**11.4.1.3** If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.

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

**11.4.1.5** Partial occupancy or use in accordance with Paragraph 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial



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occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

**11.4.2** Boiler and Machinery Insurance. The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; 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.

**11.4.3** Loss of Use Insurance. The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused.

**11.4.4** If the Contractor requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

**11.4.5** If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Subparagraph 11.4.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

**11.4.6** Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverages required by this Paragraph 11.4. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days' prior written notice has been given to the Contractor.

**11.4.7** Waivers of Subrogation. The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Paragraph 11.4 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver 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, 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.

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**11.4.8** A loss insured under Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Subparagraph 11.4.10. The Contractor shall pay Subcontractors their just shares 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.

**11.4.9** If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or in accordance with an arbitration award in which case the procedure shall be as provided in Paragraph 4.6. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

**11.4.10** The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection is made, the dispute shall be resolved as provided in Paragraphs 4.5 and 4.6. The Owner as fiduciary shall, in the case of arbitration, make settlement with insurers in accordance with directions of the arbitrators. If distribution of insurance proceeds by arbitration is required, the arbitrators will direct such distribution.

### 11.5 PERFORMANCE BOND AND PAYMENT BOND

**11.5.1** 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.

**11.5.2** 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 permit a copy to be made.

## 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 Architect's request or to requirements specifically expressed in the Contract Documents, it must, if required in writing by the Architect, be uncovered for the 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 which the Architect has not specifically requested to examine prior to its being covered, the 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, 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.



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**12.2 CORRECTION OF WORK**

**12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION**

**12.2.1.1** The Contractor shall promptly correct Work rejected by the 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 and compensation for the 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 Paragraph 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 Subparagraph 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 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. The Owner shall give such notice promptly after discovery of the condition. 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 Paragraph 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 performance of the Work.

**12.2.2.3** The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Paragraph 12.2.

**12.2.3** The Contractor shall remove from the site portions of the Work which 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 which is not in accordance with the requirements of the Contract Documents.

**12.2.5** Nothing contained in this Paragraph 12.2 shall be construed to establish a period of limitation with respect to other obligations which the Contractor might have under the Contract Documents. Establishment of the one-year period for correction of Work as described in Subparagraph 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.

**12.3 ACCEPTANCE OF NONCONFORMING WORK**

**12.3.1** If the Owner prefers to accept Work which 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.

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## ARTICLE 13 MISCELLANEOUS PROVISIONS

### 13.1 GOVERNING LAW

**13.1.1** The Contract shall be governed by the law of the place where the Project is located.

### 13.2 SUCCESSORS AND ASSIGNS

**13.2.1** The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to the other party hereto and to partners, successors, assigns and legal representatives of such other party in respect to covenants, agreements and obligations contained in the Contract Documents. Except as provided in Subparagraph 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party 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 an institutional lender providing construction financing for the Project. In such event, the lender shall assume 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

**13.3.1** Written notice shall be deemed to have been duly served if delivered in person to the individual or 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 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 by law.

**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 thereunder, except as may be specifically agreed in writing.

### 13.5 TESTS AND INSPECTIONS

**13.5.1** Tests, inspections and approvals of portions of the Work required by the Contract Documents or by laws, ordinances, rules, regulations or orders of public authorities having jurisdiction shall be made at an appropriate time. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of tests, inspections or approvals which do not become requirements until after bids are received or negotiations concluded.

**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 Subparagraph 13.5.1, the Architect will, upon written authorization from the Owner, 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 Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Subparagraph 13.5.3, shall be at the Owner's expense.



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**13.5.3** If such procedures for testing, inspection or approval under Subparagraphs 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 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 Architect.

**13.5.5** If the Architect is to observe tests, inspections or approvals required by the Contract Documents, the 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.

### 13.6 INTEREST

**13.6.1** 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 COMMENCEMENT OF STATUTORY LIMITATION PERIOD

**13.7.1** As between the Owner and Contractor:

.1 Before Substantial Completion. As to acts or failures to act occurring prior to the relevant date of Substantial Completion, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than such date of Substantial Completion;

.2 Between Substantial Completion and Final Certificate for Payment. As to acts or failures to act occurring subsequent to the relevant date of Substantial Completion and prior to issuance of the final Certificate for Payment, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than the date of issuance of the final Certificate for Payment; and

.3 After Final Certificate for Payment. As to acts or failures to act occurring after the relevant date of issuance of the final Certificate for Payment, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than the date of any act or failure to act by the Contractor pursuant to any Warranty provided under Paragraph 3.5, the date of any correction of the Work or failure to correct the Work by the Contractor under Paragraph 12.2, or the date of actual commission of any other act or failure to perform any duty or obligation by the Contractor or Owner, whichever occurs last.

## 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 which requires all Work to be stopped;

.2 an act of government, such as a declaration of national emergency which requires all Work to be stopped;

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.3 because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Subparagraph 9.4.1, or because the Owner has not made payment on a Certificate 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 Subparagraph 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 Paragraph 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 Subparagraph 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed and for proven loss with respect to materials, equipment, tools, and construction equipment and machinery, including reasonable overhead, profit and damages.

**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 persistently 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 Subparagraph 14.1.3.

**14.2 TERMINATION BY THE OWNER FOR CAUSE**

**14.2.1** The Owner may terminate the Contract if the Contractor:

.1 persistently or repeatedly refuses or fails to supply enough properly skilled workers or proper materials;

.2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;

.3 persistently disregards laws, ordinances, or rules, regulations or orders of a public authority having jurisdiction; or

.4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

**14.2.2** When any of the above reasons exist, the Owner, upon certification by the Architect that sufficient cause exists to justify such action, 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 take possession of the site and of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;

.2 accept assignment of subcontracts pursuant to Paragraph 5.4; and

.3 finish the Work by whatever reasonable method the Owner may deem expedient. Upon 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 Subparagraph 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.



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**14.2.4** If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Architect, upon application, and this obligation for payment shall survive 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 Subparagraph 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, 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, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed.

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ARCHITECT'S SUPPLEMENTARY CONDITIONS:

PART 1 GENERAL

1.01 Description

A. The Amendments to the General Conditions contain changes and additions to AIA Document A201. Where any part of the General Conditions is supplemented hereby, the AIA Provisions of such article shall remain in effect. All supplemental provisions shall be considered as added thereto. Where any such part or article is amended, voided, or superseded thereby, the provisions of such article not so specifically amended, voided, or superseded shall remain in effect.

1. ARTICLE 2 OWNER:

(add) "2.1.1.2 The Owner is Pruitthealth Forsyth County, LLC and is referred to in the Contract Documents as if singular in number and masculine in gender."

2. ARTICLE 3 CONTRACTOR:

(add) "3.6.2 Contractor shall pay all applicable Federal, State and Local taxes, including sales taxes on all equipment and materials used in the project."

(add) "3.7.5 Contractor shall procure all applicable permits and licenses, including permits and licenses required pursuant to applicable patent and copyright laws, shall pay all charges and fees, and shall give all notices necessary and incidental to the due and lawful prosecution to the work"

3. ARTICLE 4 ADMINISTRATION OF THE CONTRACT:

(add) "4.1.1 The Architect is David R. Polston, Architect, 3806 Park Avenue, Unit 2L, Wilmington, North Carolina 28403, (910) 350-8900, and is referred to in the Contract Documents as if singular in number and masculine in gender."

(add) "4.1.2 The term 'Architect' means the Architect or his authorized representative, and means the same as 'Architect/Engineer', or 'Engineer'."

4. ARTICLE 7 CHANGES IN THE WORK:

(add) "7.1.5 No modification or rescission of this contract shall be effective unless evidenced by a written change order signed by both parties, the Architect and by the surety to this contract. The Owner may issue change orders, which are defined as written order to Contractor prepared by Architect and signed by the Owner or his designee, authorizing an addition, deletion or revision in the work or an adjustment in the contract price or the contract time. Contractor agrees to perform such reasonable extra work as may be ordered in writing by Architect.

The Owner agrees to pay Contractor, upon Contractor's presentation of itemized cost statements, for extra work computed as follows: (a) labor used at actual payroll charges therefore; (b) actual payroll charges for Workers' Compensation Insurance, Social Security and all other payroll charges; (c) a competitive hourly rate for actual operating hours of equipment used; (d) amounts paid by Contractor to vendors, as evidenced by paid invoices, for material purchased and used on extra work orders; (e) cost of bonding, if applicable and (f) overhead and profit combined shall be based on new paragraph 7.1.6."

(add) "7.1.6 The allowance for overhead and profit combined, and management fee when applicable, for all change orders included in the total cost to the Owner, shall be based on the following schedule:

1. For the Contractor, for any work performed by the Contractor's own forces, 10 percent plus 5 percent management fee of the cost.

2. For the Contractor, for work performed by his Subcontractor, 5 percent of the amount due the Subcontractor.

3. For each Subcontractor or Sub-subcontractor involved, for any work performed by his own forces, 10 percent of the cost.

4. For each Subcontractor, for work performed by his Sub-subcontractors, 5 percent of the amount due the Sub-subcontractor.

5. Cost to which overhead and profit or management fee is to be applied shall be determined in accordance with Subparagraph of the General Conditions.

6. In order to facilitate checking of quotations for extras or credits, all proposals, shall be submitted in the following manner. Change Order Requests failing to comply with this form will be returned for correction.

   a) Materials (itemized breakdown) $ _____

   b) *Rent of Equipment (list separately) $ _____

   Sub-Total (1) $ _____

   c) Labor (itemized breakdown) $ _____

   Sub-Total (2) $ _____

   d) For Subcontract Work - Overhead & Profit (**10% x Sub-Total 1 and 2) $ _____

   Sub-Total (3) $ _____

e) Management Fee (when applicable, 5% x a, b, c, and d. See 1 through 5 above) $ _____

Sub-Total (4) $ _____

f) Insurance (Workmen's Compensation, Social Security or as otherwise required and/or specified) $ _____

Sub-Total (5) $ _____

g) Guarantee Bond (on Sub-Total 3 or 4 as applicable) $ _____

Total $ _____

* Rates not in excess of those prevailing in areas

** If deductive changes, this figure to be 5%"

5. ARTICLE 8 TIME:

(add) "8.1.2 The Contractors shall commence work to be performed under this agreement on a date to be specified in a written order from the Architect and shall fully complete all work hereunder according to the following schedule:

485 Consecutive Calendar Days

Time is of the essence, and if the Contractor fails to complete the work within the maximum time, the Owner will incur substantial damages, including but not limited to capitalized interest payments and loss of revenue resulting from the inability to utilize the completed project for patient care.

If the progress or completion of the work be delayed by any fault, neglect, act or failure to act on the part of the Contractor or anyone acting for or on behalf of the Contractor, then the Contractor shall, in addition to all of the other obligations imposed by this Contract and by law upon the Contractor, and at no cost or expense to the Owner, work such overtime or require the appropriate subcontractor to work such overtime as may be necessary to make up for all time lost and to avoid delay in the progress and completion of the work.

Should the progress or completion of the work be delayed by any fault, neglect, act or failure to act on the part of the Contractor or anyone acting for or on behalf of the Contractor so as to cause any additional cost, expense, liability, or damage to the Owner of any damage or additional cost or expense for which the Owner may or shall become liable, the Contractor shall and does hereby agree to compensate the Owner for and to

indemnify the Owner against all such costs, expenses, liabilities and damages.

For the purposes of this Article, subcontractors shall be deemed to be acting for and on behalf of the Contractor. The construction shall be completed within 485 calendar days from the date of a Written Notice to Proceed issued by the Owner.

6. ARTICLE 11 INSURANCE AND BONDS:

(add) " 11.1.1 During the term of the Contract, the Contractor shall, at his own expense, purchase and maintain insurance by companies properly licensed in North Carolina and satisfactory to the Owner, who shall be designated on the policy as Pruitthealth Forsyth County, LLC as the named insured, of the kinds and minimum amounts specified below.

Certificates and Notice of Cancellation: Before commencing work under this contract, Contractor shall furnish the Owner with certificates of all insurance required below. Certificates shall indicate the type, amount, class of operations covered, effective date and expiration date of all policies, and shall contain the following statement:

> "The insurance covered by this certificate will not be canceled or materially altered, except after thirty (30) days written notice has been received by the Owner."

Workers' Compensation and Employer's Liability Insurance: Covering all of the Contractor's employees to be engaged in the work under this contract, providing the required statutory benefits under North Carolina Workers' Compensation Law, and employers liability insurance providing limits at least in the amount of $500,000/1,000,000 applicable to claims due to bodily injury by accident or disease.

Commercial General Liability: Including coverage for independent contractor operations, contractual liability assumed under the provisions of this contract, products/completed operations liability and broad form property damage liability insurance coverage. Exclusions applicable to explosion, collapse and underground hazards are to be deleted when the work involves these exposures. The policy shall provide liability limits at least in the amount of $1,000,000 occurrence, combined single limits, applicable to claims due to bodily injury and/or property damage.

Owners and Contractors Protective Liability Insurance: To be issued in the name of Pruitthealth Forsyth County,LLC. This coverage shall be provided by a separate policy and written with liability limits at least in the amount of $1,000,000 per occurrence, combined single limits, applicable to claims due to bodily injury and/or property damage arising out of work to be performed under this contract on behalf of the Owner.

Automobile Liability Insurance: Covering all owned, non-owned and hired vehicles, providing liability limits at least in the amount of $1,000,000 per occurrence combined single limits applicable to claims due to bodily injury and/or property damage.

Builder's Risk Insurance: Contractor shall provide builder's risk insurance written in the amount of 100 percent of the contract amount. Coverage shall apply to risks of direct physical loss or damage to buildings and structures while in the course of construction, including foundations, attachments, machinery and all permanent fixtures constituting a part of said buildings or structures. Contractor shall be responsible for any loss within the deductible applicable to this insurance. The coverage shall be written in the name of Pruitthealth Forsyth County, LLC and shall protect the Contractors as their interests may appear."

(add) "11.4.3 The successful bidder shall deliver to the Owner in duplicate a Performance Bond and a separate Labor and Material Payment Bond, AIA Form A-311, each in an amount at least equal to 100 percent (100%) of the Contract sum as security for the faithful performance of the Contract, and the payment of all persons performing labor and furnishing materials in connection with this Contract. The surety shall be subject to approval by the Owner and shall be licensed to transact business in the State of North Carolina. The Performance and Labor and Materials Payment Bonds must each be accompanied by a current Power of Attorney. The cost of such bonds shall be included in the Contractor's proposal amount."

7. ARTICLE 13 MISCELLANEOUS PROVISIONS:

(add) "13.1.1.1 The Work shall be executed in accordance with all applicable provisions and requirements of the latest edition of the North Carolina State Building Code and county building ordinances in effect at the time the Contract is executed."

8. ARTICLE 15 EQUAL OPPORTUNITY:

Add the following Article:

"ARTICLE 15 EQUAL OPPORTUNITY"

"15.1 The Contractor shall maintain policies of employment as follows:

"15.1.1 The Contractor and all subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, color, sex, or national origin. The Contractor shall take affirmative action to insure that applicants are employed, and that employees are treated during employment without regard to their race, religion, color, sex or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment, advertising; layoff or termination; rates of pay or other forms of compensation; and selection for

training, including apprenticeship. The Contractor agrees to post in conspicuous places available to employees and applicants for employment, notices setting forth the policies of non-discrimination."

"15.1.2 The Contractor and all subcontractors shall, in all solicitations or advertisements for employees placed by them or on their behalf, state that all qualified applicants will receive consideration for employment without regard to race, religion, color, sex or national origin."

DIVISION ONE - GENERAL REQUIREMENTS

Section 01010 - General

SCOPE: This division is to be added to the AIA General Conditions and shall also form a part of the contract. Precedence shall be given to items in this division. Items in the AIA General Conditions which may be in conflict with this division shall be null and void.

SCOPE OF WORK: Contractor shall furnish all labor, materials and equipment and shall perform all work in the manner and form as provided by the following enumerated specifications and documents, which are attached hereto and made a part hereof as if fully contained herein: General Conditions, Supplemental General Conditions, Plans and Specifications, and Insurance Certificates for Workers' Compensation, and Public Liability and Property Damage, for the project more fully described therein and generally described as: Pruitthealth Forsyth County, LLC. The scope of work for this contract shall include the furnishing of all labor, materials, equipment and services as required to complete the construction of a new 100 bed nursing home and as detailed on the construction drawings and specification manual by David R. Polston, Architect. The specified work includes, but is not limited to the site work, general construction, plumbing, electrical, fire protection and HVAC systems necessary to construct a complete nursing home.

PRE-CONSTRUCTION CONFERENCE: The Architect shall arrange for a pre-construction conference in coordination with the Owner. He shall give written notice to all Contractors and the Owner as to the time and place of this conference. The purpose of this meeting is to review the requirements of the project and to coordinate activities for all construction. The conference shall cover but not be limited to the following items:

1. Protocol For Payment Requests
2. Protocol For Change Order Requests
3. Protocol For Communication Between Owner, Architect and Contractor
4. State Inspection Schedule
5. Protocol For Time Extensions
6. Required Reports During The Construction Period
7. Protocol For Shop Drawings
8. Establishment of Project Schedule
9. Establishment of Monthly Construction Conference
10. Protocol For Project Close-Out

The Architect shall send copies of the minutes of this conference to all Contractors, the Owner and to other interested parties.

PROJECT SCHEDULE: The Contractor shall develop a project schedule (CPM Chart) prior to the pre-construction meeting which schedules all major trades for the contract period. The project schedule shall be reviewed and updated during each monthly progress meeting.

MONTHLY PROGRESS MEETINGS: The Architect shall establish and conduct a regular scheduled monthly meeting, to be held at the job site. These meetings shall be open to subcontractors, material suppliers, and any others who can contribute toward maintaining required job progress. The Architect shall request that each prime contractor be represented by both home office and project personnel. These representatives shall have authority to act on behalf of the Contractor. It shall be the purpose of these meetings to effect coordination, cooperation, and assistance in maintaining progress of the project on schedule in order to complete the project within the contract time.

PROJECT COMPLETION AND CLOSE-OUT: Prior to final inspection of the work by the North Carolina DHSR Construction Section, the Contractor shall provide the following documentation for review by the State Personnel:

1. Certification by the Project Architect and Consulting Engineer in each design category, i.e. plumbing, heating/air conditioning, electrical systems, that the work was completed in accordance with the drawings and any supplementary construction documents.

2. Final Occupancy Permit.

3. Documentation indicating the flame spread rating of the carpet used. (This must be from an independent testing laboratory.)

4. Evidence that the Boiler Inspection Division of the North Carolina Department of Labor has made an inspection or that the inspection has been requested for all boilers and/or hot water heaters if their capacities are more than 120 gallons or 200,000 BTU or 200 degrees.

5. Documentation indicating the flame spread rating of the draperies, curtains, and privacy screens.

6. Certification by the local sanitarian indicating that the kitchen may be used for food preparation and that the potable water system has been sanitized in accordance with North Carolina State Building Code.

7. Certification that the sprinkler system has been installed in accordance with National Fire Protection Association Code No. 13 and that flow control and supervisory valve alarms are active.

8. An evacuation plan and smoking regulations must have been established and posted prior to the final inspection. The plan and regulations must be posted in prominent locations on all floors, approximately half the distance down each corridor.

9. Documentation showing the values of impedance and equipotential voltage for each grounded point in a patient use room and showing the value of current leakage (with grounds in place and lifted) of each piece of fixed electrical equipment. (See NFPA

99, 1987 Section 3-5.2)

10. Installation instructions for fire dampers, ceiling radiation dampers, smoke dampers, and duct smoke detectors.

11. Two copies of the Owner's equipment operational and maintenance manuals.

12. Owner's guarantees and warranties.

13. Certification that all required portable fire extinguishers are installed.

14. One set of Owner's reproducible as-built drawings.

The Contractor shall also provide to the Owner:

1. A set of reproducible record drawings prepared by the Architect and Contractor. The Contractor must update the job set documents of any changes on a daily basis. The Architect will make these changes to the originals at the end of the project and supply the owner with one reproducible set of record drawings.

2. An executed copy of the Waiver Of Liens from the Contractor.

3. A disclaimer from the Contractor establishing the date of final completion and stating that he is satisfied with the money paid to him.

4. A Consent of Surety.

5. Two copies of the installation, operation and maintenance manuals for all installed equipment.

INTENTION: The Contractor shall, unless otherwise specified, supply all heat, sanitary facilities, water, scaffolding and incidentals necessary for the entire and proper and substantial completion of his work and shall install, maintain and remove all equipment of the construction, other utensils or things and be responsible for the safe, proper and lawful construction, maintenance and use and everything incidental thereto, as shown on the plans, stated in the specifications or reasonable implied, therefrom, all in accordance with the contract documents.

PERMITS: Each Contractor shall apply for, take out and pay for all permits, licenses, inspections, etc., as required. Refer to new Paragraph 3.7.5 of the Supplementary Conditions of the General Conditions.

CONTRACTOR PAYMENTS: The Contractor shall submit a completed Schedule of Values (AIA Document G703) for all project costs to the Architect for approval prior to the start of construction. During the pre-construction conference, the General Contractor, Architect, and Owner will establish a monthly cut-off date for pay applications by the Contractor. The Contractor shall submit to the Architect completed AIA Form G702 (Application and

Certification of Payment), AIA Form G703 (Schedule of Value) along with verification of sales tax payments for each monthly application for payment. The Architect will review the application and will approve or adjust the application for payment within seven calendar days. Payments will be made on the basis of ninety (90%) percent of the estimated payments until completion and acceptance of the work at which time complete payment will be made.

MEASUREMENTS: Before ordering materials or doing any work, each contractor shall verify all measurements at site and shall be responsible for the correctness of such measurements. No extra charge on completion will be allowed on account of differences between actual dimensions and the measurements indicated on the drawings; any differences which may be found shall be submitted to the Architect for consideration before proceeding with the work.

PROJECT SIGN: The General Contractor shall furnish, erect, paint and maintain one temporary project sign. The sign shall be painted by a professional sign painter. See attached drawing for detail of sign construction. The entire cost of the sign shall be paid by the General Contractor. Maintain the sign in good condition until the work has been completed, and then remove it from the site.

SANITARY ARRANGEMENTS: The Contractor shall provide, where directed, portable toilet facilities for employees, and shall furnish and install in these facilities all water closets required for a complete and adequate sanitary arrangement. Sanitary arrangements must meet all requirements of the local and state health authorities.

TEMPORARY STRUCTURES: Each Contractor shall provide all necessary storage facilities (trailers), etc. for their own use. All temporary structures shall be built in a sound waterproof manner and shall remain on the premises until their removal is directed by the Architect.

BARRIERS: The Contractor shall protect all trees and shrubs in the vicinity of the operations by building substantial boxes around same. Barricade all walks, roads, etc. as directed by the Architect to keep the public away from the construction. All trenches, excavations or other hazards in the vicinity of the work shall be well barricaded and properly lighted at night.

PROTECTION: The Contractor shall be responsible for the entire site and the building or construction of same and provide all necessary protections as required by the Owner or Architect, and by laws or ordinances governing such conditions. He will be responsible for any damage to the Owner's property or that of others on the job, by him, his men or his sub-contractors and shall pay for any claims against the Owner.

EXAMINATION OF CONDITIONS: The submission of a bid will assume that the Contractor has fully examined the site and knows existing conditions, and has made every provision for the operation under existing conditions, and has included all necessary items.

COOPERATION WITH OTHERS: All Contractors will be required to cooperate and consult with each other during the construction of this project. Each Contractor shall lay out and execute his work so as to cause the least delay to other contractors. Each Contractor shall be held responsible for any damage to other Contractor's work.

The Contractor shall consult the Architect prior to closing any furred spaces or pipe spaces or pouring any concrete floors to determine that all mechanical work has been installed. Omission of mechanical work from furred spaces due to failure of the Contractor to check with the Architect will not be tolerated. If such occurs, the Contractor shall open the space at his own expense. Each contractor shall provide full and safe access for inspection at all times.

COVERED WORK: No work or material will be covered up until inspected and approved by the Architect. Work covered before such inspection shall be uncovered at the Contractor's expense and replaced at his expense and as directed after approval is given.

APPROVALS: Each Contractor shall obtain written approval from the Architect for the use of materials as specified equal and for those not mentioned as standard. Such approvals must be obtained as soon after contract award as possible and before any materials are ordered. Application for approvals will be made by the Contractor and not by subcontractors or material men.

WORK AND MATERIALS: All materials will be new and the best quality of those specified. Samples or other necessary evidence of quality may be asked for and will be furnished by the Contractor without cost as also the necessary tests to show that requirements have been established. Workmanship shall be the best quality, done by mechanics skilled in the special work involved.

CONDUCT OF WORKMEN: At any time during the construction and completion of the work covered by these specifications, if the conduct of any workmen of the various crafts be adjudged ungentlemanly and a nuisance to the Owner or Architect, the contractor shall order such parties removed immediately from the grounds.

SUPERINTENDENT: All Contractors shall keep full time superintendents, satisfactory to the Architect, on the work as required.

OWNER'S RIGHT TO EMPLOY OTHER WORKMEN: The Owner shall have the right to employ other workmen during the construction of the building to do work not included in the contract. Such work will in no way change or void this contract.

VERBAL AGREEMENTS: Verbal agreements at variance with these drawings and specifications will not be regarded as binding. A written memorandum or change order must be made by the Owner or Architect.

SHOP DRAWINGS: The Contractor shall execute, with such promptness to cause no delay in his own work or in the work of others, three copies of all shop or setting drawings and schedules required for the work. The Architect shall pass upon them with reasonable promptness. The Contractor shall make any corrections required; and if necessary, resubmit shop drawings for the Architect's approval.

EXTRAS: No extras will be paid unless approved by the Architect in writing. The Owner has the right during construction to make changes or authorize extra work. This will in no way void

or change the contract except to add to or deduct from the amount of the contract by a reasonable and fair valuation.

DRAWINGS AND SPECIFICATIONS: The Owner will furnish copies of the drawings and specifications to the successful Contractors without charge. The drawings and specifications are complementary and any work shown and not specified, or vice-versa, shall be furnished the same as if shown and specified.

SUBCONTRACTORS: Subcontractors are subject to the approval of the Architect and such approval will be asked for and given in writing. Subcontractors will not be allowed to start work until they and their insurance certificates have been approved.

CLEANING: The Contractor will keep the site, within and around the operation, clean and neat and free of trash and debris accumulations. All debris shall be removed from the site. He will keep it free from inflammable or dangerous stored material at all times. If such is not done as directed, it will be done by the Owner and such costs charged to the Contractor. Upon completion, all parts of the work shall be left clean and neat to present a finished appearance. Floors shall be scrubbed if necessary.

GUARANTEE: All work, materials and equipment must be guaranteed for a period of twelve (12) months from the date of final acceptance by the Owner. Any defects developing from faulty workmanship or material or negligence in this period will be made by the Contractor without expense to the Owner. Also, damage resulting therefrom to other work shall be made good at the expense of the Contractor.

CORRELATION OF PLANS AND SPECIFICATIONS: If the plans and specifications are found to disagree, the Architect shall be the judge to which shall govern and his decision shall be final.

WATER: The General Contractor shall provide and pay for construction water as required.

ELECTRICITY: The General Contractor shall provide and pay for construction electricity as required.

HEAT: The General Contractor shall provide and pay for building heating as required.

TELEPHONE: The General Contractor shall provide and pay for construction telephone services as required.

SECTION 01030 – ALLOWANCES

PART 1 - GENERAL

1.01 ALLOWANCE LIST

A. ALLOWANCE NO. 1: Brick Allowance:
   1. Allow $400.00 (Four Hundred Dollars) per thousand including taxes.
   2. As specified in Section 04210.
   3. Include only the cost of the material in the allowance (manufacturer's price, taxes, freight).
   4. Include all other related costs in the Contract sum.

B. ALLOWANCE NO. 2: Kitchen Equipment:
   1. The General Contractor shall include an allowance of $450,000 for the purchase of kitchen equipment shown on Sheets A-13. Kitchen exhaust hood, dishwasher condensation hood, all related hood ductwork, duct fire protection and roof exhaust fans/curbs shall be by the Mechanical Contractor, part of the General Contractor's Base Bid and not part of this allowance. Allowance to include equipment purchase cost, tax and freight. General Contractor to include in Base Bid installation of allowance equipment and required electrical, plumbing and gas services/connections.

C. ALLOWANCE NO. 3: Laundry Equipment:
   1. The General Contractor shall include an allowance of $90,000 for the purchase of 3 commercial washers and 3 commercial dryers as shown on Sheet A-13. Allowance to include equipment purchase cost, tax and freight. General Contractor to include in Base Bid installation of Laundry Equipment and required electrical, plumbing, gas and ductwork services/connections.

## SECTION 01220 - SUBMITTALS

## PART 1 - GENERAL

### 1.01 SUMMARY

A. Section Includes:
   1. Preparing and processing of submittals for review and action.
   2. Preparing and processing of informational submittals.

B. Submit the following for the Contractor's review and action:
   1. Shop drawings.
   2. Product data.
   3. Samples.
   4. Submittals indicated as "for approval."
   5. Submittals for which procedures are not defined elsewhere.

C. Submit the following as informational submittals:
   1. Certificates.
   2. Coordination drawings.
   3. Reports.
   4. Qualification statements for manufacturers/installers.

D. Specific submittals are described in individual sections.
   1. Provide other information required by Division 15 for plumbing work.
   2. Provide other information required by Division 16 for electrical work.
   3. Provide other information required by Division 17 for HVAC work.

E. Submit all submittals to the Contractor.

### 1.02 DEFINITIONS

A. Product Data Submittals: Standard printed data which show or otherwise describe a product or system, or some other portion of the Work.
   1. Product data submittals to include selection data showing standard colors.

B. Samples: Actual examples of the products or Work to be installed.

C. Informational Submittals: Submittals identified in the Contract Documents are to be submitted for information only.

### 1.03 FORM OF SUBMITTALS

A. Sheets Larger Than 8-1/2 by 11-inches:

1. Maximum sheet size: 24 by 32-inches.
   a. Exception: Full size pattern or template drawings.
2. Number of copies:
   a. Submittals for review:
      1. Five (5) copies of blue- or black-line prints.
      2. All but three (3) copies will be returned.
   b. Informational submittals:
      1. Three (3) copies of opaque prints.
      2. No copies will be returned.

B. Small Sheets or Pages:
1. Minimum sheet size: 8-1/2 by 11-inches.
2. Number of copies:
   a. Opaque copies:
      1. For review: Five (5) copies.
         a. Three (3) copies will be retained.
      2. Informational submittals: Three (3) copies.

C. Samples: Two (2) sets of each.
1. One (1) set will be returned.

**PART 2 - PRODUCTS (NOT USED)**

**PART 3 - EXECUTION**

3.01 TIMING OF SUBMITTALS

A. Deliver each submittal requiring approval in time to allow for adequate review and processing time, including resubmittals if necessary. Failure of the Subcontractor in this respect will not be considered as grounds for an extension of the Contract Time.

B. If a submittal must be processed within a certain time in order to maintain the progress of the Work, state so clearly on the submittal.

3.02 SUBMITTAL PROCEDURES - GENERAL

A. Preparation of Submittals:
1. Label each copy of each submittal with the following information:

a. Project name.
b. Date of submittal.
c. Subcontractor's name and address.
d. Supplier's name and address.
e. Manufacturer's name.
f. Specification section where the submittal is specified.
g. Numbers of applicable drawings and details.

3.03 SHOP DRAWINGS

A. Content: Include the following information:
1. Dimensions at accurate scale.
2. All field measurements that have been taken at accurate scale.
3. Names of specific products and materials used.
4. Details identified by the Contract Document sheet and detail numbers.
5. Show compliance with the specific standards referenced.
6. Name of preparing firm.

B. Preparation:
1. Reproductions of the Contract Documents is not acceptable as shop drawings.

C. Required submittals:
1. Structural and miscellaneous metals.
2. Roof trusses.
3. Casework.
   a. Cabinets.
   b. Nurses' Station.
4. Doors.
   a. Hollow Metal.
   b. Wood.
   c. Hardware.
   d. Access Doors.
5. Accessories.
6. Fire extinguishers and cabinets.
7. Column covers.
8 Mechanical, electrical and plumbing.

3.04 SAMPLES

A. Samples:
1. Where selection is required, provide full set of all options.
2. Attach a description to each sample.

3. Attach name of manufacturer or source to each sample.

B. Required Sample and/or Color Submittals
1. Brick and mortar.
2. Shingles.
3. Gutters and downspouts.
4. Plastic laminate.
5. Cabinet stain and finish.
6. Door stain and finish.
7. Paint.
8. Flooring and Walls.
   a. VCT and base.
   b. Ceramic tile and base.
   c. Quarry tile and base.
9. Vinyl wallcoverings.

3.05 REVIEW OF SUBMITTALS

A. Submittals for approval will be reviewed, marked with appropriate action, and returned.

3.06 RETURN AND RESUBMITTAL

A. Submittals may be returned to the Subcontractor by mail.

B. Perform resubmittals in the same manner as original submittals; indicate all changes requested by the Contractor.

END OF SECTION 01220

## SECTION 01241 - QUALITY CONTROL PROCEDURES

## PART 1- GENERAL

1.01 SUMMARY

A. Section Includes:
   1. General quality control activities.
   2. Procedures for submittal of quality control documentation.

B. Related Sections:
   1. Section 01300 - Submittals.

1.02 CONTRACT CONDITIONS

A. Independent testing agencies may not change the requirements of the Contract Documents and may not approve any portion of the Work.

B. Employment of testing agencies, by the Contractor or the Subcontractor, shall not relieve the Subcontractor of his obligation to perform the Work in accordance with the Contract Documents.

1.03 SUBMITTALS

A. Reports:
   1. Unless otherwise indicated, submit to the Contractor for review.
   2. Submit reports no later than the date of application for payment for the work to which the quality control activity relates.
   3. Reports shall be prepared by the entity performing the quality control activity.
   4. Include the following information in all types of reports:
      a. Date of report.
      b. Project name (and number, if applicable).
      c. Description.
      d. Name, address, and telephone number of entity performing activity.
      e. Date quality control activity was performed if applicable.
      f. Specification section(s) involved.
      g. Basis for evaluation (test method, etc.).
      h. Results or conclusions, including evaluations and interpretations.
      i. Title, name, and signature of person performing activity.
   5. Include the following information in all test reports:
      a. Locations from which samples were taken, if any.

b. Ambient conditions at time of activity.
c. Recommendations for retesting, if any.

**PART 2 - PRODUCTS (NOT USED)**

**PART 3 - EXECUTION**

3.01 GENERAL

A. Use installers who are capable of producing work of the specified quality.

B. Perform all quality control activities specified unless indicated to be performed by other entities.

3.02 TESTING

A. Perform tests specified.

B. When results of tests are unsatisfactory, make whatever changes or repairs are necessary and retest, at no cost to the Contractor or the Owner.

C. Submit a written report of each original test and of each retest.

END OF SECTION 01241

## SECTION 01312 - TEMPORARY FACILITIES AND SERVICES

## PART 1 - GENERAL

### 1.01 SUMMARY

A. Section Includes:
1. Temporary utilities.
2. Temporary construction.
3. Protective facilities.
4. Employee facilities.
5. Temporary services.
6. Required temporary facilities and services include but are not limited to:
   a. Access roads.
   b. Existing property protection.
   c. Public protective facilities required by law.
   d. Water supply.
      1. Include water service and sewer usage charges.
   e. Electrical service, except extension cords.
      1. Include electric service usage charges.
   f. Temporary lighting.
   g. Use of permanent lighting systems.
   h. Use of permanent electrical systems.

### 1.02 DEFINITIONS

A. Temporary Facilities: Construction, fixtures, fittings and other built items required to accomplish the Work but which are not incorporated into the finished work.

B. Temporary Utilities: A type of temporary facility, primary sources of electric power, water, natural gas supply, etc., obtained from public utilities, other main distribution systems, or temporary sources constructed for the Project, but not including the fixtures and equipment served.

C. Temporary Services: Activities required during construction which do not directly accomplish the Work.

D. Construction Equipment: A type of temporary facility, consisting of fixed equipment used to accomplish the Work, determined by the method the Subcontractor chooses to accomplish the Work.

### 1.03 QUALITY ASSURANCE

A. Comply with requirements of governing authorities, as to type, quantity, location and use of temporary facilities.

B. Comply with requirements of governing authorities, as to type and frequency of temporary services.

C. Comply with requirements of public utilities affected.

1.04 PROJECT CONDITIONS

A. Obtain easements where required.

1.05 SEQUENCING AND SCHEDULING

A. Maintain required facilities until not needed or until shortly before Substantial Completion. Remove facilities before Substantial Completion.

**PART 2 - PRODUCTS**

2.01 MATERIALS

A. General: Provide materials which are both suitable for the use and durable enough to withstand the use and abuse to be expected.

2.02 TEMPORARY UTILITIES

A. Temporary Water Service:
1. Plumbing Subcontractor to provide the following as part of the Work:
   a. Connect to existing water main.
   b. Provide meter and shut-off valve.
   c. Disinfect temporary piping before use.

B. Temporary Power:
1. Electrical Subcontractor to provide the following as part of the Work:
   a. Obtain temporary service from local utility.
   b. Provide disconnect at connection to service.
   c. Provide service conductors and equipment.
   d. Provide metering equipment.

2.03 PROTECTIVE FACILITIES

A. Grading Subcontractor to provide the following as part of the Work:
1. Barricades at sidewalks and open ditches where construction work may present hazards to vehicles and personnel.

a. Do not remove until other security facilities, either temporary or permanent, are in place and in operation.

2. All protective facilities to meet standards of OSHA and The Haskell Company.

3. Existing Property Protection: Provide fixed barriers to prevent damage due to construction machinery, vehicles, and adjacent work;

2.04 EMPLOYEE FACILITIES

A. Temporary Lighting: Electrical Subcontractor to provide lighting.

2.05 TEMPORARY CONSTRUCTION

A. Access Roads: Grading Subcontractor to provide temporary roads as required.

1. Provide traffic surfaces which are adequate for the loads expected and which will be durable in normal weather conditions.

**PART 3 - EXECUTION**

3.01 TERMINATION AND REMOVAL

A. Remove temporary facilities when no longer needed, or when use of appropriate permanent facility is approved, but not later than Substantial Completion.

B. Where temporary roads are not provided in same location as permanent roads, Grading Subcontractor is to restore the Site to its original condition after removal of temporary roads, if required by the Drawings.

1. Remove temporary paving.
2. In areas to be planted, remove contaminants which inhibit growth of plants.
3. In areas where specific soil or fill is required, remove soil and fill that does not comply.
4. Till and regrade as required to restore original degree of compaction.

END OF SECTION 01312

## SECTION 01630 - PRODUCT OPTIONS AND SUBSTITUTIONS

## PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. General product requirements, including:
      a. Product options.
      b. Procedures for substitution requests.

## PART 2 - PRODUCTS (NOT USED)

## PART 3 - EXECUTION

3.01 PRODUCT OPTIONS

A. It is the Subcontractor's responsibility to select products which comply with the Contract Documents and which are compatible with one another.
   1. Verify that electrical characteristics of products are compatible with electrical systems. Notify the Contractor of all discrepancies.

3.02 SUBSTITUTION PROCEDURE

A. Submission of request for substitution shall constitute a representation by the Subcontractor that he:
   1. Has investigated the proposed product and determined that it is equal to or better than the specified product. Absence of an explicit comparison of any characteristic of the proposed product to the specified product shall constitute a representation that the proposed product is equal to or better than the specified product with regard to that characteristic.
   2. Will provide the same warranty for the proposed product as for the specified product.
   3. Will coordinate the installation and make other changes which may be required for the Work to be complete in all respects, including:
      a. Redesign.
      b. Additional components and capacity required by other work affected by the change.
   4. Waives all claims for additional costs and time extensions which subsequently may become apparent and which are caused by the change.

B. Substitutions will not be considered when acceptance would require substantial revision of the Contract Documents.

C. Data Required with Substitution Request: Provide at least the following data:

1. Complete product data.
2. An itemized comparison of the proposed product to the specified product.
3. Description of changes that will be required in other work or products if the substitute product is approved.

END OF SECTION 01630

## SECTION 01700 - CONSTRUCTION PROCEDURES

## PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
1. Laying out the Work.
2. General construction and installation procedures.
3. Cleaning during construction.
4. Project completion procedures.

1.02 PROJECT CONDITIONS

A. Take precautions to prevent accidents due to physical hazards.
1. Provide barricades, warning lights, or signs as required to inform personnel and the public of the hazard being protected against.
2. Safety barricades: Comply with regulations.
3. Notify the Contractor before beginning work that involves hazardous operations, including use of explosives and the like.
4. Comply with all OSHA 15 safety requirements.
5. Hardhats and safety glasses are to be worn by all personnel on the Job Site and all precautions shall comply with governing safety agencies.

B. Take care to prevent pollution of air, water and soil.
1. Comply with environmental protection regulations.
2. Do not dump contaminants on the Project Site. Dispose of materials in accordance with all Federal, State and Local requirements.

C. Keep public streets free of debris, dirt and rocks due to the Work.

D. Provide adequate traffic control by means of signs, signals and flagmen, as necessary.

## PART 2 - PRODUCT (NOT USED)

## PART 3 - EXECUTION

3.01 GENERAL EXAMINATION REQUIREMENTS

A. Prior to performing Work, examine the applicable substrates and the conditions under which the Work is to be performed.

B. If unsatisfactory conditions are encountered, notify the Contractor and take corrective action before proceeding.

C. Conditions which could have been discovered by examination will not be allowed as cause for claims for extra work.

D. Notify the Contractor promptly of any modifications required due to existing conditions or previous work.

E. Verify space requirements of items which are shown diagrammatically on the Drawings.

3.02 GENERAL PREPARATION REQUIREMENTS

A. Take field measurements as required to fit the Work properly.

B. Recheck measurements prior to installing each product.

3.03 GENERAL INSTALLATION PROCEDURES

A. Accurately locate the Work and components of the Work; make vertical work plumb; make horizontal work level.

B. Coordinate exact locations of fixtures and outlets with finish elements.

3.04 CLEANING AND PROTECTION

A. Remove debris from concealed spaces prior to enclosing the space.

B. Keep the Site and the Work free of waste materials and debris.
1. Remove waste from the Site periodically. DO NOT conceal waste (cans, bottles, cigarette butts etc.) within the new construction.
2. Keep hazardous and unsanitary materials in containers separate from other waste.

C. Clean areas in which Work is to be done to level of cleanliness necessary for proper execution of that Work.
1. Where dust would impair execution of Work, broom and vacuum clean the entire interior area and keep clean.

D. One (1) request will be made to the Subcontractor to maintain a clean and safe work area. If area is not maintained, the Contractor may maintain the area(s) and back charge the Subcontractor for all associated costs.

3.05 INSTALLATION OF COMPONENTS

A. Install all products in accordance with the manufacturer's instructions and recommendations, whether conveyed in writing or not.

B. Mounting Heights: Where mounting heights are not indicated, mount at heights directed by the Contractor.

C. Provide all anchors and fasteners required and use methods necessary to securely fasten the Work.
   1. Allow for thermal expansion and contraction, and for building movement.

D. After installation, adjust operating components to proper operation as required.

3.06 FINAL CLEANING

A. Dispose of debris in a lawful manner.
   1. Do not burn or bury debris on the Site if not allowed by the regulating agencies having jurisdiction.
   2. Do not dispose of volatile wastes in storm or sanitary drains.
   3. Dispose of Hazardous materials as specified in the Material Data Safety Sheets and Federal, State and Local ordinances.

B. All areas are to be completed in a broom cleaned condition.

3.07 PROJECT COMPLETION PROCEDURES

A. Complete the Work, prior to Substantial Completion, as required to obtain a Certificate of Occupancy from the governing authorities.

END OF SECTION 01700

## SECTION 02010—SUBSURFACE EXPLORATION

## PART 1 – GENERAL

1.01. Related Documents
Drawings and General Provisions of Contract including General Conditions, Geotechnical / Soils Report, Supplementary Conditions, and Division 1 Specification Sections.

1.02. A subsurface investigation and Report for this project was prepared and has been distributed to all parties affiliated with this project to include those invited to provide the Owner with a qualified bid. The information obtained is available to the Contractor for use in the preparation of this bid and the Construction of Building Phase. This report is available to all prospective Bidders. The information is made available to all bidders only so that they have access to the identical information available to the Owner. Accordingly, the information shall be used at each bidders own judgment.

1.03. ***The subsurface information included in these specifications shall not be considered*** a substitute for personal investigation, interpretations, or judgments of bidders as to the character of subsurface materials that may not be encountered for the work.

1.04. If a bidder requires additional subsurface information, he may have access to the job site for making his own exploration at his own expense. Providing however, that he first has approval of the Owner, and also that he leaves the site in as neat and orderly condition as before entering the site.

1.05. The Owner, and Architect, assumes no responsibility for the accuracy of such information, and no representations are made by them regarding the subsurface conditions.

## PART 2 - SUB SURFACE REPORT

2.01. The published report of subsurface exploration and geo-technical evaluation on the Project is enclosed in these Specifications.

END OF SECTION





# ECS Southeast, LLP

## Preliminary Geotechnical Engineering Report

## Pruitt Health Nursing Homes

Advantage Way
Winston-Salem, North Carolina

ECS Project Number 09:29374

March 26, 2021

March 26, 2021

Mr. Edward Loeffler
Curry Engineering
205 S Fuquay Ave
Fuquay-Varina, NC 27526

ECS Project No. 09:29374

Reference: Preliminary Geotechnical Engineering Report
**Pruitt Health Nursing Homes**
Advantage Way
Winston-Salem, North Carolina

Dear Mr. Loeffler:

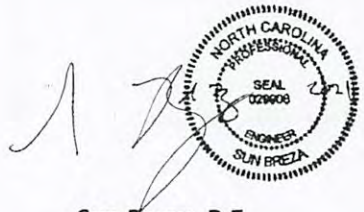
ECS Southeast, LLP (ECS) has completed the preliminary subsurface exploration, laboratory testing, and geotechnical engineering analyses for the above-referenced project. Our services were performed in general accordance with our agreed to scope of work. This preliminary report presents our understanding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






***Ertica Susanto***
*Project Manager*
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***Sun Breza, P.E.***
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- Boring Location Diagram

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- Subsurface Exploration Procedure: Standard Penetration Testing (SPT)
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**Appendix C – Laboratory Testing**
- Laboratory Test Results Summary
- Liquid and Plastic Limits Test Report

## EXECUTIVE SUMMARY

The following summarizes the main findings of the exploration, particularly those that may have a cost impact on the planned development. Further, our principal foundation recommendations are summarized. Information gleaned from the Executive Summary should not be utilized in lieu of reading the entire geotechnical report.

- Potential highly plastic soils classified as Elastic SILT (MH) is present at the localized area of site (in the vicinity of Boring B-10). This is potentially expansive soils per the current North Carolina Building Code and local practice. Depending on final design grades and location of the proposed buildings, mitigation measures may be required to reduce the potential for structure or pavement distress (cracking, excessive deformation) as a result of volumetric changes in potentially expansive soils due to variations in its moisture content. Mitigation options include separation distances or chemical (lime) stabilization. Additional soil sampling and laboratory testing should be performed during the design phase of the project to further evaluate the potentially expansive soils.

- Existing fill was encountered in some of the borings (Borings B-6, B-8, B-9, and B-10) to approximate depths ranging from approximately 8 to 22 feet below the existing grades. The fill placement was observed on a part time basis by ECS between 2009 and 2012. The near surface existing fill should be evaluated at the time of construction by proofrolling, excavation of test pits, hand auger borings, and/or construction excavations. If the existing near surface fill is very soft to soft and/or contains excessive inert debris or excessive organic materials, it should not be used to support foundations, floor slabs, or pavements, and it should be undercut and replaced with compacted structural fill consisting of satisfactory materials.

- Based on the soil test borings and depending on design grades, we anticipate undercutting of near surface existing fill and very soft to soft or very loose near-surface natural soils may be necessary in localized areas of the site (in the vicinity of Borings B-2, B-4, B-8, B-9, and B-10). If site earthwork is performed during the typically cooler, wetter months of the year, additional undercutting is anticipated due to excessively wet poor soils.

- Lightly loaded 1- to 3-story structures (column loads less than 50 kips and wall loads less than 3 kips per foot) can be supported by shallow foundations bearing on undisturbed residual soils, new engineered fill, approved existing fill.

- Partially Weathered Rock (PWR) was encountered in Boring B-7 at approximate depth of 12 feet below the existing grade and auger refusal at approximate depth of 15 feet.

- The pavement subgrade soils for this project should consist of Silty SAND (SM) or Sandy SILT (ML). A California Bearing Ratio (CBR) of 3 can be used for preliminary pavement section thickness design, until a design phase CBR laboratory testing is performed.

Once grades, building location, and foundation loads have been determined, this information should be provided to ECS. Additional field and laboratory testing should be performed during the design phase to develop final geotechnical recommendations.

## 1.0 INTRODUCTION

The purpose of this study was to provide preliminary geotechnical information for the development of nursing homes facility for Pruitt Health. The recommendations developed for this report are based on project information supplied by Mr. Edward Loeffler with Curry Engineering.

Our services were provided in accordance with our Proposal No. 28036-P, dated February 22, 2021, which included our Terms and Conditions of Service, and was authorized by Mr. Adam Loeffler on February 22, 2020.

This report contains the procedures and results of our subsurface exploration and laboratory testing programs, review of existing site conditions, engineering analyses, and preliminary 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 surface topographical features and site conditions.
- A review of area and site geologic conditions.
- A review of subsurface soil stratigraphy with pertinent physical properties.
- Final soil test boring logs
- Preliminary foundation, floor slabs, and pavement recommendations.
- Preliminary site construction recommendations.
- Recommendations for additional testing and/or consultation that might be required to complete the geotechnical assessment and related engineering for this project.

## 2.0 PROJECT INFORMATION

This proposal is based on the following sources of information:

- Emails between Edward Loeffler with Curry Engineering and Erika Frey with ECS on February 18, 2021.
- Telephone conversation between Edward Loeffler and Ertica Susanto with ECS on February 18, 2021.
- Plat prepared by Allied Associates filed on September 13, 2017.
- Google Earth aerial photo dated February 3, 2019.
- Site and topographic information obtained from the Forsyth County GIS website.

### 2.1 SITE INFORMATION

ECS understands the subject site is located at Advantage Way in Winston-Salem, North Carolina. The site is at the approximate location shown on the Site Location Diagram in Appendix A and following figure.




**Figure 2.1.1. Site Location Shown Outlined in Red**

The site is currently undeveloped grassy lots. There is an existing pond at the southern part of the site. Based on historical aerial images obtained from Google Earth, mass site grading occurred in 2009. ECS performed fill placement observation and density testing between 2009 and 2012.

### 2.2 PROPOSED CONSTRUCTION

The project involves development of 1-story nursing home facilities. At the time of this report, the location of the proposed building and pavements, structural loads, or grading information was not available.

Based on existing site grades and our experience with similar projects, we assume that fill and cut depths will be less than 10 feet for general site grading. Design foundation loads have not been provided to us. We assume the maximum unfactored foundation loads will be:

- Maximum Column Load = 50 kips
- Maximum Wall Loads= 2 kips per foot

The structural engineer should verify these assumptions and notify ECS if the actual unfactored foundation design loads exceed or are significantly less than these assumed values.

## 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 ten (10) borings. Our borings were located with a handheld GPS unit and their approximate locations are shown on the Boring Location Diagram in Appendix A.

### 3.1 SUBSURFACE CHARACTERIZATION

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

The site is located within the Piedmont physiographic province. The Piedmont is characterized by residual overburden soils weathered in place from the underlying igneous and metamorphic rock. The topography and relief of the Piedmont uplands have developed from differential weathering of the bedrock. Because of the continued chemical and physical weathering, the bedrock in the Piedmont is now generally covered with a mantle of soil that has weathered in place from the parent bedrock. These soils have variable thicknesses and are referred to as residuum or residual soils. The residuum is typically finer grained and has higher clay content near the surface because of the advanced weathering. Similarly, the soils typically become coarser grained with increasing depth because of decreased weathering. As the degree of weathering decreases, the residual soils generally retain the overall appearance, texture, gradation and foliations of the parent rock. The boundary between soil and rock in the Piedmont is not sharply defined. A transitional zone termed "partially weathered rock" is normally found overlying the parent bedrock. Partially weathered rock (PWR) is defined for engineering purposes as residual material with Standard Penetration Resistances (N-values) exceeding 100 blows per foot. The transition between hard/dense residual soils and partially weathered rock occurs at irregular depths due to variations in degree of weathering. Also, it is not unusual to find lenses and boulders of hard rock and/or zones of partially weathered rock within the soil mantel well above the general bedrock level.

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.

| Approximate Depth (ft) | Stratum | Description | Ranges of SPT[(2)] N-values (bpf) |
|---|---|---|---|
| 0 - 0.2 (Surface cover) | n/a | **Surficial Material:** Topsoil (1 to 2 inches) | N/A |
| 0.1 - 8 | I | **Existing Fill and/or Residuum:** Sandy Elastic SILT (MH), Elastic SILT (MH), and Sandy SILT (ML).<br><br>Notes:<br>1. Existing fill were encountered in Borings B-6, B-8, B-9, and B-10. | 3 to 17 |
| 0.1 - 20 | II | **Residuum:** Silty SAND (SM) and Clayey SAND (SC).<br>Notes:<br>1. Encountered in Borings B-1, B-5, B-7, and B-8. | 6 to 37 |
| 12 – 15 or greater than 15 | III | **Partially Weathered Rock (PWR) and Bedrock:** Spoon Refusal (50/0") or Auger Refusal.<br><br>Notes:<br>1. Encountered in Boring B-7. | 100+ |

Notes:

(1) Please note that the ground surface elevations were not surveyed by a licensed surveyor; these elevations are approximate based on Google-Earth©. Therefore, elevation ranges are approximate +/- several feet.

(2) Standard Penetration Testing; blows per foot.

### 3.2 GROUNDWATER OBSERVATIONS

Groundwater seepage was observed in Borings B-1, B-2, B-7, and B-8, at completion of drilling at approximate depths ranging from 13.5 to 24.5 feet below the existing grades. Caving, which may be an indicator of groundwater presence was observed in most borings at approximate depths of 12 to 17 feet below the existing grades. Variations in the long-term water table may occur as a result of changes in precipitation, evaporation, surface water runoff, construction activities, and other factors.

### 3.3 LABORATORY TESTING

Classification and index property tests were performed on representative soil samples. Laboratory tests performed on selected samples included percent finer than No. 200 sieve test (ASTM D 1140), moisture content tests (ASTM D 2216), and Atterberg limit test (ASTM D 4318). Please refer to the laboratory testing summary in Appendix C.

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) and 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 PRELIMINARY DESIGN RECOMMENDATIONS

## 4.1 BUILDING/STRUCTURE DESIGN

### 4.1.1 Preliminary Foundation Recommendations

Lightly loaded 1-story structures (column loads less than 50 kips and wall loads less than 2 kips per foot) can be supported by shallow foundations bearing on undisturbed residual soils, new engineered fill, or approved existing fill. An allowable bearing of 2,000 to 3,000 psf can be used to design the foundations. If very loose and/or soft soils are present in areas of the site, more undercutting should be anticipated if a bearing pressure of 3,000 psf instead of 2,000 psf is used to size the footings.

Based on the soil test borings and depending on design grades, we anticipate undercutting of near surface existing fill and very soft to soft or very loose near-surface natural soils may be necessary in localized areas of the site (in the vicinity of Borings B-2, B-4, B-8, B-9, and B-10).

Once preliminary grades, building locations, and foundation loads have been determined, this information should be provided to ECS. We may be able to modify these foundation recommendations once additional project information is available. Also, additional field testing, including additional soil test borings, seismic refraction, pressuremeter (Menard) testing and detailed settlement analyses may increase the recommended design bearing pressures. We request the preliminary unfactored loads and column/bearing wall foundation plans before performing further testing.

### 4.1.2 Floor Slabs

ECS recommends ground floor slabs be designed as a slabs-on-grade over existing natural soils, new compacted structural fill or existing fill that are adequate when proofrolled. A preliminary modulus of subgrade reaction of 100 pci is recommended for design of floor slabs bearing on firm natural soils and newly-placed and properly-compacted structural fill soils that can be successfully proofrolled. This value is appropriate for a 1-foot square loaded area. If the method of structural analysis of the slab utilizes subgrade reaction values adjusted for the size and shape of the loaded area, please contact us for modifications to the subgrade reaction values. In order to allow for some relative displacement, the floor slabs should be structurally separated from both columns and load bearing walls. In addition, slabs should be provided with sufficient joints to control cracking associated with concrete volume changes. To help reduce curling of the slab and resulting cracking, proper curing techniques should be used.

A minimum separation of 2 feet should be maintained between the floor slab subgrade elevation and Elastic SILT (MH) or Sandy Elastic SILT (MH), if encountered.

## 4.2 PRELIMINARY SITE DESIGN CONSIDERATIONS

### 4.2.1 Pavements

Undisturbed low-plasticity residual soils, newly placed engineered fill, or approved existing fill can provide adequate support for a pavement structure designed for appropriate subgrade strength and traffic characteristics.

At the time of this report, a preliminary site plan is not available. Based on the results of our soil test borings, it appears that the soils that is potentially exposed as pavement subgrades, exposed in cuts and placed as fill, will consist mainly of existing fill material and natural soils classified as Sandy SILT (ML) and Silty SAND (SM). These soils typically demonstrate laboratory CBR values of at least 3. A preliminary design CBR value of 3 is recommended for this project. This value should be confirmed by CBR sampling and testing during the design phase of the project.

We emphasize that good base course drainage is essential for successful pavement performance. Water buildup in the base course will result in premature pavement failures. The subgrade and pavement should be graded to provide effective runoff to either the outer limits of the paved area or to catch basins so that standing water will not accumulate on the subgrade or pavement.

The pavement at locations for refuse dumpsters should be properly designed for the high axial loads and twisting movements of the trucks. Consideration should be given to the use of Portland cement concrete (PCC) pavement for the dumpster and approach areas. We recommend that the refuse collector be consulted to determine the size and thickness of the concrete pads for dumpsters. At locations where delivery truck, semi-trailers, and/or buses will be turning and maneuvering, the flexible pavement section should be designed to resist the anticipated shear stress on the pavement throughout the required pavement service life.

## 5.0 PRELIMINARY SITE CONSTRUCTION RECOMMENDATIONS

### 5.1 SUBGRADE PREPARATION

The subgrade preparation should consist of stripping vegetation, rootmat, topsoil, and other soft or inadequate materials from the proposed construction areas. The borings generally encountered 1 to 2 inches of topsoil. Deeper topsoil or organic laden soils are likely present in wet, low-lying, and poorly drained areas.

We anticipate average stripping depths of 6 inches to remove topsoil and rootmat from areas that are currently grass-, weed- or brush-covered. We recommend that these average stripping depths be used for quantity approximations for preliminary earthwork design and construction cost estimating.

Based on the soil test borings and depending on design grades, we anticipate undercutting of near surface existing fill and very soft to soft or very loose near-surface natural soils may be necessary in localized areas of the site (in the vicinity of Borings B-2, B-4, B-8, B-9, and B-10).

Existing Fill: Borings B-6, B-8, B-9, and B-10 represent engineered fill placed in 2009 to 2012. The existing engineered fill thickness encountered at the boring locations varied from approximately 8 to 22 feet. ECS tested and documented the placement and compaction of the existing fill at the site at that time on a part-time, on-call basis. The engineered fill generally classified as Silty SAND (SM) and Sandy SILT (ML). Isolated zones of the existing fill had lower N-values, indicating pockets of looser, softer materials. However, this can occur even for properly placed and compacted engineered fill due to variability in soil types and current moisture conditions within the fill mass, in addition to acceptable variability in fill placement and compaction procedures and efforts.

In our opinion, the existing fill is adequate for support of the proposed single story buildings and pavements. However, it should be evaluated at the time of construction, and undercutting and replacement of the existing fill in localized areas should be anticipated due to potential wetting and disturbance of the near-surface materials since it was originally placed. Undercutting and replacement of existing fill could be addressed contractually through allowances and unit prices.

### 5.2 EARTHWORK OPERATIONS

The majority of existing fill appears to be satisfactory for support of proposed pavements, floor slabs, foundations, and retaining walls. However, the fill should be evaluated through proofrolling within pavement and floor slab areas and through dynamic cone penetration (DCP) testing within shallow foundation to confirm bearing capacity. Where the existing fill does not meet the requirements or specifications of this report, it should be undercut and replaced with compacted structural fill. It appears that the existing fill soils are satisfactory for re-use as compacted structural fill. Dependent on the time of planned grading activities, the soils may require moisture conditioning to achieve the specified density.

Depending on design grades and location of the proposed buildings, we anticipate that site grading and temporary construction excavations for this project will not require the hammering and/or blasting of partially weathered rock and rock. Depending on planned design grades, the excavations may also encounter groundwater, which should be removed by appropriate dewatering measures.

Satisfactory structural fill materials for this project consist of sands or low-plasticity silts/clays. We anticipate that the majority of the soils encountered in the preliminary borings within the anticipated excavation depths will be satisfactory for use as compacted structural fill. Structural fill should be placed in horizontal lifts and compacted adequately to achieve sufficient soil stiffness and shear strength. Detailed compaction recommendations can be provided in a design-phase geotechnical report.

Permanent cut and fill slopes should be no steeper than 3H:1V. It may be possible to steepen the permanent slopes if detailed slope stability analyses are performed.

### 5.3 ADDITIONAL GEOTECHNICAL EXPLORATION

The preliminary conclusions and recommendations submitted in this report are based upon the data obtained from a limited subsurface exploration program and are intended to provide a general assessment of geotechnical conditions at select locations on the site. Once final grades, building locations, pavement locations, site retaining wall locations, and stormwater control measure locations have been determined, we recommend that additional soil test borings and laboratory testing be performed to develop final geotechnical design and construction recommendations.

## 6.0 CLOSING

ECS has prepared this report of findings, evaluations, and recommendations to guide geotechnical-related design and construction aspects of the project.

The description of the proposed project is based on information provided to ECS. If any of this information is inaccurate, either due to our interpretation of the documents provided or site or design changes that may occur later, ECS should be contacted immediately in order that we can review the report in light of the changes and provide additional or alternate recommendations as may be required to reflect the proposed construction.

We recommend that ECS be allowed to review the project's plans and specifications pertaining to our work so that we may ascertain consistency of those plans/specifications with the intent of the geotechnical report.

Field observations, monitoring, and quality assurance testing during earthwork and foundation installation are an extension of and integral to the geotechnical design recommendation. We recommend that the owner retain these quality assurance services and that ECS be allowed to continue our involvement throughout these critical phases of construction to provide general consultation as issues arise. ECS is not responsible for the conclusions, opinions, or recommendations of others based on the data in this report.

## APPENDIX A – Drawings

Site Location Diagram
Boring Location Diagram




# Site Location Diagram
# PRUITT HEALTH NURSING HOMES

**ADVANTAGE WAY, WINSTON-SALEM, NORTH CAROLINA**
**THE CURRY ENGINEERING GROUP, PLLC**

| | |
|---|---|
| ENGINEER | SB |
| SCALE | AS NOTED |
| PROJECT NO. | 09:29374 |
| SHEET | 1 OF 1 |
| DATE | 3/24/2021 |




# Boring Location Diagram
# PRUITT HEALTH NURSING HOMES

**ADVANTAGE WAY, WINSTON-SALEM, NORTH CAROLINA**
**THE CURRY ENGINEERING GROUP, PLLC**

| | |
|---|---|
| ENGINEER | SB |
| SCALE | AS NOTED |
| PROJECT NO. | 09:29374 |
| SHEET | 1 OF 1 |
| DATE | 3/23/2021 |

## APPENDIX B – Field Operations

Reference Notes for Boring Logs
Subsurface Exploration Procedure: Standard Penetration Testing (SPT)
Boring Logs

# REFERENCE NOTES FOR BORING LOGS

## MATERIAL[1,2]

| | | |
|---|---|---|
|  | | ASPHALT |
|  | | CONCRETE |
|  | | GRAVEL |
|  | | TOPSOIL |
|  | | VOID |
|  | | BRICK |
|  | | AGGREGATE BASE COURSE |
|  | GW | WELL-GRADED GRAVEL<br>gravel-sand mixtures, little or no fines |
|  | GP | POORLY-GRADED GRAVEL<br>gravel-sand mixtures, little or no fines |
|  | GM | SILTY GRAVEL<br>gravel-sand-silt mixtures |
|  | GC | CLAYEY GRAVEL<br>gravel-sand-clay mixtures |
|  | SW | WELL-GRADED SAND<br>gravelly sand, little or no fines |
|  | SP | POORLY-GRADED SAND<br>gravelly sand, little or no fines |
|  | SM | SILTY SAND<br>sand-silt mixtures |
|  | SC | CLAYEY SAND<br>sand-clay mixtures |
|  | ML | SILT<br>non-plastic to medium plasticity |
|  | MH | ELASTIC SILT<br>high plasticity |
|  | CL | LEAN CLAY<br>low to medium plasticity |
|  | CH | FAT CLAY<br>high plasticity |
|  | OL | ORGANIC SILT or CLAY<br>non-plastic to low plasticity |
|  | OH | ORGANIC SILT or CLAY<br>high plasticity |
|  | PT | PEAT<br>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, $Q_P$[4] | SPT[5] (BPF) | CONSISTENCY[7] (COHESIVE) |
|---|---|---|
| <0.25 | <3 | 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 |

## GRAVELS, SANDS & NON-COHESIVE SILTS

| SPT[5] | DENSITY |
|---|---|
| <5 | Very Loose |
| 5 - 10 | Loose |
| 11 - 30 | Medium Dense |
| 31 - 50 | Dense |
| >50 | Very Dense |

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

## WATER LEVELS[6]

- WL (First Encountered)
- WL (Completion)
- WL (Seasonal High Water)
- WL (Stabilized)

## FILL AND ROCK

FILL | POSSIBLE FILL | PROBABLE FILL | ROCK

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

[2]To 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.

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

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

[5]Standard 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.

[6]The 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.

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

[8]Percentages 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 12 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.

| CLIENT: | PROJECT NO.: | BORING NO.: | SHEET: |
|---|---|---|---|
| **The Curry Engineering Group, PLLC** | **09:29374** | **B-1** | **1 of 1** |
| PROJECT NAME: | DRILLER/CONTRACTOR: | | |
| **Pruitt Health Nursing Homes** | **Presley Drilling** | | |
| SITE LOCATION: | | | LOSS OF CIRCULATION |
| **Advantage Way, Winston-Salem, North Carolina 27023** | | | |
| NORTHING: | EASTING: | STATION: | SURFACE ELEVATION: | BOTTOM OF CASING |
| **842472.1** | **1611724.7** | | **863.0** | |

| DEPTH (FT) | SAMPLE NUMBER | SAMPLE TYPE | SAMPLE DIST. (IN) | RECOVERY (IN) | DESCRIPTION OF MATERIAL | WATER LEVELS | ELEVATION (FT) | BLOWS/6" |
|---|---|---|---|---|---|---|---|---|
| | | | | | Topsoil Thickness[1.00"] | | | |
| | S-1 | SS | 18 | 18 | (ML) Residuum, SANDY SILT, contains mica, dark reddish brown to grayish brown, moist, firm to stiff | | | 2-3-3 (6) |
| | S-2 | SS | 18 | 18 | | | | 4-4-6 (10) |
| 5 | | | | | | | 858 | |
| | S-3 | SS | 18 | 18 | | | | 4-5-6 (11) |
| | S-4 | SS | 18 | 18 | | | | 6-7-6 (13) |
| 10 | | | | | | | 853 | |
| | S-5 | SS | 18 | 18 | (SM) SILTY SAND, contains rock fragments, white and gray to dark reddish brown, wet, loose to medium dense | | | 5-3-3 (6) |
| 15 | | | | | | | 848 | |
| | S-6 | SS | 18 | 18 | | ▼ | | 6-5-3 (8) |
| 20 | | | | | **END OF DRILLING AT 20.0 FT** | | 843 | |
| 25 | | | | | | | 838 | |
| 30 | | | | | | | 833 | |

Plastic Limit Water Content Liquid Limit

⊗ STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD

REC

○ CALIBRATED PENETROMETER TON/SF

[FINES CONTENT] %




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

| | | | |
|---|---|---|---|
| ▽ WL (First Encountered) | BORING STARTED: **Mar 15 2021** | CAVE IN DEPTH: | **16.00** |
| ▼ WL (Completion) **18.50** | BORING COMPLETED: **Mar 15 2021** | HAMMER TYPE: | **Manual** |
| ▽ WL (Seasonal High Water) | EQUIPMENT: **ATV Simco** | LOGGED BY: | DRILLING METHOD: **2.25 HSA** |
| ▽ WL (Stabilized) | | | |

| CLIENT: | PROJECT NO.: | BORING NO.: | SHEET: |
|---|---|---|---|
| **The Curry Engineering Group, PLLC** | **09:29374** | **B-2** | **1 of 1** |
| PROJECT NAME: | DRILLER/CONTRACTOR: | | |
| **Pruitt Health Nursing Homes** | **Presley Drilling** | | |
| SITE LOCATION: | | | LOSS OF CIRCULATION |
| **Advantage Way, Winston-Salem, North Carolina 27023** | | | |
| NORTHING: | EASTING: | STATION: | SURFACE ELEVATION: |
| **842469.4** | **1611474.2** | | **869.0** |

| DEPTH (FT) | SAMPLE NUMBER | SAMPLE TYPE | SAMPLE DIST. (IN) | RECOVERY (IN) | DESCRIPTION OF MATERIAL | WATER LEVELS | ELEVATION (FT) | BLOWS/6" |
|---|---|---|---|---|---|---|---|---|
| | | | | | Topsoil Thickness[2.00"] | | | |
| | S-1 | SS | 18 | 18 | (ML) Residuum, SANDY SILT, contains mica, grayish brown, moist, firm to stiff | | | 2-2-3 (5) |
| | S-2 | SS | 18 | 18 | | | | 5-5-5 (10) |
| 5 | | | | | | | 864 | |
| | S-3 | SS | 18 | 18 | | | | 4-4-6 (10) |
| | S-4 | SS | 18 | 18 | (ML) SANDY SILT, grayish orange, moist, firm | | | 3-3-5 (8) |
| 10 | | | | | | | 859 | |
| | S-5 | SS | 18 | 18 | (ML) SANDY SILT, contains mica, grayish brown, firm to stiff | | | 4-5-5 (10) |
| 15 | | | | | | | 854 | |
| | S-6 | SS | 18 | 18 | | ▼ | | 3-4-4 (8) |
| 20 | | | | | **END OF DRILLING AT 20.0 FT** | | 849 | |
| 25 | | | | | | | 844 | |
| 30 | | | | | | | 839 | |

Plastic Limit Water Content Liquid Limit

⊗ STANDARD PENETRATION BLOWS/FT

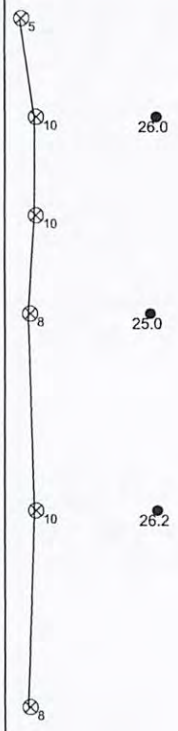
ROCK QUALITY DESIGNATION & RECOVERY

RQD

REC

○ CALIBRATED PENETROMETER TON/SF

[FINES CONTENT] %




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

| | | | |
|---|---|---|---|
| ▽ WL (First Encountered) | BORING STARTED: **Mar 15 2021** | CAVE IN DEPTH: **16.00** | |
| ▼ WL (Completion) **19.00** | BORING COMPLETED: **Mar 15 2021** | HAMMER TYPE: **Manual** | |
| ▼ WL (Seasonal High Water) | EQUIPMENT: **ATV Simco** | LOGGED BY: | DRILLING METHOD: **2.25 HSA** |
| ▽ WL (Stabilized) | | | |

| CLIENT: | PROJECT NO.: | BORING NO.: | SHEET: |
|---|---|---|---|
| **The Curry Engineering Group, PLLC** | **09:29374** | **B-3** | **1 of 1** |
| PROJECT NAME: | DRILLER/CONTRACTOR: | | |
| **Pruitt Health Nursing Homes** | **Presley Drilling** | | |
| SITE LOCATION: | | | LOSS OF CIRCULATION |
| **Advantage Way, Winston-Salem, North Carolina 27023** | | | |
| NORTHING: | EASTING: | STATION: | SURFACE ELEVATION: |
| **842260.5** | **1611438.6** | | **858.0** |

| DEPTH (FT) | SAMPLE NUMBER | SAMPLE TYPE | SAMPLE DIST. (IN) | RECOVERY (IN) | DESCRIPTION OF MATERIAL | WATER LEVELS | ELEVATION (FT) | BLOWS/6" |
|---|---|---|---|---|---|---|---|---|
| | | | | | Topsoil Thickness[1.00"] | | | |
| | S-1 | SS | 18 | 18 | (ML) Residuum, SANDY SILT, contains mica, reddish brown, moist, firm | | | 2-3-3 (6) |
| | S-2 | SS | 18 | 18 | (ML) SANDY SILT, contains mica, grayish brown, moist, firm to stiff | | | 4-6-4 (10) |
| 5 | | | | | | | 853 | |
| | S-3 | SS | 18 | 18 | | | | 5-5-6 (11) |
| | S-4 | SS | 18 | 18 | | | | 3-3-4 (7) |
| 10 | | | | | | | 848 | |
| | | | | | (ML) SANDY SILT, contains mica, gray and reddish brown, moist, stiff | | | |
| | S-5 | SS | 18 | 18 | | | | 6-5-7 (12) |
| 15 | | | | | | | 843 | |
| | S-6 | SS | 18 | 18 | | | | 5-4-6 (10) |
| 20 | | | | | **END OF DRILLING AT 20.0 FT** | | 838 | |
| 25 | | | | | | | 833 | |
| 30 | | | | | | | 828 | |

Plastic Limit Water Content Liquid Limit

⊗ STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD

REC

○ CALIBRATED PENETROMETER TON/SF

[FINES CONTENT] %




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

| | | | |
|---|---|---|---|
| ▽ WL (First Encountered) | BORING STARTED: **Mar 15 2021** | | CAVE IN DEPTH: **13.00** |
| ▼ WL (Completion) **Dry** | BORING COMPLETED: **Mar 15 2021** | | HAMMER TYPE: **Manual** |
| ⧩ WL (Seasonal High Water) | EQUIPMENT: **ATV Simco** | LOGGED BY: | DRILLING METHOD: **2.25 HSA** |
| ⧩ WL (Stabilized) | | | |

| CLIENT: | PROJECT NO.: | BORING NO.: | SHEET: |
|---|---|---|---|
| **The Curry Engineering Group, PLLC** | **09:29374** | **B-4** | **1 of 1** |
| PROJECT NAME: | DRILLER/CONTRACTOR: | | |
| **Pruitt Health Nursing Homes** | **Presley Drilling** | | |
| SITE LOCATION: | | | LOSS OF CIRCULATION |
| **Advantage Way, Winston-Salem, North Carolina 27023** | | | |
| NORTHING: | EASTING: | STATION: | SURFACE ELEVATION: |
| **842062.6** | **1611337.4** | | **856.0** |

| DEPTH (FT) | SAMPLE NUMBER | SAMPLE TYPE | SAMPLE DIST. (IN) | RECOVERY (IN) | DESCRIPTION OF MATERIAL | WATER LEVELS | ELEVATION (FT) | BLOWS/6" |
|---|---|---|---|---|---|---|---|---|
| | | | | | Topsoil Thickness[1.00"] | | | |
| | S-1 | SS | 18 | 18 | (ML) Residuum, SANDY SILT, contains mica, grayish brown to reddish gray, moist, firm to stiff | | | 1-2-2 (4) |
| | S-2 | SS | 18 | 18 | | | | 3-4-5 (9) |
| 5 | | | | | | | 851 | |
| | S-3 | SS | 18 | 18 | | | | 4-5-6 (11) |
| | S-4 | SS | 18 | 18 | | | | 6-6-7 (13) |
| 10 | | | | | | | 846 | |
| | S-5 | SS | 18 | 18 | | | | 4-5-4 (9) |
| 15 | | | | | | | 841 | |
| | S-6 | SS | 18 | 18 | | | | 4-6-6 (12) |
| 20 | | | | | **END OF DRILLING AT 20.0 FT** | | 836 | |
| 25 | | | | | | | 831 | |
| 30 | | | | | | | 826 | |

Plastic Limit Water Content Liquid Limit

⊗ STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD

REC

○ CALIBRATED PENETROMETER TON/SF

[FINES CONTENT] %




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

| | | | |
|---|---|---|---|
| ▽ WL (First Encountered) | BORING STARTED: **Mar 15 2021** | | CAVE IN DEPTH: **14.80** |
| ▼ WL (Completion) **Dry** | BORING COMPLETED: **Mar 15 2021** | | HAMMER TYPE: **Manual** |
| ▼ WL (Seasonal High Water) | EQUIPMENT: **ATV Simco** | LOGGED BY: | DRILLING METHOD: **2.25 HSA** |
| ▽ WL (Stabilized) | | | |

| CLIENT: | PROJECT NO.: | BORING NO.: | SHEET: |
|---|---|---|---|
| **The Curry Engineering Group, PLLC** | **09:29374** | **B-5** | **1 of 1** |
| PROJECT NAME: | DRILLER/CONTRACTOR: | | |
| **Pruitt Health Nursing Homes** | **Presley Drilling** | | |
| SITE LOCATION: | | | LOSS OF CIRCULATION |
| **Advantage Way, Winston-Salem, North Carolina 27023** | | | |
| NORTHING: | EASTING: | STATION: | SURFACE ELEVATION: |
| **841882.4** | **1611435.2** | | **849.0** |

| DEPTH (FT) | SAMPLE NUMBER | SAMPLE TYPE | SAMPLE DIST. (IN) | RECOVERY (IN) | DESCRIPTION OF MATERIAL | WATER LEVELS | ELEVATION (FT) | BLOWS/6" |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | Topsoil Thickness[1.00"] | | | |
| | S-1 | SS | 18 | 18 | (SM) Residuum, SILTY SAND, contains mica and rock fragments, black and orange, moist, loose to medium dense | | | 3-4-4 (8) |
| | S-2 | SS | 18 | 18 | | | | 6-6-7 (13) |
| 5 | | | | | | | 844 | |
| | S-3 | SS | 18 | 18 | | | | 5-6-7 (13) |
| | S-4 | SS | 18 | 18 | (ML) SANDY SILT, white and orange, moist, firm | | | 2-3-5 (8) |
| 10 | | | | | | | 839 | |
| | S-5 | SS | 18 | 18 | (ML) SANDY SILT, contains mica, reddish brown, moist, stiff | | | 5-6-7 (13) |
| 15 | | | | | | | 834 | |
| | S-6 | SS | 18 | 18 | | | | 3-4-5 (9) |
| 20 | | | | | **END OF DRILLING AT 20.0 FT** | | 829 | |
| 25 | | | | | | | 824 | |
| 30 | | | | | | | 819 | |

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD

REC

CALIBRATED PENETROMETER TON/SF

[FINES CONTENT] %

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

| | | | |
|---|---|---|---|
| WL (First Encountered) | BORING STARTED: **Mar 15 2021** | CAVE IN DEPTH: **15.20** | |
| WL (Completion) **Dry** | BORING COMPLETED: **Mar 15 2021** | HAMMER TYPE: **Manual** | |
| WL (Seasonal High Water) | EQUIPMENT: **ATV Simco** | LOGGED BY: | DRILLING METHOD: **2.25 HSA** |
| WL (Stabilized) | | | |

| CLIENT: | PROJECT NO.: | BORING NO.: | SHEET: |
|---|---|---|---|
| **The Curry Engineering Group, PLLC** | **09:29374** | **B-6** | **1 of 1** |
| PROJECT NAME: | DRILLER/CONTRACTOR: | | |
| **Pruitt Health Nursing Homes** | **Presley Drilling** | | |
| SITE LOCATION: | | | |
| **Advantage Way, Winston-Salem, North Carolina 27023** | | | |
| NORTHING: | EASTING: | STATION: | SURFACE ELEVATION: |
| **842098.8** | **1611584.2** | | **832.0** |

LOSS OF CIRCULATION

BOTTOM OF CASING

| DEPTH (FT) | SAMPLE NUMBER | SAMPLE TYPE | SAMPLE DIST. (IN) | RECOVERY (IN) | DESCRIPTION OF MATERIAL | WATER LEVELS | ELEVATION (FT) | BLOWS/6" |
|---|---|---|---|---|---|---|---|---|
| | | | | | Topsoil Thickness[1.00"] | | | |
| | S-1 | SS | 18 | 18 | (SM FILL) SILTY SAND, reddish brown, moist | | | 2-3-4 (7) |
| | S-2 | SS | 18 | 18 | | | | 5-5-6 (11) |
| 5 | | | | | | | 827 | |
| | S-3 | SS | 18 | 18 | | | | 3-4-5 (9) |
| | | | | | (ML) Residuum, SANDY SILT, contains mica, grayish brown, moist, stiff | | | |
| | S-4 | SS | 18 | 18 | | | | 4-5-5 (10) |
| 10 | | | | | | | 822 | |
| | S-5 | SS | 18 | 18 | | | | 4-5-9 (14) |
| 15 | | | | | | | 817 | |
| | S-6 | SS | 18 | 18 | | | | 3-4-7 (11) |
| 20 | | | | | **END OF DRILLING AT 20.0 FT** | | 812 | |
| 25 | | | | | | | 807 | |
| 30 | | | | | | | 802 | |

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD

REC

CALIBRATED PENETROMETER TON/SF

[FINES CONTENT] %




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

| | | | |
|---|---|---|---|
| WL (First Encountered) | BORING STARTED: **Mar 15 2021** | CAVE IN DEPTH: **16.20** | |
| WL (Completion) **Dry** | BORING COMPLETED: **Mar 15 2021** | HAMMER TYPE: **Manual** | |
| WL (Seasonal High Water) | EQUIPMENT: **ATV Simco** | LOGGED BY: | DRILLING METHOD: **2.25 HSA** |
| WL (Stabilized) | | | |

| CLIENT: | PROJECT NO.: | BORING NO.: | SHEET: |
|---|---|---|---|
| **The Curry Engineering Group, PLLC** | **09:29374** | **B-7** | **1 of 1** |
| PROJECT NAME: | DRILLER/CONTRACTOR: | | |
| **Pruitt Health Nursing Homes** | **Presley Drilling** | | |
| SITE LOCATION: | | | LOSS OF CIRCULATION |
| **Advantage Way, Winston-Salem, North Carolina 27023** | | | BOTTOM OF CASING |
| NORTHING: | EASTING: | STATION: | SURFACE ELEVATION: |
| **842256.3** | **1611759.6** | | **853.0** |

| DEPTH (FT) | SAMPLE NUMBER | SAMPLE TYPE | SAMPLE DIST. (IN) | RECOVERY (IN) | DESCRIPTION OF MATERIAL | WATER LEVELS | ELEVATION (FT) | BLOWS/6" |
|---|---|---|---|---|---|---|---|---|
| | | | | | Topsoil Thickness[1.00"] | | | |
| | S-1 | SS | 18 | 18 | (SM) Residuum, SILTY SAND, contains mica, dark reddish brown to light gray, moist, loose to dense | | | 3-4-4 (8) |
| | S-2 | SS | 18 | 18 | | | | 3-5-5 (10) |
| 5 | | | | | | | 848 | |
| | S-3 | SS | 18 | 18 | | | | 3-4-3 (7) |
| | S-4 | SS | 18 | 18 | | | | 22-18-19 (37) |
| 10 | | | | | | | 843 | |
| | S-5 | SS | 6 | 4 | (WR) PARTIALLY WEATHERED ROCK SAMPLED AS SILTY SAND, orangish brown [Weathered ROCK] | ▼ | | 50 |
| 15 | S-6 | SS | 6 | 0 | Refusal encountered at 15.0 feet. | | 838 | 50 |
| | | | | | **END OF DRILLING AT 15.0 FT** | | | |
| 20 | | | | | | | 833 | |
| 25 | | | | | | | 828 | |
| 30 | | | | | | | 823 | |

Plastic Limit Water Content Liquid Limit (X—●—△)

⊗ STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD

REC

○ CALIBRATED PENETROMETER TON/SF

[FINES CONTENT] %




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

| | | | |
|---|---|---|---|
| ▽ WL (First Encountered) | BORING STARTED: **Mar 15 2021** | CAVE IN DEPTH: **12.00** | |
| ▼ WL (Completion) **13.50** | BORING COMPLETED: **Mar 15 2021** | HAMMER TYPE: **Manual** | |
| ⧩ WL (Seasonal High Water) | EQUIPMENT: **ATV Simco** | LOGGED BY: | DRILLING METHOD: **2.25 HSA** |
| ⧨ WL (Stabilized) | | | |

| CLIENT: | PROJECT NO.: | BORING NO.: | SHEET: |
|---|---|---|---|
| **The Curry Engineering Group, PLLC** | **09:29374** | **B-8** | **1 of 1** |
| PROJECT NAME: | DRILLER/CONTRACTOR: | | |
| **Pruitt Health Nursing Homes** | **Presley Drilling** | | |
| SITE LOCATION: | | | |
| **Advantage Way, Winston-Salem, North Carolina 27023** | | | |
| NORTHING: | EASTING: | STATION: | SURFACE ELEVATION: |
| **842172.2** | **1612002.3** | | **801.0** |

LOSS OF CIRCULATION

BOTTOM OF CASING

| DEPTH (FT) | SAMPLE NUMBER | SAMPLE TYPE | SAMPLE DIST. (IN) | RECOVERY (IN) | DESCRIPTION OF MATERIAL | WATER LEVELS | ELEVATION (FT) | BLOWS/6" |
|---|---|---|---|---|---|---|---|---|
| | | | | | Topsoil Thickness[1.00"] | | | |
| | S-1 | SS | 18 | 18 | (ML FILL) SANDY SILT, contains mica, grayish brown, moist, soft | | | 2-2-2 (4) |
| | S-2 | SS | 18 | 18 | (SM FILL) SILTY SAND, contains mica, reddish brown, moist | | | 3-3-4 (7) |
| 5 | S-3 | SS | 18 | 18 | | | 796 | 3-3-4 (7) |
| | S-4 | SS | 18 | 18 | (ML FILL) SANDY SILT, contains mica, grayish brown, moist | | | 2-4-4 (8) |
| 10 | | | | | | | 791 | |
| | S-5 | SS | 18 | 18 | (ML FILL) SANDY SILT, contains mica, grayish brown, moist | | | 3-1-2 (3) |
| 15 | | | | | | | 786 | |
| | S-6 | SS | 18 | 18 | | | | 3-4-5 (9) |
| 20 | | | | | | | 781 | |
| | S-7 | SS | 18 | 18 | (SC) Alluvium, CLAYEY SAND, trace organics, contains rock fragments, gray and black, wet, medium dense | ▼ | | 3-6-7 (13) |
| 25 | | | | | **END OF DRILLING AT 25.0 FT** | | 776 | |
| 30 | | | | | | | 771 | |

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

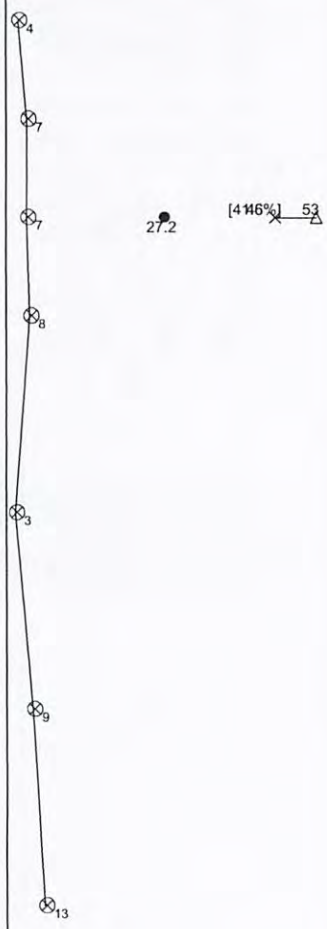
ROCK QUALITY DESIGNATION & RECOVERY

RQD

REC

CALIBRATED PENETROMETER TON/SF

[FINES CONTENT] %




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

| | | | |
|---|---|---|---|
| ▽ WL (First Encountered) | BORING STARTED: **Mar 15 2021** | CAVE IN DEPTH: **17.00** | |
| ▼ WL (Completion) **24.50** | BORING COMPLETED: **Mar 15 2021** | HAMMER TYPE: **Manual** | |
| ⧩ WL (Seasonal High Water) | EQUIPMENT: **ATV Simco** | LOGGED BY: | DRILLING METHOD: **2.25 HSA** |
| ⧩ WL (Stabilized) | | | |

| CLIENT: | PROJECT NO.: | BORING NO.: | SHEET: |
|---|---|---|---|
| **The Curry Engineering Group, PLLC** | **09:29374** | **B-9** | **1 of 1** |
| PROJECT NAME: | DRILLER/CONTRACTOR: | | |
| **Pruitt Health Nursing Homes** | **Presley Drilling** | | |
| SITE LOCATION: | | | LOSS OF CIRCULATION |
| **Advantage Way, Winston-Salem, North Carolina 27023** | | | |
| NORTHING: | EASTING: | STATION: | SURFACE ELEVATION: |
| **842385.1** | **1612038.8** | | **813.0** |

| DEPTH (FT) | SAMPLE NUMBER | SAMPLE TYPE | SAMPLE DIST. (IN) | RECOVERY (IN) | DESCRIPTION OF MATERIAL | WATER LEVELS | ELEVATION (FT) | BLOWS/6" |
|---|---|---|---|---|---|---|---|---|
| | | | | | Topsoil Thickness[1.00"] | | | |
| | S-1 | SS | 18 | 18 | (ML FILL) SANDY SILT, contains mica, grayish brown to reddish brown, moist | | | 1-1-2 (3) |
| | S-2 | SS | 18 | 18 | | | | 3-2-3 (5) |
| 5 | | | | | | | 808 | |
| | S-3 | SS | 18 | 18 | | | | 2-3-4 (7) |
| | S-4 | SS | 18 | 18 | (ML FILL) SANDY SILT, contains mica, reddish brown, moist | | | 3-5-6 (11) |
| 10 | | | | | | | 803 | |
| | | | | | (ML) Residuum, SANDY SILT, contains mica, grayish brown, moist, stiff | | | |
| | S-5 | SS | 18 | 18 | | | | 4-4-7 (11) |
| 15 | | | | | | | 798 | |
| | S-6 | SS | 18 | 18 | | | | 3-4-5 (9) |
| 20 | | | | | **END OF DRILLING AT 20.0 FT** | | 793 | |
| 25 | | | | | | | 788 | |
| 30 | | | | | | | 783 | |

Plastic Limit Water Content Liquid Limit
X———●———△

⊗ STANDARD PENETRATION BLOWS/FT

ROCK QUALITY DESIGNATION & RECOVERY

RQD

REC

○ CALIBRATED PENETROMETER TON/SF

[FINES CONTENT] %

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

| | | | |
|---|---|---|---|
| ▽ WL (First Encountered) | BORING STARTED: **Mar 15 2021** | CAVE IN DEPTH: | **16.00** |
| ▼ WL (Completion) **Dry** | BORING COMPLETED: **Mar 15 2021** | HAMMER TYPE: | **Manual** |
| ▼ WL (Seasonal High Water) | EQUIPMENT: **ATV Simco** | LOGGED BY: | DRILLING METHOD: **2.25 HSA** |
| ▽ WL (Stabilized) | | | |

| CLIENT: | PROJECT NO.: | BORING NO.: | SHEET: |
|---|---|---|---|
| **The Curry Engineering Group, PLLC** | **09:29374** | **B-10** | **1 of 1** |
| PROJECT NAME: | DRILLER/CONTRACTOR: | | |
| **Pruitt Health Nursing Homes** | **Presley Drilling** | | |
| SITE LOCATION: | | | LOSS OF CIRCULATION |
| **Advantage Way, Winston-Salem, North Carolina 27023** | | | |
| NORTHING: | EASTING: | STATION: | SURFACE ELEVATION: |
| **842538.3** | **1612228.1** | | **832.0** |

| DEPTH (FT) | SAMPLE NUMBER | SAMPLE TYPE | SAMPLE DIST. (IN) | RECOVERY (IN) | DESCRIPTION OF MATERIAL | WATER LEVELS | ELEVATION (FT) | BLOWS/6" |
|---|---|---|---|---|---|---|---|---|
| | | | | | Topsoil Thickness[1.00"] | | | |
| | S-1 | SS | 18 | 18 | (SM FILL) SILTY SAND, trace gravel, contains mica, reddish brown, moist | | | 2-1-2 (3) |
| | S-2 | SS | 18 | 18 | (ML FILL) SANDY SILT, contains mica and rock fragments, grayish brown to reddish brown, moist, | | | 2-2-3 (5) |
| 5 | S-3 | SS | 18 | 18 | | | 827 | 2-3-4 (7) |
| | S-4 | SS | 18 | 18 | | | | 4-4-6 (10) |
| 10 | | | | | | | 822 | |
| | S-5 | SS | 18 | 18 | (MH) Residuum, ELASTIC SILT, orange to light gray, moist, stiff | | | 3-4-7 (11) |
| 15 | | | | | | | 817 | |
| | S-6 | SS | 18 | 18 | | | | 5-8-9 (17) |
| 20 | | | | | **END OF DRILLING AT 20.0 FT** | | 812 | |
| 25 | | | | | | | 807 | |
| 30 | | | | | | | 802 | |

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

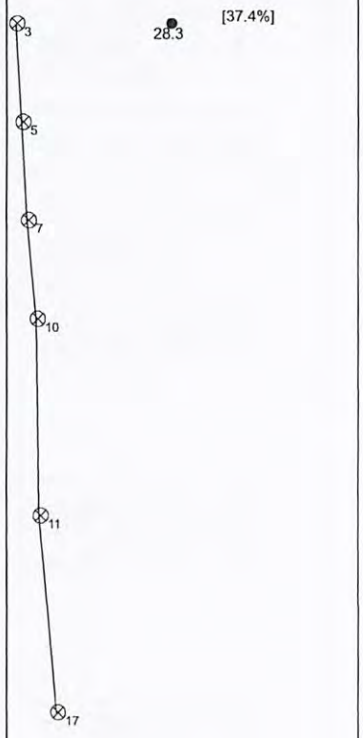
ROCK QUALITY DESIGNATION & RECOVERY

RQD

REC

CALIBRATED PENETROMETER TON/SF

[FINES CONTENT] %




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

| | | | |
|---|---|---|---|
| WL (First Encountered) | BORING STARTED: **Mar 15 2021** | CAVE IN DEPTH: **16.40** | |
| WL (Completion) **Dry** | BORING COMPLETED: **Mar 15 2021** | HAMMER TYPE: **Manual** | |
| WL (Seasonal High Water) | EQUIPMENT: **ATV Simco** | LOGGED BY: | DRILLING METHOD: **2.25 HSA** |
| WL (Stabilized) | | | |

# APPENDIX C – Laboratory Testing

Laboratory Test Results Summary
Liquid and Plastic Limits Test Report

# Laboratory Testing Summary

| Sample Source | Sample Number | Depth (feet) | ^MC (%) | Soil Type | Atterberg Limits | | | **Percent Passing No. 200 Sieve | Moisture - Density | | CBR (%) | | #Organic Content (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | LL | PL | PI | | Maximum Density (pcf) | Optimum Moisture (%) | 0.1 in. | 0.2 in. | |
| B-2 | S-2 | 3.5-5.0 | 26.0 | | | | | | | | | | |
| B-2 | S-4 | 8.5-10.0 | 25.0 | | | | | | | | | | |
| B-2 | S-5 | 13.5-15.0 | 26.2 | | | | | | | | | | |
| B-6 | S-2 | 3.5-5.0 | 18.7 | SM | 52 | 32 | 20 | 49.5 | | | | | |
| B-8 | S-3 | 6.0-7.5 | 27.2 | SM | 53 | 32 | 21 | 41.6 | | | | | |
| B-10 | S-1 | 1.0-2.5 | 28.3 | SM | NP | NP | NP | 37.4 | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

**Notes:** See test reports for test method, ^ASTM D2216-19, *ASTM D2488, **ASTM D1140-17, #ASTM D2974-20e1

**Definitions:** MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, PI: Plasticity Index, CBR: California Bearing Ratio, OC: Organic Content

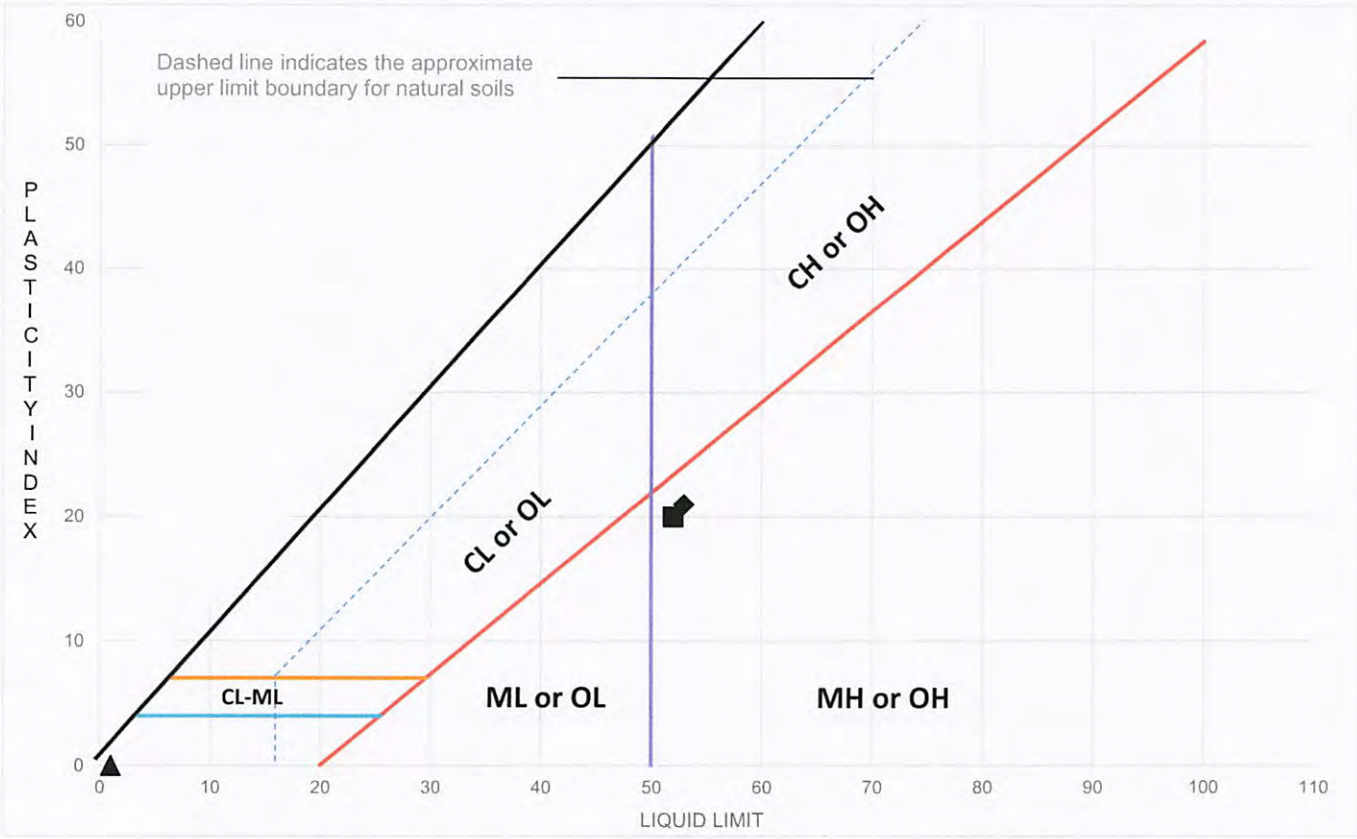
Project: Pruitt Health Nursing Homes
Client:

Project No.: 09: 29374
Date Reported: 3/19/2021


| Office / Lab | Address | Office Number / Fax |
|---|---|---|
| ECS Southeast LLP - Charlotte | 1812 Center Park Drive<br>Suite D<br>Charlotte, NC 28217 | (704)525-5152<br>(704)357-0023 |


| Tested by | Checked by | Approved by | Date Received |
|---|---|---|---|
| CER | | CRupert | 3/17/2021 |

# LIQUID AND PLASTIC LIMITS TEST REPORT




**TEST RESULTS ()**

| | Sample Location | Sample Number | Sample Depth (ft) | LL | PL | PI | %<#40 | %<#200 | AASHTO | USCS | Material Description |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ■ | B-6 | S-2 | 3.5-5.0 | 52 | 32 | 20 | | 49.5 | | SM | Silty SAND |
| ◆ | B-8 | S-3 | 6.0-7.5 | 53 | 32 | 21 | | 41.6 | | SM | Silty SAND |
| ▲ | B-10 | S-1 | 1.0-2.5 | NP | NP | NP | | 37.4 | | SM | Silty SAND |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Project: Pruitt Health Nursing Homes
Client:

Project No.: 09:29374
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|---|---|---|
| ECS Southeast LLP - Charlotte | 1812 Center Park Drive<br>Suite D<br>Charlotte, NC 28217 | (704)525-5152<br>(704)357-0023 |


| Tested by | Checked by | Approved by | Date Received |
|---|---|---|---|
| CER | | CRupert | |

## SECTION 02251—TERMITE CONTROL

## PART 1 - GENERAL

1.01. Related Documents
Drawings and General Provisions of Contract including General Conditions, Supplementary Conditions, and Division 1 Specification Sections.

1.02. Termite control shall be applied under all slabs on grade, and along entire inside and outside perimeters of the foundation walls.

1.03. Deliver chemicals in factory sealed containers. Prepare working solution by diluting as recommended by the manufacturer. Dilution with fuel oil will not be permitted.

1.04. Chemical soil treatment materials and procedures shall comply with current FHA, "Minimum Property Standards" Publication No. 300, Section 815, and with recommendations contained in the U.S. Department of Agriculture H&G Bulletin No. 64 "Subterranean Termites, Their Prevention and Control in Buildings".

1.05. Termite control contractor shall be registered and licensed by the governing state and local authority to perform this type of work.

1.06. Testing is not required when the applicator provides an insured contract that is non-cancelable by all parties except the Owner.

1.07. Guarantee

a. Upon completion of soil treatment, and as a condition of final acceptance, furnish the Owner with a written insured guarantee.
b. The guarantee shall state that the application was made at the concentration rates and methods that comply with these specifications.
c. The effectiveness of the treatment is guaranteed for not less than five (5) years, without additional cost to the Owner.
d. Re-treatment, upon evidence of subterranean termite activity, shall be at no charge to the Owner, in accordance with accepted trade practices.
e. Damage to the building caused by termites shall be corrected without cost to the Owner; up to a minimum of $50,000.00 in value or greater per Company's warrantee.
f. The guarantee is non-cancelable by all parties to the contract except the Owner.
g. Draw the guarantee in favor of the Owner and submit a sample form of guarantee to the Architect for approval before beginning the work.
h. Submit 4 originals at the Close out Phase in compliance with Section 01700.

## PART 2 - PRODUCTS

2.01. Toxicants

a. Use only water-base emulsion soil chemicals.

b. Use working solutions containing any one of the following chemicals at the listed minimum concentrations:

| | | | |
|---|---|---|---|
| Dursban T.C. | 1.0% | EPA | Reg. #464562 |
| Goldcrest Tribute | 0.5-1.0% | EPA | Reg. #876459 |
| Torpedo | 0.5% | EPA | Reg. #10182-18 |

c. If combinations of toxicants are used, one of them must be at the listed percentage.

## PART 3 - EXECUTION

3.01. Application

a. Do not begin soil-poisoning work until all filling and compaction work is complete. Apply treatment before placement of any type vapor barrier.

b. Do not apply soil poison when surface water is present.

3.02. Rate of Application

a. Building areas: Apply soil poison at the minimum rate of one (1) gallon of toxicant to each ten (10) square feet of area under slabs on grade within the building lines. On coarse or porous fill use 1.5 gallons per ten (10) square feet.

b. Masonry foundation wall: Treat the voids of the foundation walls at the rate of one (1) gallon per five (5) linear feet.

c. Miscellaneous: Apply soil poison at the rate of two (2) gallons per five (5) lineal feet at the following areas: immediately below expansion joints, control joints, where slab is penetrated by construction features and where exterior veneers of facings extend below grade.

END OF SECTION

## SECTION 03015 - CONCRETE TESTING

## PART 1 - GENERAL

1.01 DESCRIPTION

A. Work included:
   1. Field sampling and testing of fresh, structural concrete.
   2. Laboratory testing of concrete test specimens.

1.02 TESTING AGENCY

A. As selected and directed by the General Contractor.

B. Requests for Testing Services: Scheduled by the Contractor

C. Qualifications:
   1. Equipped and staffed in accordance with appropriate sections of ASTM E 329.
   2. Participation in periodic inspection program of its procedures and equipment by recognized National and State authority or trade association.

D. Duties:
   1. Perform sampling and testing in strict accordance with specified ASTM test procedures using calibrated testing equipment.
   2. Issue test reports as directed by the General Contractor.
      a. Communicate nonconforming field tests to Job Superintendent prior to leaving the Job Site.
      b. Communicate nonconforming laboratory tests to the General Contractor and the Architect/ Engineer within twenty-four (24) hours.
   3. Upon request by the Architect, provide latest inspection report.

## PART 2 - PRODUCTS (NOT USED)

## PART 3 - EXECUTION

3.01 SAMPLING

A. Frequency:

1. Sample each class of structural concrete not less than once a day, nor less than once for each 100 cubic yards, nor less than once for each 5,000 square feet of slab area.

B. Method: Sample concrete in accordance with ASTM C 172 with exception that composite sample is not required. Obtain one (1) sample from middle half of load during discharge.

3.02 FIELD TESTING (FOR EACH SAMPLE)

A. Slump Test: Perform slump test in accordance with ASTM C 143.

B. Temperature: Measure and record concrete and air temperature.

C. Test Cylinders:
1. Mold three (3) test cylinders in accordance with ASTM C 31.
2. Protect cylinders from moisture loss by providing plastic cylinder caps or "baggies."
3. Store cylinders at Job Site for initial sixteen (16) to twenty-four (24) hours in area protected from damage and extreme temperature.

3.03 LABORATORY TESTING

A. Type: Compressive strength tests.

B. In accordance with ASTM C 39.

C. Test one (1) cylinder at seven (7) days, two (2) cylinders at twenty-eight (28) days, and one (1) cylinder at fifty-six (56) days.

3.04 REPORTING

A. For each sample of concrete tested, complete test report indicating the following.
1. Sample date.
2. Mix designation.
3. Concrete supplier.
4. Time batched.
5. Time sampled.
6. Air and mix temperatures.
7. Location of concrete placement.
8. Load size.
9. Amount of water added at the Job Site.
10. Slump test.
11. Other field test results.

12. Laboratory test results.
13. All other information required by ASTM C 39.

B. Sequentially number test reports for easy identification.

C. Prepare and issue typed test reports not later than one (1) working day following laboratory testing.

D. Distribute reports to the General Contractor, the Owner, and the Architect.

END OF SECTION 03015

## SECTION 03210 - CONCRETE REINFORCEMENT

## PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
1. Reinforcing steel for cast-in-place concrete.

1.02 QUALITY ASSURANCE

A. Codes and Standards: Comply with the following documents, except where requirements of the Contract Documents or of governing codes and governing authorities are more stringent:
1. ACI 301.
2. ACI 318.
3. CRSI Manual of Standard Practice.

## PART 2 - PRODUCTS

2.01 REINFORCING MATERIALS

A. Reinforcing Bars: Provide deformed bars complying with ASTM A 615, Grade 60.

B. Welded Wire Fabric: 6/6 x W1.4/W1.4 ASTM A 185, cold-drawn steel, plain.

## PART 3 - EXECUTION

3.01 PLACING REINFORCEMENT

A. General: Comply with requirements of ACI 301.

B. Preparation: Clean reinforcement of loose rust and mill scale, soil and other materials which adversely affect bond with concrete.

C. Wire mesh to be lifted to center of slab.

END OF SECTION 03210

## SECTION 03310 - CONCRETE FORMWORK

## PART 1 - GENERAL

### 1.01 SUMMARY

A. Section Includes:
1. Formwork for cast-in-place concrete.
2. Formwork accessories.
3. Form stripping.

### 1.02 QUALITY ASSURANCE

A. Codes and Standards: Comply with the following documents, except where requirements of the Contract Documents or of governing codes and governing authorities are more stringent:
1. ACI 301.
2. ACI 318.
3. ACI 347.

## PART 2 - PRODUCTS

### 2.01 FORMWORK

A. Void Forms: Treated cardboard, plastic, rubber, fiber, or laminated paper forms specially designed to reduce concrete mass.

B. Formwork Accessories:
1. Form coating: Form release agent that will not adversely affect concrete surfaces or prevent subsequent application of concrete coatings.

## PART 3 - EXECUTION

### 3.01 CONCRETE FORM PREPARATION

A. General: Comply with requirements of ACI 301 for formwork, and as herein specified. The Subcontractor is responsible for design, engineering and construction of formwork, and for its timely removal.

B. Earth Forms: Hand-trim bottoms and sides of earth forms to profiles indicated on the Drawings. Remove loose dirt prior to placing concrete.

C. Construction: Construct and brace formwork to accurately achieve end results required by the Contract Documents, with all elements properly located and free of distortion. Provide for necessary openings, inserts, anchorages and other features shown on the Drawings or as otherwise required.

D. Tolerances for Formed Surfaces: Comply with minimum tolerances established in ACI 347.

E. Release Agent: Provide either form materials with factory-applied non-absorptive liner or field-applied form coating. If field-applied coating is employed, thoroughly clean and recondition formwork and reapply coating before each use. Rust on form surfaces is unacceptable.

END OF SECTION 03310

## SECTION 03321 - CAST-IN-PLACE CONCRETE

## PART 1 - GENERAL

### 1.01 SUMMARY

A. Section Includes:
   1. Cast-in-place concrete.
   2. Concrete curing.

### 1.02 QUALITY ASSURANCE

A. Comply with the following documents:
   1. ACI 301.
   2. ACI 318.

## PART 2 - PRODUCTS

### 2.01 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150.

B. Water: Potable.

C. Aggregates:
   1. Normal weight concrete: ASTM C 33.

D. Admixtures - General: Admixtures which result in more than 0.1 percent of soluble chloride ions by weight of cement are prohibited.

E. Air-Entraining Admixture: ASTM C 260.

F. Water-Reducing Admixture: ASTM C 494, Type A.

G. High-Range Water-Reducing Admixture (Superplasticizer): ASTM C 494, Type F or G.

### 2.02 MISCELLANEOUS MATERIALS AND ACCESSORIES

A. Vapor Retarder:
   1. Polyethylene sheet, ten (10) mils thick.

B. Nonshrink Grout: ASTM C 1107.
   1. Type: Non-metallic type.

C. Liquid Curing Compounds:
1. Comply with ASTM C 309, Type 1.

2.03 CONCRETE MIX DESIGN

A. Comply with recommendations of ACI 211.1, normal weight concrete.

B. Specified compressive strength at twenty-eight (28) days: 3000 psi.

C. Admixtures:
a. Air-entraining admixture: Add at rate to achieve total air content in accordance with Table 1.4.3 of ACI 301.2. For concrete not exposed to exterior, add at rate to achieve total air content between two (2) percent and four (4) percent.

**PART 3 - EXECUTION**

3.01 VAPOR RETARDER INSTALLATION

A. General: Lap edges 6-inches.

3.02 JOINT CONSTRUCTION

A. Construction Joints: If construction joints are not indicated, locate in manner which will not impair strength and will have least impact on appearance, as acceptable to the Contractor.
1. Keyways: Provide keyways not less than 1 ½-inches deep.

B. Control Joints: If control joints are not indicated, provide at thirty (30) feet on center, maximum, as acceptable to the Contractor.

C. Saw Joints: 1/3 to 1/2 depth of floor.

3.03 CONCRETE PLACEMENT

A. Inspection:
1. Wood forms: Moisten immediately before placing concrete in locations where form coatings are not used.

## 3.04 FINISHING SLABS

A. Finishing Operations - General:
   1. Do not directly apply water to slab surface or dust with cement.
   2. Screeding: Verify conformance to surface tolerances. Correct deficiencies while concrete is still plastic.
   3. Grind smooth surface defects which would telegraph through final floor covering system.

B. Slab Surface Tolerances:
   1. Achieve flat, level planes except where slopes are indicated. Slope uniformly to drains. Maximum tolerances in high or low spots is 1/8-inch in ten (10) feet.

C. Slab Finishes:
   1. Area which receives no applied finish except sealer/ hardener: Smooth steel troweled.
   2. Areas which are to receive resilient flooring, carpet, etc.: Steel troweled.
   3. Exterior patio or sidewalk areas which receive no additional applied surface: Broom finish with tooled control and expansion joints.
   4. Sidewalk curb ramps shall have a detectable warning surface complying with the Americans with Disabilities Act, latest printing.

END OF SECTION 03321

## SECTION 04200 - CONCRETE MASONRY UNITS

## PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
1. Concrete masonry units
2. Mortar.
3. Reinforcement, anchorage, and accessories.

1.02 QUALITY ASSURANCE

A. Comply with the following documents:
1. ASTM C 33
2. ASTM C 331

1.03 DELIVERY, STORAGE AND HANDLING

A. Deliver, handle and store masonry units by means which will prevent mechanical damage and deterioration due to moisture, temperature changes and contamination by other materials.

B Protect cementitious materials from precipitation and absorption of ground moisture.

C. Store masonry accessories to prevent corrosion, dirt accumulation and other deterioration.

1.04 PROJECT CONDITIONS

A. Construction Protection: Cover tops of incomplete masonry elements with waterproof sheet material at end of each work day and when masonry work is not under way.

## PART 2 - PRODUCTS

2.01 CONCRETE MASONRY UNITS

A. Provide sizes and shapes as indicated on the Drawings.

2.02 MORTAR MATERIALS

A. Masonry Cement: Type "S".

B. Aggregate for Mortar: ASTM C 144.

C. Water: Potable.

2.03 REINFORCEMENT AND ANCHORAGE

A. As required according to the Structural Drawings.

B. Provided minimum of ASTM A 82 class 1 mill galvanized or as required by local codes.

2.04 MISCELLANEOUS MASONRY ACCESSORIES

A. Expansion Joint Strips: Neoprene filler strips complying with ASTM D 1056, Classification 2 A1, capable of thirty-five (35) percent compression and sized for specific conditions indicated.

B. Sealant and Backer Rod: As specified in Division 7.

C. Flashing: Twenty (20) mil PVC width as per the Drawings.

2.05 MORTAR MIX

A. Do not use calcium chloride in mortar mixture.

B. Mixing: Use mechanical batch mixer and comply with referenced ASTM standards.

C. Mortar for Unit Masonry: ASTM C 270, Proportion Specification.

**PART 3 - EXECUTION**

3.01 INSTALLATION PROCEDURES

A. Openings for Equipment and Services: Leave openings in masonry as required for subsequent installation of equipment and services.

B. Cutting: Where cutting is required, use power saws to provide clean, sharp, unchipped edges.

3.02 CONSTRUCTION TOLERANCES

A. Variation from Plumb:
   1. ¼-inch in ten (10) feet.

B. Variation from Level:
   1. ¼-inch in one (1) bay; ten (10) feet maximum.
   2. ½-inch in twenty (20) feet or more.

C. Variation from Plan Lines:
   1. ½-inch in any bay; twenty (20) feet maximum.

E. Variation in Mortar Joint Thickness:
   1. Bed joints: Plus or minus 1/8-inch.
   2. Head joints: Minus ¼-inch, plus 1/8-inch.

3.03 MASONRY CONSTRUCTION - GENERAL

A. Pattern Bond: Lay exposed masonry in running bond except where other bonds are indicated.

B. Built-in Work: As work progresses, build in items indicated for installation in masonry, filling around built-in items solidly with masonry.

C. Expansion and Control Joints: Build in movement joints where indicated, or as required, installing accessory items as masonry is constructed.

D. Lintels: Install steel lintels at all openings unless noted otherwise.
   1. Bearing: Provide not less than 8-inches of bearing at each jamb.

3.04 LAYING MASONRY UNITS

A. Solid Masonry Units: Install in full bed joints and with head joint completely filled prior to laying each unit.

B. Joints: Make mortar joints visually and dimensionally consistent.
   1. Except as otherwise indicated, maintain mortar joint widths of 3/8-inch.

C. Exposed Joints: Using concave jointer slightly larger than joint width, tool exposed joints before mortar has assumed final set.

3.05 INSTALLING CONCEALED MASONRY FLASHING

A. General: Whether or not specifically indicated, install flashing at all conditions such as lintels and shelf angles, where the downward flow of any

water within the masonry will be interrupted, so that such water will be diverted to the exterior. Extend flashing full width at such obstructions and at least 4-inches into adjoining masonry, or turn up to form watertight pan at non-masonry construction. Remove or cover protrusions or sharp edges on substrates which could puncture flashing. Place flashing on sloped mortar bed. Seal lapped ends and penetrations of flashing before covering with mortar.

1. Extend fabric or laminated flashing to within ¼-inch of exterior face of masonry.

B. Heads and Sills: Turn up ends of flashing at least 2-inches at heads and sills to form a pan; seal joints.

C. Sealing: Seal all joints in flashing to assure watertight integrity. Lap end joints of flexible flashing at least 4-inches. Seal in accordance with the manufacturer's instructions.

D. Reglets and Other Accessories: Install to receive flashing where indicated.

## 3.06 REPAIRING MASONRY

A. Replacement: Carefully remove areas of damaged masonry and replace with matching, undamaged units using mortar which matches original work.

B. Pointing: As joints are being tooled, remove mortar with visible holes or mortar which cannot be compacted properly because of hidden voids and replace with fresh mortar, filling each joint completely and tooling to match adjacent work.

## 3.07 CLEANING AND PROTECTION

A. Clean masonry after mortar is thoroughly set and cured.
1. Scrape off adhered mortar particles by hand.

B. Protection: Institute protective measures as required to ensure that unit masonry work and adjacent areas will be clean and undamaged at Substantial Completion.

C. Remove excess materials and associated products from the Site at completion of concrete masonry unit installation.

END OF SECTION 04200

## SECTION 04210 - VENEER MASONRY

## PART 1 - GENERAL

### 1.01 SUMMARY

A. Section Includes:
   1. Brick masonry veneer with anchorage to structural backup.
   2. Mortar.
   3. Reinforcement, anchorage and accessories.

B. Allowances:
   1. Facing brick: Furnish facing brick under allowance as designated in Section 01030.

### 1.02 QUALITY ASSURANCE

A. Source Control: Obtain exposed masonry units from one manufacturer, with texture and color uniform or of a uniform blend acceptable to the Contractor.

B. Mock-up: Prior to commencement of exposed masonry work, erect sample panel to serve as the standard of appearance and workmanship throughout the construction period, if requested by the Contractor.
   1. Build on Site, approximately 4'-0" x 4'-0".
   2. Upon completion of construction and subsequent approval by the Contractor, demolish mock-up construction completely and remove debris.

### 1.03 DELIVERY, STORAGE AND HANDLING

A. Deliver, handle and store masonry units by means which will prevent mechanical damage and deterioration due to moisture, temperature changes and contamination by other materials.

B Protect cementitious materials from precipitation and absorption of ground moisture.

C. Store masonry accessories to prevent corrosion, dirt accumulation, and other deterioration.

1.04 PROJECT CONDITIONS

A. Construction Protection: Cover tops of incomplete masonry elements with waterproof sheet material at the end of each work day and when masonry work is not under way.

**PART 2 - PRODUCTS**

2.01 BRICK MASONRY UNITS

A. Facing Brick:
1. Provide facing brick as indicated.

2.02 MORTAR MATERIALS

A. Masonry Cement: Type "N".

B. Aggregate for Mortar: ASTM C 144.

C. Water: Potable.

2.03 REINFORCEMENT AND ANCHORAGE

A. Masonry Veneer Anchors: Twenty-two (22) gauge corrugated ties.
1. Fasteners: Self-drilling, self-tapping, corrosion-resistant screws.

2.04 MISCELLANEOUS MASONRY ACCESSORIES

A. Expansion Joint Strips: Neoprene filler strips complying with ASTM D 1056, Classification 2 A1, capable of thirty-five (35) percent compression and sized for specific conditions indicated.

B. Weep Holes: Cotton sash cord of length required to allow 2-inch exposure while leaving 18-inches within cavity.

C. Sealant and Backer Rod: As specified in Division 7.

D. Flashing: Twenty (20) mil PVC width as per the Drawings.

2.05 MASONRY CLEANER

A. Acidic Cleaner: General-purpose cleaner designed for new masonry surfaces.

2.06 MORTAR MIX

A. Do not use calcium chloride in mortar mixture.

B. Mixing: Use mechanical batch mixer and comply with referenced ASTM standards.

C. Mortar for Unit Masonry: ASTM C 270, Proportion Specification.

## PART 3 - EXECUTION

### 3.01 INSTALLATION PROCEDURES

A. Openings for Equipment and Services: Leave openings in masonry as required for subsequent installation of equipment and services.

B. Cutting: Where cutting is required, use power saws to provide clean, sharp, unchipped edges.

### 3.02 CONSTRUCTION TOLERANCES

A. Variation from Plumb:
1. ¼-inch in ten (10) feet.

B. Variation from Level:
1. ¼-inch in one (1) bay; ten (10) feet maximum.
2. ½-inch in twenty (20) feet or more.

C. Variation from Plan Lines:
1. ½-inch in any bay; twenty (20) feet maximum.

E. Variation in Mortar Joint Thickness:
a. Bed joints: Plus or minus 1/8-inch.
b. Head joints: Minus ¼-inch, plus 1/8-inch.

### 3.03 MASONRY CONSTRUCTION - GENERAL

A. Pattern Bond: Lay exposed masonry in running bond except where other bonds are indicated.

B. Built-in Work: As work progresses, build in items indicated for installation in masonry, filling around built-in items solidly with masonry.

C. Expansion and Control Joints: Build in movement joints where indicated, or as required, installing accessory items as masonry is constructed.

D. Lintels: Install steel lintels at all openings unless noted otherwise.
1. Bearing: Provide not less than 8-inches of bearing at each jamb.

3.04 LAYING MASONRY UNITS

A. Solid Masonry Units: Install in full bed joints and with head joint completely filled prior to laying each unit.

B. Joints: Make mortar joints visually and dimensionally consistent.
1. Except as otherwise indicated, maintain mortar joint widths of 3/8-inch.

C. Exposed Joints: Using concave jointer slightly larger than joint width, tool exposed joints before mortar has assumed final set.

3.05 INSTALLING CONCEALED MASONRY FLASHING

A. General: Whether or not specifically indicated, install flashing at all conditions such as lintels and shelf angles, where the downward flow of any water within the masonry will be interrupted, so that such water will be diverted to the exterior. Extend flashing full width at such obstructions and at least 4-inches into adjoining masonry, or turn up to form watertight pan at non-masonry construction. Remove or cover protrusions or sharp edges on substrates which could puncture flashing. Place flashing on sloped mortar bed. Seal lapped ends and penetrations of flashing before covering with mortar.
1. Extend fabric or laminated flashing to within ¼-inch of exterior face of masonry.

B. Veneer Flashing: Turn flashing up not less than 4-inches at backup. Lap top of flashing with building paper, or otherwise seal to prevent moisture penetration between flashing and backup.

C. Heads and Sills: Turn up ends of flashing at least 2-inches at heads and sills to form a pan; seal joints.

D. Sealing: Seal all joints in flashing to assure watertight integrity. Lap end joints of flexible flashing at least 4-inches. Seal in accordance with the manufacturer's instructions.

E. Weep Holes: Provide weep holes in head joints of the first course of masonry immediately above concealed flashing. Space at intervals of 32-inches on center.

F. Reglets and Other Accessories: Install to receive flashing where indicated.

3.06 REPAIRING MASONRY

A. Replacement: Carefully remove areas of damaged masonry and replace with matching, undamaged units using mortar which matches original work.

B. Pointing: As joints are being tooled, remove mortar with visible holes or mortar which cannot be compacted properly because of hidden voids and replace with fresh mortar, filling each joint completely and tooling to match adjacent work.

3.07 CLEANING AND PROTECTION

A. Clean masonry after mortar is thoroughly set and cured.
   1. Scrape off adhered mortar particles by hand, using non-metallic tools.
   2. Protect adjacent surfaces from cleaner with appropriate coating or polyethylene sheet.

B. Protection: Institute protective measures as required to ensure that unit masonry work and adjacent areas will be clean and undamaged at Substantial Completion.

C. Remove excess materials and associated products from the Site at completion of brick installation.

END OF SECTION 04210

## SECTION 04721—SIMULATED STONE

## PART 1 - GENERAL

1.01. SUBMITTALS

a. General: Submit in accordance with Section 01300 – Submittals.

b. Product Data: Submit product data indicating manufacturer, size, patter, colors and manufacturers recommend storage and installations.

1.02 PROJECT MOCK-UP:

a. Provide project mock-up indicating patterns and colors.

b. Mock-up shall be constructed in conjunction with Precast Concrete Shapes as specified.

1.03 DELIVERY, STORAGE AND HANDLING:

a. Deliver materials, handle and store in accordance with the manufacturer's printed recommendations.

1.04 PROJECT CONDITIONS

a. Project materials from rain, moisture, and freezing temperatures prior to, during and for 48 hours after completion of work.

b. Allow no construction activity on opposite side of wall to which work is being applied during, and for 48 hours after completion of work.

## PART 2 - PRODUCTS

2.01. ACCEPTABLE MANUFACTURERS:

a. Horizon Stone

2.02 STONE TYPE

a. Simulated Stone

1. Pattern and Color: ' Ledge Stone Mossy Creek
See attached Specifications.

2.03 MANUFACTURED UNITS

a. Characteristics

1. Compressive Strength: Tested in accordance with UBC Standard No. 26-10, Parts I and IV.

2. Shear (adhesion) Strength: Tested in accordance with ASTM C 482.

3. Thermal Resistance: R factor 1.19 in accordance with ASTM C 177-71. R factor is based on a 1.779" thick sample.

4. Fire Hazard Test: Flame spread of 0, smoke development of 0 in accordance with UL 723.

2.04 ACCESSORIES

a. Mortar: Factor mixed Portland Cement, ASTM C 150, Type 1 or masonry cement (Type N), ASTM C91.

b. Masonry Sealer: Breather type, non-film forming sealer.

c. Weather-Resistant Barrier: Kraft waterproof building paper, UBC standard no. 17-1 or equal.

d. Metal Lath: Paperbacked 3/8" rib galvanized expanded metal lath.

f. Drainage System: ¼" Rain Screen Mat 'Cav Clear' total-wall air space and moisture control. Cavclear.com.

## PART 3 - EXECUTION

3.01 PREPARATION:

a. Install one layer of weather-resistant barrier with 4" lap joints. Apply metal lath, attached with galvanized screws 6" o.c. vertical and 16" o.c. horizontal.

3.02 MORTAR MIXING:

a. Thoroughly mix mortar ingredients in quantities needed for immediate use in accordance with ASTM C 482, Type N.

b. Do not use anti-freeze compounds.

3.03 APPLICATION:

a. Apply ½" to ¾" of mortar to lath, covering a maximum of 10 sq. ft. at one time. Press units firmly into position in soft mortar bed, joggle each piece slightly to bond firmly, causing mortar to extrude slightly around edge of units.

b. Place units uniform mortar joints. Joints should not be over ½" width. Install outside corner return units with short and long lengths alternated.

c. Plan work to minimize job site cutting. Cut stone only with saws approved by manufacturer to provide uniform edges; use care to prevent breaking unit corners or edges.

d. Minimum width of units at inside corners and at perimeter of opening shall be 4" to 6".

e. Remove excess mortar; do not allow mortar to set up on face of units. Point, rake and tool joints before mortar has set. Clean and finish joints in accordance with the manufacturer's written instructions.

f. Apply breather-type non-film forming masonry sealer to clean completed surfaces in accordance with manufacturer's written instructions.

END OF SECTION

## SECTION 05100 - MISCELLANEOUS METALS

## PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Miscellaneous structural fabrications.

1.02 JOB CONDITIONS

A. Fit fabrications accurately to actual construction. If it is not practical or possible to take field measurements before fabrication, allow adequate fabrication tolerances and trim to fit.

## PART 2 - PRODUCTS

2.01 MATERIALS - METALS

A. Steel Shapes:
   1. Plates, bars, angles, channels, and H-sections: ASTM A 36.
   2. Tube: Cold-formed: ASTM A 500.
   3. Pipe: ASTM A 53 (black steel and hot-dipped galvanized).

2.02 MATERIALS - MISCELLANEOUS

A. Fasteners: Use fasteners suitable for the material being fastened and for the type of connection required.
   1. Use fasteners of same material as items being fastened unless otherwise indicated.
   2. Lock washers: FS FF-W-84.

2.03 FABRICATION - GENERAL

A. Fabricate and shop-assemble in largest practical sections for delivery to the Site.
   1. Prepare and reinforce fabrications as required to receive applied items.
   2. Fabricate items with joints tightly fitted, flush, secured, and hairline.

B. Anchors: Fabricate to suit substrate indicated; use anchors of same material and finish as item except where specifically indicated otherwise.

C. Welding:
   1. Provide continuous welds at welded corners and seams.
   2. Exposed welds: Grind flush and smooth.

D. Joints Exposed to Weather: Fabricate to keep water out, or provide adequate drainage of water that penetrates.

E. Shop prime all steel members.

## PART 3 - EXECUTION

3.01 INSTALLATION - GENERAL

A. Provide all fasteners required.

B. Install items in correct location, plumb and level, without rack or warp.

C. Provide temporary supports and bracing as required.

END OF SECTION 05100

## SECTION 05120—STRUCTURAL STEEL

## PART 1 – GENERAL

1.01. Related Documents
Drawings and General Provisions of Contract including General Conditions, Supplementary Conditions, and Division 1 Specification Sections.

1.02. Section includes

a. Structural steel columns, beams, lintels, and other steel framing members.
b. Base plates, column anchor bolts.
c. Steel to steel connection bolts.

1.03. References

| | | |
|---|---|---|
| a. | ASTM A53: | Hot-Dipped, Zinc-coated welded and seamless steel pipe. |
| b. | ASTM A108: | Steel Bars, carbon, cold-finished, standard quality. |
| c. | ASTM A123: | Zinc (hot dipped galvanized) coating on iron and steel products. |
| d. | ASTM A153: | Zinc coating (hot dip) on iron and steel hardware. |
| e. | ASTM A307: | Carbon steel externally threaded standard fasteners. |
| f. | ASTM A325: | High strength bolts for structural steel joints. |
| g. | ASTM A490: | Quenched and tempered alloy steel bolts for structural steel joints. |
| h. | ASTM A500: | Cold formed welded and seamless carbon steel structural tubing round and shapes. |
| i. | ASTM A501: | Hot formed welded and seamless carbon steel structural tubing. |
| j. | ASTM A502: | Steel structural rivets. |
| k. | ASTM A992: | High strength low alloy Columbium-Vanadium steel of structural quality. |
| l. | AWS A2.0: | Standard welding symbols. |
| m. | AWS D1.1: | Structural welding code. |
| n. | AISC: | Specification for the design, fabrication and erection of structural steel for buildings. |
| o. | AISC: | Specification for Architectural exposed structural steel. |
| p. | SSPC: | Steel structures painting council. |

1.04. Submittals

a. Shop Drawings:
   1. Indicate profiles, sizes, spacing, and locations of structural members, miscellaneous members, attachments, and fasteners.
   2. Connections detailed fully.
   3. Indicate welded connections with AWS A2.0 welding symbols. Indicate net weld lengths.
   4. Prepare shop drawings under the seal of a professional engineer.

b. Manufacturer's Mill Certificate: Certify that products meet or exceed specified requirements.
c. Mill Test Reports: Submit indicating structural strength, destructive and non-destructive test analysis.
d. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.
e. Field Test Reports: Submit testing and inspection reports from Owner's testing agency to the Architect.

1.05. Quality Assurance

a. Fabricate structural steel members in accordance with AISC – Specification for the design, fabrication and erection of Structural Steel for buildings.
b. Perform exposed work in accordance with AISC – Specification for architectural exposed structural steel.

1.06. Qualifications

a. Fabricator: Company specializing in performing the work of this section with minimum five years documented experience.
b. Design connections not detailed on the drawings under direct supervision of a professional structural engineer experienced in design of this work

1.07. Field Measurements: Verify that field measurements are as shown on drawings.

## PART 2 – PRODUCTS

2.01. Materials

a. Structural Steel Members: Certified to ASTM A572.
b. Structural Tubing: ASTM A500, Grade B.
c. Pipe: ASTM A53, Grade B.
d. Bolts, Nuts, and Washers: ASTM A325.
e. Anchor bolts: ASTM A36.
f. Welding Materials: AWS D1.1; type required for materials being welded.
g. Grout: Non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing additives, capable of developing a minimum compressive strength of 7000 psi at 24 hours.
h. Shop Primer: One coat SSPC 15, type 1, red oxide.

2.02. Finish

a. Prepare structural component surfaces required to be primed in accordance with SSPC SP-3.

b. Shop prime not required for structural steel members where steel is to be enclosed and concealed from view in walls and ceilings or encased in concrete or masonry. All structural steel exposed to view shall be shop primed. Apply sufficient primer to insure 2 mil DFT.

## PART 3 – EXECUTION

### 3.01. Examination

a. Verify that field conditions are acceptable and are ready to receive work.
b. Verify that lay down areas are sufficient, clean, level, and of sufficient strength and stability to support safely members and handling equipment.

### 3.02. Handling and Storage

a. Provide proper equipment to safely off load material to prevent damage.
b. Provide adequate dunnage and skids to keep steel from getting muddy and dirty.
c. Store steel in such a manner to prevent the accumulation of water and debris.
d. Do no erect steel that is muddy or stained with any deleterious material. Clean steel if necessary before erection.

### 3.03. Erection

a. Allow for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing.
b. Do not field cut or alter structural members without approval of Architect/Engineer.
c. After erection, clean and prime paint welds, abrasions and surfaces where shop prime has been disturbed.
d. All eaves shall be aligned to be straight and true. All joist extended ends at the eaves and all TS outriggers at the gables shall be pulled into alignment and securely welded to the continuous edge plate or angle as applicable. Edge plates and angles shall be string lined for straightness.
e. Gable outriggers shall be accurately laid out on 36" centers to fit under the wide flute of the metal deck and shall be welded to the top of the affected joists. The metal deck shall be puddle welded to the top of the TS outriggers at 12" oc in addition to welding to the supporting joists.
f. The bent plate ridge plate shall be aligned vertically and horizontally and shall be securely welded to the ends of the joist extended ends to form straight and level ridge.
g. The continuous eave and ridge bent plates and gable edge angles shall be butt-welded straight and full strength at joints. Provide a break in the continuous bent plate and angle members at maximum 40-foot intervals. The minimum length of these members shall be 30 feet. These break joints shall be over a support and shall be welded thereto.
h. Grout under column base plates to get full uniform bearing.

### 3.04. Field Quality Control

a. The Architect will perform Field inspection.
b. Connection bolts and field welds shall be inspected by an independent testing lab employed by the Owner.
c. The materials testing laboratory shall certify shop welds and fabrication quality. At the option of the lab, the inspection may be conducted in the field after delivery or at the fabrication plant during fabrication and/or prior to shipment.
d. All structural steel members shall be inspected by the testing laboratory for sweep, camber, and twist to comply with ASTM A6 and AISC Code of Standard Practice for fabricated structural steel.

END OF SECTION

## SECTION 06110 - WOOD FRAMING

## PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
1. Carpentry work not specified as part of other Sections and which generally is not exposed, except as otherwise indicated.
2. Rough carpentry for:
   a. Miscellaneous lumber for attachment and support of other work.
   b. Wood furring.
   c. Sheathing.
   d. Construction panels for miscellaneous uses.
3. Preservative treatment.

B. Related Sections:
1. Standing and running trim: Elsewhere in Division 6.
2. Prefabricated wood trusses: Elsewhere in Division 6.

1.02 REFERENCES

A. APA Form E30L – Residential & Commercial; American Plywood Association, 1993.

B. Standard Grading Rules for Southern Pine Lumber; Southern Pine Inspection Bureau (SPIB), 1994.

C. NFPA WCD #1 – Manual for Wood Frame Construction; American Forest and Paper Association (formerly National Forest Products Association), 1988.

1.03 DELIVERY STORAGE AND HANDLING

A. Protect wood products against moisture and dimensional changes. Support stacks at several uniformly spaced points to prevent deformation. Store stacks raised above ground. Cover to protect from rain and snow. Select and arrange cover to allow air circulation under and all around stacks to prevent condensation. Maintain and restore displaced coverings.

## PART 2 - PRODUCTS

2.01 DIMENSION LUMBER

A. Size: Provide nominal sizes indicated, except where actual sizes are specifically required.
   1. SPF Grade: No. 2 (structural light framing) or stud unless approved otherwise by the Structural Engineer.

B. Miscellaneous Lumber: Provide dimension lumber and boards necessary for the support of Work specified in other Sections, whether or not specifically indicated, and including but not limited to blocking, nailers, etc.

2.02 CONSTRUCTION PANELS

A. Roof Sheathing:
   1. 5/8-inch APA rated, exposure 1 roof plywood deck with a minimum span rating of 24/16.

B. Exterior Wall Sheathing:
   1. 5/8-inch OSB rated sheathing:
      a. Exterior exposure class.

C. Construction Panels/Plywood:
   1. Electrical/telephone panel backer: AC grade.

D. Catwalk: 3/4inch CDX sheathing.

2.03 MISCELLANEOUS MATERIALS

A. Fasteners: Provide as required by applicable codes and as indicated on structural drawings.

B. Plywood Sheathing clips: Eighteen (18) gauge, galvanized as required by applicable codes.

**PART 3 - EXECUTION**

3.01 INSTALLATION - GENERAL

A. Arrange work to use full length pieces except where lengths would exceed commercially available lengths. Discard pieces with defects that would lower the required strength or appearance of the Work.

B. Cut and fit members accurately. Install plumb and true to line and level.

C. Fasten carpentry in accordance with applicable codes and recognized standards.

D. Where exposed, countersink nails and fill flush with suitable wood filler.

E. Use fasteners of appropriate type and length. Predrill members when necessary to avoid splitting wood.

3.02 MISCELLANEOUS CARPENTRY

A. Provide miscellaneous blocking, nailers and framing as shown and as required for support of facing materials, fixtures, specialty items and trim. Cut and shape to the required size. Provide in locations required by other work.

3.03 WOOD FURRING

A. Install wood furring plumb and level; shim as necessary to bring true to plane; install closure strips at ends perpendicular to main furring direction.

END OF SECTION 06110

## SECTION 06190 - PREFABRICATED WOOD TRUSSES

## PART - GENERAL

1.01 SUMMARY

A. Section Includes:
1. Trusses fabricated from dimension lumber.
2. Plate connectors.
3. Engineering of trusses.
4. Erection of trusses.
5. Erection accessories and bracing.
6. Bridging.
7. Attachment to structure.

1.02 REFERENCES

A. National Design Specification for Wood Construction.

B. Design Values for Wood Construction, a Supplement to the National Design Specification.

C. American Forest and Paper Association (formerly National Forest Products Association).

D. TPI PCT – Design Specification for Metal Plate Connected Parallel Chord Wood Trusses; Truss Plate Institute, latest edition.

1.03 SUBMITTALS

A. Shop Drawings: Submit detailed drawings for fabrication and erection of trusses including plans, elevations and details of special connections, joining and accessories, as required. Reproduction of the Contract Documents is not permitted.
1. Include mark, number, location and spacing of trusses and bridging.
2. Show dimensions, applied loads, reactions and permanent bracing.
3. Provide templates or location drawings of anchors or bearing accessories to be installed as Work of other Sections.

B. Shop drawings shall be sealed by a professional engineer registered in the state in which the Project is located.

1.04 DELIVERY, STORAGE AND HANDLING

A. Handle units to avoid damage. Comply with the manufacturer's printed instructions.

## PART 2 - PRODUCTS

### 2.01 TRUSS CONNECTOR PLATES

A. Connector Plates: Fabricate connector plates from sheet metal meeting the following requirements:
   1. Structural properties: ASTM A 446, any grade.
   2. Finish: Hot-dipped galvanized; ASTM A 525, G60, minimum.
   3. Thickness: As required by truss design but not less than 0.036-inch (21 gauge).

### 2.02 LUMBER

A. General:
   1. Surfacing: Dressed, S4S.
   2. Moisture content: Nineteen (19) percent maximum at time of dressing and shipment.

### 2.03 MISCELLANEOUS

A. Provide all attachment clips, wood header beams and hanger attachments, as required.

## PART 3 - EXECUTION

### 3.01 PREPARATION

A. Inspect trusses for damage and loosening of connector plates before installation. Make repairs in accordance with the truss connector plate manufacturer's instructions; otherwise, replace trusses which cannot be properly repaired.

### 3.02 INSTALLATION

A. Lift trusses at designated lifting points only.

B. Provide temporary bracing to hold trusses upright and in place until permanently secured.

C. Install permanent bridging, bracing and anchors to maintain trusses straight and in correct position before installing supported construction or superimposing loads.

D. Field cutting of truss members is not allowed.

END OF SECTION 06190

## SECTION 07210 - BUILDING INSULATION

## PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
1. Extruded polystyrene board.
2. Glass fiber blanket/batt.
3. Open cell spray foam.

## PART 2 - PRODUCTS

2.01 MATERIALS

A. Provide manufacturer's standard preformed insulation units, sized for proper fit in indicated applications.

B. R-values or thickness of insulation is indicated on the Drawings.

C. Extruded Polystyrene Board Insulation: Manufactured by extrusion process with integral high density skin:
1. Edges: Provide boards with square edges.

D. Glass Fiber Insulation-Blanket/Batt:
1. Unfaced blanket/batt: Type I (ASTM C 665), passing ASTM E 136 combustion test requirements.

E. Open Cell Spray Foam: Open cell spray foam complying with Florida Building Code Chapter 26 with code (2604.4.1.6) approved ignition barrier. Tailored Foam of Florida or approved equal.

2.02 ACCESSORIES

A. Provide accessories as necessary to properly install specified products.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

A. Comply with the insulation manufacturer's recommendations and installation sequence. Provide permanent placement and support of insulation.

B. Insulation Boards:
   1. Extruded polystyrene insulation:
      a. Under-slab installation: Do not install insulation before compaction of subgrade is verified. Provide installation capable of sustaining subsequent construction work without damage or displacement.

END OF SECTION 07210

## SECTION 07270 - FIRESTOPPING AND SMOKESTOPPING

## PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Firestopping of all penetrations through fire barriers.
   2. Smokestopping of all penetrations through smoke barriers.

B. Extent of fire and smoke barriers is indicated on the Drawings.

C. Work Not Included: Repairing penetrations made in error and repairing penetrations which are too large to be sealed by the methods indicated; these are to be repaired using the original material of the construction.

D. Products Furnished but Not Installed:
   1. Sleeves which are an integral part of the firestopping assembly but which must be set by installer of other construction.

E. Coordinate with mechanical and electrical trades.

1.02 REFERENCES

A. Fire Resistance Directory; Underwriters Laboratories Inc., latest edition.

1.03 DEFINITIONS

A. Fire Barrier: Any wall or ceiling which is indicated as having a fire-resistance rating.

B. Smoke Barrier: Any wall or ceiling which is indicated as being designed to prevent passage of smoke and gases; may be indicated as "smoke barrier," "smoke partition," "smoke wall," etc.

1.05 SEQUENCING AND SCHEDULING

A. Perform firestopping and smokestopping work after completion of work which penetrates fire and smoke barriers, but prior to covering up or eliminating access to the penetration. Coordinate with installers of such other work. Protect all openings.

## PART 2 - PRODUCTS

2.01 MATERIALS

A. Firestopping Materials: Provide penetration seal assemblies whose fire-resistance ratings have been determined by testing in the configurations required and which have fire-resistance ratings at least as high as that of the fire-rated assembly in which they are to be installed.
1. Use the materials required for the tested assemblies indicated on the Drawings.
a. Where no tested assembly is indicated for a particular penetration, use tested assembly which complies with the requirements of this Specification.

B. Smokestopping: Use any gunnable or pourable joint sealant suitable for the application. Use only fully curing types where accessible in the finished Work.

C. Labels: Red, permanent marking using the words "Fire and Smoke Barrier Protect All Openings."
1. For marking fire and smoke barriers themselves, use letters at least 2-inches high.

**PART 3 - EXECUTION**

3.01 EXAMINATION

A. If the configuration of a particular penetration does not conform to the configuration necessary for the required firestopping assembly, notify the Contractor for modification of the configuration to suit the assembly. Do not use the firestopping assembly in other configurations except as approved by the authority having jurisdiction.

3.02 PERMANENT IDENTIFICATION OF PENETRATIONS

A. Mark each fire and smoke barrier above lay-in ceilings or in attic space with words identifying it as a fire or smoke barrier at intervals required by authorities having jurisdiction, but not more than twenty (20) feet.

3.03 FIELD QUALITY CONTROL

A. Inspect completed installations for completeness and correct installation.
1. If installed work is to be covered in completed work, inspect and obtain approval prior to covering.

3.04 CLEANING

A. Clean up excess material promptly.

3.05 FIRESTOPPING INSTALLATION

A. Firestopping Installer shall have a manufacturer's trained certification to achieve consistent filed workmanship for the National Recognized Testing Laboratory (NRTL) details required for each application.

B. All firestop penetration installer(s) regardless of trade performing the work shall meet the Quality Assurance requirements of the specifications.

END OF SECTION 07270

## SECTION 07310 - FIBERGLASS, CLASS "A" ASPHALT SHINGLES

## PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
1. Fiberglass Class "A" asphalt shingle roofing.
2. Accessories, including underlayment materials, fasteners and adhesives required for a complete fiberglass, class "A" asphalt shingle installation.
3. Ridge vent.

1.02 DELIVERY, STORAGE, AND HANDLING

A. Furnish materials wrapped in the manufacturer's original packaging.

B. Store materials separated from the ground and in a dry location, protected until installation in accordance with the manufacturer's instructions.

1.03 WARRANTY

A. Submit the manufacturer's standard warranty guaranteeing to correct failures in the product which may occur during the warranty period, without reducing or otherwise limiting any other rights to correction which the Owner may have under the Contract Documents.
1. Warranty period: Thirty (30) years.

1.04 EXTRA MATERIALS

A. Furnish five (5) bundles of shingles used in the Work.

## PART 2 - PRODUCTS

2.01 MATERIALS

A. Fiberglass Class "A" Asphalt Shingles: Mineral-surfaced, self-sealing, glass fiber base.
1. Fire resistance: Class A, UL labeled.
2. Style: Architectural.
3. Color: Weatherwood.
4. Manufacturer: Timberline.

B. Underlayment: Asphalt-saturated organic roofing felt, thirty (30) pound, 36-inch-wide rolls.

C. Asphalt Plastic Cement: ASTM D 4586, fibrated asphalt cement, asbestos free.

D. Ridge Vents: Use Roll Vent Attic Ventilation System by Benjamin Obdyke Inc. or equal.

## PART 3 - EXECUTION

### 3.01 EXAMINATION

A. Review substrate to receive shingles for obstructions, loose sheathing, or voids in sheathing. Repair or replace unacceptable work which may affect proper material installation.

### 3.02 PREPARATION

A. Remove projections and debris from substrate before starting installation; lay sheet metal over minor voids and nail to substrate.

B. Coordinate shingle installation with flashing and other work integral with shingles.

C. Secure all vent stacks, curbs and other penetrations to substrate before starting shingle installation.

### 3.03 INSTALLATION

A. Single Layer Underlayment: Apply one layer of thirty (30) pound felt horizontally over substrate, with 2-inch minimum side laps and 4-inch minimum end laps. Secure with roofing nails until shingles are installed.

B. Flashing:
1. Install the flashing and edge protection to provide a weathertight installation:
   a. Step flashing at vertical walls: Install for entire length of intersection of roof surface and vertical wall.
   b. Drip edge: Install over underlayment along entire length of eaves and rakes. Nail to roof deck with noncorrosive nails 8-inches to 10-inches apart. In high wind areas, nail at 4-inches on center.

C. Shingles:
   1. Install in accordance with the manufacturer's written instructions.
   2. Shingles to be fastened to the roof decking as required to resist the wind loads shown on the structural engineering drawings.

D. Ridge Vents:
   1. Install in accordance with the manufacturer's written instructions.

3.04 CLEANING

A. Remove construction debris from roof surfaces and surrounding ground surfaces.

B. Replace shingles broken or damaged during installation.

END OF SECTION 07310

## SECTION 07464 - SIDING

## PART 1 - GENERAL

1.01 SUMMARY

A. The Contractor shall furnish all labor, materials, tools, equipment and perform all work and services necessary for, or incidental to, the furnishing and installation of all vinyl siding and related work shown on the Drawings or specified herein.

1.02 QUALITY ASSURANCE

A. Codes and Standards: Comply with the following documents, except where requirements of the Contract Documents or of governing codes and governing authorities are more stringent:
1. NOA 15-0122.04 (Miami-Dade Approval).

1.03 WARRANTY

A. Upon Substantial Completion, provide the manufacturer's written lifetime limited warranty.

1.04 SUBMITTALS

A. Shop drawings showing special conditions and the manufacturer's standard installation details.

B. Product Data.

C. Submittals: Color samples; sample of each type of proposed material

## PART 2 - PRODUCTS

2.01 MATERIALS

A. Hardie Plank Lap Siding Select Cedarmill. Trim and soffit as required for a complete installation per the manufacturer's instructions.

## SECTION 07630 - ALUMINUM GUTTERS AND DOWNSPOUTS

### PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Gutters and downspouts at interior courtyard only.
   2. Diverters at exterior doors and walks.

### PART 2 - PRODUCTS

2.01 MATERIALS

A. Prefinished Aluminum Sheet: ASTM B 209, manufacturer's standard alloy and temper for indicated applications.
   1. Minimum size and thickness:
      a. Gutters: 5-inches, 0.027 gauge OGEE Seamless.
      b. Downspouts: 3-inches x 4-inches, 0.19 gauge.
   2. Color: To be selected by the Architect.

2.02 ACCESSORY MATERIALS

A. Fasteners: Corrosion-resistant metal of same material as the material being fastened, or other material recommended by the aluminum manufacturer. Match finish and color of exposed fastener heads to finish and color of sheet material being fastened.

B. Joint Adhesive: Two-component non-corrosive epoxy adhesive, recommended by the aluminum manufacturer for sealing of non-moving joints.

C. Bituminous Coating: Heavy bodied, sulfur-free, asphalt-based paint.

D. Diverters: Aluminum or galvanized standard shapes.

2.03 FABRICATION - GENERAL

A. Form sheet metal to match profiles indicated and substantially free from oil-canning, fish-mouths, and other defects.

B. Fabricate cleats and attachment devices from the same material as sheet metal component being anchored or from compatible, non-corrosive metal recommended by the sheet metal manufacturer.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

A. The Siding Contractor shall be responsible for all installation including but not necessarily limited to:

1. Comply with the manufacturer's instructions and recommendations for the installation of the specified material.
2. Install so that expansion and contraction are not restricted.
3. Verify substrate and inform the General Contractor of any unacceptable construction before installing.
4. Use fasteners as recommended by the manufacturer for the specified material, substrate and structural wind loading shown on the structural engineering sheets.

END OF SECTION 07464

1. Gauge: As recommended by SMACNA or the metal manufacturer for application, but in no case less than gauge of the metal being secured.

2.04 GUTTERS AND DOWNSPOUTS

A. Fabricate from prefinished aluminum sheet.

B. Provide expansion joints in gutters at spacing not to exceed forty (40) feet.

C. Gutter Supports: Straps.

D. Downspout Supports: Straps.

**PART 3 - EXECUTION**

3.01 CLEANING AND PROTECTION

A. Repair or replace Work which is damaged or defaced, as directed by the Contractor.

END OF SECTION 07630

## SECTION 07910 - JOINT SEALERS

## PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
1. Preparing sealant substrate surface.
2. Sealant and backing.
3. Preparing and installing all materials required where joint sealers are not specifically described in other Sections of the Specifications.

1.02 SUBMITTALS

A. Submittals: Under provisions of Section 01220.

B. Product Data: Indicate sealant chemical characteristics, performance criteria, limitations and color availability.

C. Samples: Submit two (2) samples illustrating colors selected.

D. Manufacturer's Installation Instructions: Provide detailed instructions for construction including preparation, handling and environmental requirements.

1.03 WARRANTY

A. Provide two (2) year warranty.

B. Warranty: Include coverage of installed sealants and accessories which fail to achieve air tight and water tight seal, exhibit loss of adhesion or cohesion, or do not cure.

1.04 ENVIRONMENTAL REQUIREMENTS

A. Do not install solvent curing sealants in enclosed building spaces.

B. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

## PART 2 - PRODUCTS

### 2.01 SEALANTS

A. Acrylic Latex: ASTM C834; Pecora AC-20.

B. Butyl Rubber: TT-S-001657, Type I; Pecora BC-158.

C. One (1) Part Polyurethane: TT-S-00230C, Type II, Class A; ASTM C920; Pecora Dynatrol I.

D. Polysulfide: TT-S-00230, Type II, Class A; Pecora GC-9, Synthacalk.

E. Silicone: TT-S-00230C, Type II, Class A; Pecora 863.

### 2.02 ACCESSORIES

A. Primer: Non-staining type, recommended by the sealant manufacturer to suit application.

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

C. Joint Backing: ANSI/ ASTM D1056; D1565; round, closed cell foam rod; oversized thirty (30) to fifty (50) percent larger than joint width.

D. Bond Breaker: Pressure sensitive tape recommended by the sealant manufacturer to suit application.

## PART 3 - EXECUTION

### 3.01 EXAMINATION

A. Verify that surfaces are ready to receive Work and field measurements are as shown on the Drawings and recommended by the manufacturer.

B. Beginning of installation means installer accepts existing surface(s).

### 3.02 PREPARATION

A. Clean and prime joints in accordance with the manufacturer's instructions.

B. Remove loose material and foreign matter which might impair adhesion of sealant.

C. Verify that joint backing and release tapes are compatible with sealant.

D. Perform preparation in accordance with ASTM C804 for solvent release and C790 for latex base sealants.

E. Protect elements surrounding the Work of this Section from damage or disfiguration.

3.03 INSTALLATION

A. Install sealant in accordance with the manufacturer's instructions.

B. Measure joint dimensions and size material to achieve required width/depth ratios.

C. Install joint backing to achieve a neck dimension no greater than 1/3 the joint width.

D. Install bond breaker where joint backing is not used.

E. Apply sealant within recommended application temperature range. Consult the manufacturer when sealant cannot be applied within these temperature ranges.

F. Install sealant free of air pockets, foreign embedded matter, ridges and sags.

G. Tool joints concave.

3.04 CLEANING AND REPAIRING

A. Clean adjacent soiled surfaces.

B. Repair or replace defaced or disfigured finishes caused by Work of this Section.

3.05 PROTECTION OF FINISHED WORK

A. Protect sealants until cured.

3.06 SCHEDULE

A. The following is a list of principal areas. Final color selection is subject to Architect approval:

1. Under thresholds: Butyl; black.
2. Sheet metal flashing: Polysulfide or polyurethane; color to be selected by the Architect.
3. Window systems: As recommended by the window manufacturer.
4. Concrete: Butyl; gray color to be selected by the Architect.
5. Wood trim: Acrylic latex; color to be selected by the Architect.
6. Toilet fixtures: Sanitary silicone; white color.
7. Masonry and stone: Polysulfide; color to be selected by the Architect.
8. Joints at perimeter of sound rated gypsum board wall assemblies: Acrylic latex; color to be selected by the Architect.
9. Brick control joints: One (1) part polyurethane.
10. Penetrating through fire-rated construction: Sealants approved for use by tested U.L. Assembly. See Section 07270 - Firestopping and Smokestopping.
11. EIFS: Silicone; color to be selected by the Architect.

END OF SECTION 07910

## SECTION 08110 - STEEL DOORS AND FRAMES

## PART 1 - GENERAL

### 1.01 SUMMARY

A. Section Includes:
1. Standard steel doors and frames.
2. Assemblies for fire-rated openings.
3. Insulated doors.

B. Related Sections:
1. Wood doors for installation in steel frames: Elsewhere in Division 8.
2. Door hardware: Elsewhere in Division 8.
3. Glass and glazing: Elsewhere in Division 8.

### 1.02 SUBMITTALS

A. Product Data: Submit the manufacturer's printed product information indicating compliance with specified requirements.

B. Shop Drawings: Submit shop drawings for fabrication and installation of steel doors and frames, including the following information:
1. Details of each frame type, including anchorage.
2. Elevations of each opening type.
3. Conditions at openings, including coordination with glass and glazing requirements.
4. Location and installation requirements of door hardware and reinforcements.
5. Schedule of openings coordinated with numbering system used in the Contract Documents.

### 1.03 QUALITY ASSURANCE

A. Labeled Assemblies: At all locations where fire-rated door and frame assemblies are required, provide assemblies which comply with NFPA 80 and have been tested and labeled in accordance with ASTM E 152 by an agency acceptable to governing authorities.
1. Temperature rise rating: For fire-rated doors in stairwell enclosures, provide door construction tested and certified to limit temperature rise in thirty (30) minutes to 450 degrees F.

### 1.04 DELIVERY, STORAGE AND HANDLING

A. Replace items damaged in delivery, unless damage is minor and can be repaired to match intact items.

B. Store products under cover, raised above ground level and stacked to prevent warping and to promote air circulation.

## PART 2 - PRODUCTS

### 2.01 MATERIALS

A. Steel Sheets, Hot-Rolled: ASTM A 569 and ASTM A 568, commercial quality, pickled and oiled.

B. Steel Sheets, Cold-Rolled: ASTM A 366 and ASTM A 568, commercial quality, matte finish exposed, oiled.

C. Anchors: Galvanized steel, minimum eighteen (18) gauge.

D. Fasteners and Inserts: Units standard with the manufacturer.
1. Exterior walls: ASTM A 153, hot-dipped galvanized, Class C or D.

E. Paint:
1. Primer: Manufacturer's standard rust-inhibitive coating, suitable to receive finish coatings specified.

### 2.02 FABRICATION

A. General: Shop-fabricate assemblies to greatest extent possible.

B. Exposed Panel Faces: Fabricate from cold-rolled steel.

C. Exposed Door Faces: Fabricate from cold-rolled steel.

E. Exposed Screws and Bolts: Where required, provide only countersunk, flat phillips-head fasteners.

F. Insulated Assemblies: At locations scheduled, provide insulating door and frame assemblies.

G. Hardware Preparation: Use approved Hardware Schedule and templates from hardware supplier.
1. Reinforcement: Reinforce doors and frames for field-installed exposed hardware items.

### 2.03 STEEL DOORS

A. Exterior Doors:
   1. Entrance doors with glass lights to be sixteen (16) gauge comparable to Amweld 300 Series.
   2. Thickness: 1 ¾-inches.

B. Fixed Panels:
   1. Provide fixed panels of same fabrication as doors; eighteen (18) gauge comparable to Amweld 1500 Series.

2.04 STEEL FRAMES

A. General: Fabricate steel frames for scheduled openings, in styles and profiles as shown, using concealed fasteners.
   1. Provide sixteen (16) gauge material.
   2. Construction: Mitered and welded corners, ground smooth.

B. Door Silencers: Drill stops to receive silencers, except on frames scheduled for weatherstripping.
   1. Provide for three (3) silencers on strike jambs of single-swing frames.
   2. Provide for two (2) silencers on heads of frames for pairs of doors.
   3. Provide for two (2) silencers on heads of frames for double egress doors.

C. Guards: Weld protective covers to back of hardware openings at locations where grout, plaster, or other materials might interfere with hardware operation.

**PART 3 - EXECUTION**

3.01 INSTALLATION

A. General: Install steel doors, frames and accessories to comply with the manufacturer's recommendations.
   1. Comply with detailed installation requirements of approved shop drawings.

3.02 ADJUST AND CLEAN

A. Touch-Up: At locations where primer has been abraded or minor rusting has occurred, sand smooth and spray-apply compatible primer.

B. Final Operating Adjustments: Check hardware at all openings for proper operation of doors, making final corrections as required to assure that the Work of this Section is complete and undamaged.

END OF SECTION 08110

## SECTION 08200 - WOOD DOORS

## PART 1 - GENERAL

### 1.01 SUMMARY

A. Section Includes:
   1. Solid core wood-faced doors.
   2. Prefitting by manufacturer.
   3. Premachining by manufacturer.
   4. Glazing stops and preparation of flush doors to receive glazing; glazing specified elsewhere.

B. Related Sections:
   1. Metal door frames: Elsewhere in Division 8.
   2. Door hardware: Elsewhere in Division 8.

### 1.02 SUBMITTALS

A. Shop Drawings: Prepare and submit shop drawings showing all relevant information, including:
   1. Dimensions and location of each product specified.
   2. Elevation for each distinct door configuration.
   3. Construction details for each distinct product type.
   4. Dimensions and location of blocking for hardware.
   5. Fire-ratings.

### 1.03 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle products as required to prevent damage or deterioration.

B. Clearly label each door with opening number where door will be installed. Use removable, temporary labels or mark on door surface which will be concealed from view after installation.
   1. Coordinate door identification with approved shop drawing designations.

C. Manufacturer's Warranty:
   1. Solid core wood-faced interior doors: One (1) year.

## PART 2 - PRODUCTS

### 2.01 WOOD DOORS - GENERAL REQUIREMENTS

A. Fire Rated Doors:
   1. Construction: Comply with testing agency requirements for indicated fire-rating.
   2. Labels: Shall be embossed metal, mounted on edges of doors between the upper hinges.

### 2.02 SOLID CORE WOOD-FACED DOORS

A. General:
   1. Grade: Mohawk Premium Grade Birch.

B. Solid Core Wood-Faced Door :
   1. Interior door: Rated as indicated on the Door Schedule and the Drawings.
   2. Faces: Rotary cut, manufacturer's standard premium birch.
   3. Finish: Pre-finished mahogany.
   4. Construction: Five (5) ply, pre-machined and pre-fitted.
   4. Core: Particleboard, bonded to stiles and rails, sanded.

### 2.03 ACCESSORIES

A. Stops for Glazing and Louvers:

### 2.04 FABRICATION

A. Doors: Fabricate to provide consistent clearances as indicated.
   1. Prefitting: Fabricate and trim the doors to size at factory to coordinate with approved frame shop drawings and floor finishes as indicated in the Finish Schedule.
   2. Premachining: Make all mortises and cutouts required for hardware at the factory, to conform to approved Hardware Schedule, hardware templates and approved door frame shop drawings.

B. Openings: Cut, trim and seal openings in doors during fabrication.

C. Doors to be pre-finished and pre-machined.

## PART 3 - EXECUTION

### 3.01 EXAMINATION

A. Inspect door frames and doors before beginning door installation.
   1. Do not install damaged or defective doors.

B. Correct unsatisfactory conditions before installing products of this Section. Commencement of installation indicates acceptance of conditions.

### 3.02 INSTALLATION

A. Clearances:
   1. Clearance between door edge and head: 1/8-inch.
   2. Clearance between door edge and jamb: 1/8-inch.
   3. Clearance between door bottom edge and top surface of threshold: ¼-inch.
   4. Clearance between door bottom edge and floor covering surface or finish (where threshold is not indicated): 1/8-inch, unless otherwise noted.
   5. Clearance between meeting edges at pairs of doors: 1/8-inch.

### 3.03 ADJUSTING

A. Adjust doors for proper operation; coordinate with hardware adjustment; replace doors which cannot be properly adjusted.

END OF SECTION 08200

## SECTION 08310 - ACCESS DOORS

## PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
1. Access doors.

1.02 SUBMITTALS

A. Product Data: Submit the manufacturer's printed product information indicating compliance with specified requirements.

B. Attic access doors shall be J.L. Industries Model FD 24" * 36" or equal.

1.03 QUALITY ASSURANCE

A. Labeled Assemblies: At all locations where fire-rated door and frame assemblies are required, provide assemblies which comply with NFPA 80 and have been tested and labeled in accordance with ASTM E 152 by an agency acceptable to governing authorities.
1. Temperature rise rating: For fire-rated doors in stairwell enclosures, provide door construction tested and certified to limit temperature rise in thirty (30) minutes to 450 degrees F.

1.04 DELIVERY, STORAGE AND HANDLING

A. Replace items damaged in delivery, unless damage is minor and can be repaired to match intact items.

B. Store products under cover, raised above ground level and stacked to prevent warping and to promote air circulation.

## PART 2 - PRODUCTS

2.01 MATERIALS

## PART 3 - EXECUTION

3.01 INSTALLATION

A. General: Install access hatch accessories to comply with the manufacturer's recommendations.

3.02 ADJUST AND CLEAN

A. Touch-Up: At locations where primer has been abraded or minor rusting has occurred, sand smooth and spray apply compatible primer.

B. Final Operating Adjustments: Check hardware at all openings for proper operation of doors, making final corrections as required to assure that the Work of this Section is complete and undamaged.

END OF SECTION 08310

## SECTION 08410—ALUMINUM ENTRANCES, STOREFRONT, CURTAIN WALL

### PART 1 - GENERAL

1.01. Related Documents
Drawings and General Provisions of Contract including General Conditions, Supplementary Conditions, and Division 1 Specification Sections.

1.02. Scope: Furnish and install entrances and storefront materials, accessories, attachment devices,

1.03 Shop Drawings

a. Submit shop drawings as required to the Architect. Shop drawings shall include engineered drawings of the systems used. System design shall withstand a minimum 145 mph wind load for the Project area. Verify structural drawing, wind zone category.

b. A Florida Registered Engineer shall seal engineered drawings.

1.04 Cleaning: Clean and Polish all work at the completion, as recommended by the manufacturer.

1.05. Guarantees

a. Guarantee shall include water tightness and defects due to materials or workmanship.

b. Guarantee over door closures for two (2) years. Guarantee shall be in writing.

1.06. Approved Manufacturers: Equivalent sections of other manufacturers may be substituted. Contractor shall submit data as required to give evidence that the requested substitution is equivalent. See Section 01640. Storefront sections shall be fabricated from single source where possible.

Manufacturers:

- Amarlite Corporation
- Kawneer Company
- Pittsburgh Plate Glass Company
- U.S. Aluminum

### PART 2 – MATERIALS

2.01. Products specified as standard of quality are manufactured by Kawneer Company, Inc.

2.02. Extrusions: 6063-T5 aluminum alloy meeting ASTM B221-79a.

2.03. Gaskets: EPDM elastomeric extrusions.

2.04. Aluminum Sheet: 5005-H34 aluminum alloy meeting ASTM-B209-80, minimum 0.050" thickness.

2.05. Fasteners: All fastening devices shall be stainless steel; countersink exposed fasteners; match entrances and storefronts in color. All fasteners shall be tamper proof.

2.06. Finish: All exposed aluminum surfaces including break metal shall be Al-R1 Mill finish.

2.07. Storefront Sealant: Non-skinning type meeting MAAMM standards 5C-1.1 color to match storefront.

2.08. Glazing Pockets: Vertical and horizontal glazing pockets shall provide ½" glass grippage.

2.09 Hardware: Provide as follows:

a. For parts of entrances:
2 sets of pivots
2 closers
2 push bars
2 pulls
1 deadlock
2 flush bolts
exit device
exit device

1 threshold
2 floor stops
1 deadlocking latch

b. For single entrances:
1 set pivots
1 closer
1 push bar
1 pull
1 deadlock
1 exit device
1 threshold
1 floor stop
1 deadlocking latch

## PART 3 - COMPONENTS

3.01. Entrances shall be medium stile design; 350 series by Kawneer Company, Inc. with minimum 500 wide stiles and top rail and 10" bottom rail. Bottom rail sweep shall be provided on doors. Hardware provided for these doors by the Storefront subcontractor.
a. Top, intermediate and bottom offset pivots: pivots positioned with threshold.
b. Floor closer: single acting (offset pivot) Rixon No. 27 with 105° hold open.

c. Threshold: Kawneer threshold (max height ½") offset pivot for floor closer.
d. Removable mullion: Similar to Sargent 980-A Aluminum (US28) with a 511 top retainer and a 502 bottom retainer size mullion to doors. See Door Schedule.
e. Exit Device: Similar to Von Duprin No. 99L with Hex key dogging kit (HDK) each leaf.
f. Cylinder Cores: One each leaf rim type 99NC-OP-F
g. **Key – card reader Locking device :** Shall be supplied by the Hardware supplier and installed by the General Contractor.

3.02. Systems: 1" front glazed and 1" butt glazed

3.03. Storefront Tri-Fab11, 451 2x6 front glazed as manufactured by Kawneer.

3.04. Curtain walls - 1600 Series 2½" x 7½" and as manufactured by Kawneer or US Aluminum Series 4500.

## PART 4 - SYSTEM PERFORMANCE REQUIREMENTS

4.01. Minimum Design wind load 100 MPH – Verify with Structural Drawings, wind zone category.

4.02 Air Leakage: Limit to 0.06 CFM/min/sq.ft. (.0003m³/sm²) of wall area at 6.24 psf (300 Pa) in accordance with ASTM E283.

4.03 Water Leakage: None measured in accordance with ASTM 331 at pressure difference of 8 psf (384 Pa).

4.04 Mullion Deflection: Limit to L/175 with full recovery of glazing materials.

4.05 **NOTE: Provide certification of the above test requirements to the Architect.**

## PART 5 - EXECUTION

5.01. Inspect job conditions and do not proceed until satisfactory conditions exist.

5.02. Cut and fit all material accurately with tight fitting joints. Horizontal members one piece with unbroken face outside and inside.

5.03. Anchor members with fastenings of sufficient size and quantity. Allow for expansion and setting.

5.04. Properly align and adjust entrance doors. Adjustments on doors shall be made at no additional expense to the Owner.

5.05. Manufacturer's flashing shall be provided to allow the system to drain.

5.06. Tightly seal between aluminum and adjoining materials with specified sealants.

5.07. Protect aluminum in contact with masonry, steel, concrete, or other dissimilar materials from contact by neoprene gaskets or bituminous coating.

END OF SECTION

## SECTION 08520 - ALUMINUM WINDOWS

## PART 1 - GENERAL

### 1.01 SUMMARY

A. Section Includes:
   1. Applications:
      a. Individual window units.
   2. Operating styles:
      a. Fixed windows.
      b. Single hung windows.
      c. Sliding windows.

B. Related Sections:
   1. Glazing: Elsewhere in Division 8.

### 1.02 SUBMITTALS

A. Product Data.

B. Shop Drawings: Prepare and submit shop drawings showing information not conveyed by the product data as well as the following:
   1. Elevations.
   2. Cross-sections of all typical members.
   3. Anchors.
   4. Accessories.
   5. Glazing methods.
   6. Sealants.

C. Samples for Color Selection of Painted Finishes: The manufacturer's standard range on aluminum sections.

D. Samples for Verification of Painted Finishes: For each color, submit 12-inch long samples of extrusions.

E. Warranty:
   1. Provide one (1) year warranty on window unit.
   2. Provide five (5) year warranty on glazing seal at double insulated glass.

1.03 QUALITY ASSURANCE:

A. Provide windows bearing AAMA certification labels.

## PART 2 - PRODUCTS

2.01 WINDOWS - GENERAL

A Windows

1. Horizontal sliding thermal windows
   PGI Wingaurd HR710 (NOA 15-0519.09)
   CGI Model 375 (NOA 16-0125.07)
   ES Model 2050 (NOA 14-0923.10)
2. Single hung thermal window
   PGT Winguard SH700 (NOA 16-0714.06)
   CGI Model 360 (NOA 16-0125.08)
   ES Model ES-H346 (NOA 15-0129.12)
3. Fixed thermal window
   PGT Winguard PW720 (NOA 16-0629.14)
   CGI Model 238 (NOA 15-0512.16)
   ES Model 1500 (NOA 14-0923.08)

2.02 MATERIALS

A. Concealed Anchors:
   1. Steel, cadmium plated after fabrication.
   2. Stainless steel.

B. Sealants: Use only non-hardening, non-shrinking, and non-migrating materials.

## PART 3 - EXECUTION

3.01 INSTALLATION OF WINDOWS

A. Install in accordance with the manufacturer's instructions and recommendations.

B. Install windows plumb and level, true and square.

END OF SECTION 08520

## SECTION 08710 - DOOR HARDWARE

## PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
1. All door hardware comparable to the items specified herein and sufficient to meet the needs of the Project.

1.02 SUBMITTALS

A. Product Data: Manufacturer's data for each different piece of hardware, with installation instructions.
1. Include evidence of testing of fire door hardware for compliance with requirements.
2. Obtain approval prior to submittal of final schedule.

B. Hardware Schedule: Show the manufacturer's complete identification for every item for every door.
1. Cross-reference to item names and designations in the Contract Documents.
2. Indicate door/frame materials and sizes.
3. Explain number codes and abbreviations.
4. Indicate hardware mounting heights or locations, if different from those specified.
5. Indicate finish for each item.

C. Keying Schedule: To be as follows unless otherwise noted:
1. All locks to be master keyed.
2. All locks to be construction master keyed.
3. All exterior doors to be keyed alike.
4. All maintenance/mechanical doors to be keyed alike.
5. All utility doors to be keyed alike.
6. All janitors' doors to be keyed alike.
7. All dietary room doors to be keyed alike.
8. All storage room doors to be keyed alike.
9. All office doors to be keyed different.
10. All medical prep. room doors to be keyed different.

D. Operation and Maintenance Data: For operating parts and finishes.

1.03 QUALITY ASSURANCE

A. Hardware for Fire-Rated Doors: Tested for compliance with NFPA 80.

1.04 DELIVERY, STORAGE AND HANDLING

A. Provide a locked storage area controlled by the Contractor for hardware not yet installed.

**PART 2 - PRODUCTS**

2.01 HINGES

A. Manufacturers:
1. To be Stanley or equal.

2.02 LOCKS, LATCHES AND BOLTS

A. Manufacturers:
1. To be Standard Duty, comparable to:
   a. Falcon "F" Series Grade 2
   b. Schalge "S" Series Grade 2
2. Exit devices: Rim panic devises with lever handle. Trim comparable to the following:
   a. VonDuprin 98 Series
   b. Precision 1100 Series
   c. Sargent 8800 Series

B. Bored Locksets and Latchsets:
1. Comply with requirements of BHMA A156.2, Series 4000, Grade 1.

2.03 LOCK CYLINDERS AND KEYING

A. Keying: See Section 1.02.C

B. Key Cabinet: Wall-mounted, for keys hung on hinged panel behind cabinet door. Allow for twenty-five (25) percent expansion.

2.04 DOOR CONTROL DEVICES

A. Manufacturers:
1. Surface-mounted closers: Provide products complying with requirements of the Contract Documents and made by one of the following:
   a. Norton 9300 Series
   b. Corbin-Russwin DC 3600 Series
   c. Sargent Manufacturing Company.

2.05 ARCHITECTURAL DOOR TRIM

A. Push/Pulls:
1. Material: Brushed stainless steel.
2. Pull handles which are not mounted on plates: Fasten with through-bolts concealed under plate on opposite side.

B. Protection Plates: Plastic Laminate. Provide 16-inch x 2-inch less door width.

**PART 3 - EXECUTION**

3.01 INSTALLATION

A. Reinforce substrates as required for secure attachment and proper operation.

B. Thresholds: Apply continuous bead of sealant to all contact surfaces before installing.

3.02 ADJUSTMENT

A. Adjust each operable unit for correct function and smooth, free operation.

B. Adjust door closers to overcome air pressure produced by HVAC systems.

C. If hardware adjustment is completed more than one (1) month before Substantial Completion, readjust hardware not more than one (1) week before Substantial Completion.

3.03 CLEANING

A. Clean hardware; clean other work soiled during hardware installation.

3.04 CONTRACT CLOSEOUT

A. Deliver all keys to the Contractor.

END OF SECTION 08710

## SECTION 08810 - GLAZING

## PART 1 - GENERAL

### 1.01 SUMMARY

A. Section Includes:
   1. Monolithic glass.
   2. Insulating glass.
   3. Glazing gaskets.
   4. Glazing sealants.
   5. Glazing accessories.

B. Types of Work in this Section Include:
   1. Exterior windows.
   2. Exterior doors.
   3. Interior doors.
   4. Hollow interior frames.

### 1.02 SUBMITTALS

A. Product Data.

B. Insulating Unit Warranty.

C. Weathertight Warranty.

### 1.03 WARRANTY

A. Warranty on Insulating Glass: Fabricator's standard warranty for five (5) years.
   1. Weathertight warranty: Five (5) years.

## PART 2 - PRODUCTS

### 2.01 GLASS TYPES

A. Glass Types - General: Provide glass types fabricated of the glass products indicated on the Drawings and as required by codes.
   1. Exterior glass thickness:
      a. 5/8-inch thick insulating glass on Gerkin windows.
      b. 3/4-inch thick insulated windows in aluminum storefront frames.
   2. Interior glass thickness: ¼-inch tempered float glass, unless otherwise indicated.

2.02 BASIC GLASS PRODUCTS

A. Sealed Insulating Units: Factory-assembled multiple panes separated by and sealed to spacers forming air-tight, dehydrated air space(s).

**PART 3 - EXECUTION**

A. Protect glazing from edge damage during handling and installation.

B. Do not install glass that has edge damage or defects that reduce glass strength or performance or diminish appearance.

3.01 GLAZING IN FRAMES

A. Do not block weep holes.

B. Sealants:
1. Use continuous spacers.

C. Compression Gaskets: Secure gaskets so they will not work out under normal movement.
1. Install so they fit tightly at corners, allowing for stretch during installation.

END OF SECTION 08810

## SECTION 09000—FINISH SCHEDULE

## PART 1 - GENERAL

1.01 Reference interior design drawings and schedules. Interior finishes indicated on the interior design drawings supersede any interior finishes called out on architectural drawings.

END OF SECTION

## SECTION 09010 - DRYWALL

## PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
1. Gypsum wallboard.
2. Gypsum backing board.
3. Water-resistant gypsum backing board.
4. Drywall finishing.

1.02 DELIVERY, STORAGE AND HANDLING

A. Store materials in dry location, fully protected from weather and direct exposure to sunlight.

B. Stack gypsum board products flat and level, properly supported to prevent sagging or damage to ends and edges.

C. Store corner bead and other metal and plastic accessories to prevent bending, sagging, distortion, or other mechanical damage.

## PART 2 - PRODUCTS

2.01 FRAMING MATERIALS

A. General: As noted on the Drawings and as required for a complete installation.

B. Studs and Tracks: Refer to the Drawings for size, gauge and to Section 09100.

C. Verify that truss bearing height and metal stud length have been coordinated with prevailing standard wood stud lengths.

2.02 GYPSUM BOARD

A. Gypsum Wallboard: Maximum lengths available.
1. Fire-resistant type (Type X or equivalent).
2. Edges: Tapered.
3. Thickness: 5/8-inch.

B. Gypsum Backing Board: Cement board equal to Durock, maximum lengths available.
   1. Edges: Manufacturer's standard.
   2. Thickness: ½-inch.
   3. Provide behind all ceramic tile and quarry base (in kitchen).

C. Soffit Board, maximum lengths available.
   1. Standard type, except as otherwise indicated.
   2. Edges: Tapered, for taped joint treatment.
   3. Thickness: 5/8-inch, fire-resistant (Type X or equivalent).

2.03 TRIM AND ACCESSORIES

A. General: Except as otherwise specifically indicated, provide trim and accessories by the manufacturer of the gypsum board materials, made of galvanized steel or zinc alloy and configured for concealment in joint compound.
   1. Include metal corner beads, edge trim and other trim units necessary for Project conditions. Provide accessories as required in order to achieve details indicated, whether or not specific accessories are shown on the Drawings.

B. Control Joints: At locations indicated, provide the manufacturer's standard one (1)piece control joints of extruded vinyl, zinc alloy, or other non-corrosive metal. Submit to the Contractor for approval prior to installation.

2.04 MISCELLANEOUS MATERIALS

A. Screws: Self-drilling type; lengths as recommended by the gypsum board manufacturer for Project conditions.

**PART 3 - EXECUTION**

3.01 INSTALLATION OF GYPSUM BOARD

A. General:
   1. Wherever possible, install gypsum board to minimize butt end joints and to within 1/2-inch of the floor.
   2. Apply ceiling boards prior to installation of wallboard. Arrange to minimize butt end joints near center of ceiling area.
   3. Install wallboard in a manner which will minimize butt end joints in center of wall area. Stagger vertical joints on opposite sides of walls.
   4. Butt all joints loosely, with maximum of 1/16-inch between boards.
   5. Place wrapped edges adjacent to one another; do not place cut edges or butt ends adjacent to wrapped edges.

6. Support all edges and ends of each board on framing or by solid substrate, except that long edges at right angles to framing members in non-fire-rated construction may be left unsupported.
7. Flat tape around all thru-wall units and window sills.
8. Comply with all U.L. ratings.
9. At headwalls in patient rooms, install board in vertical position.
10. Furnish all materials required for a complete job, to meet the UL requirements, and State and Local codes.

B. Control Joints: Form control joints by means of 1/2-inch space between adjacent gypsum boards, with each edge supported on separate framing member, ready to receive trim accessory, and located as shown on the Drawings or as follows:
1. Not more than thirty (30) feet apart on walls which are not intersected by other walls for fifty (50) feet or more.
2. On ceilings with perimeter relief, not more than fifty (50) feet apart in both directions.
3. On ceilings without perimeter relief, not more than thirty (30) feet apart in both directions.

C. Isolation Joints: Where gypsum board construction intersects structural components, provide isolation by stopping board a minimum of ¼-inch from structure.

D. Installation of Backing Board:
1. At locations noted in Section 2.02, B.3 above, install backing board behind tile only.
2. Install backing board in accordance with the manufacturer's recommendations for installation, including minimum clearances and sealing of penetrations and edges. Do not install backing board on ceilings.

3.02 INSTALLATION OF TRIM AND ACCESSORIES

A. Corner Bead: Install metal corner bead at all external corners unless details clearly indicate its omission at specific locations.

B. Edge Trim: Install metal edge trim at locations indicated and wherever edge of gypsum board otherwise would be exposed.

C. Control Joints: Install one (1)piece control joints at required locations. Do not remove tape until finishing operations are complete.

3.03 FINISHING

## SECTION 10265—HANDRAILS, WALL AND CORNER GUARDS

### PART 1 - GENERAL

1.01. Submittals:

a. General: Submit in accordance with Section 01300- Submittals.

b. Product Data: Indicate product descriptions, full characteristics, sizes and finishes. Include rough-in details.

1.02. Project Conditions:

a. Protection: Protect prefinished surfaces from damage and staining. Provide protective covering following installation until Date of Substantial Completion.

b. Coordinate installation with other work. Secure templates or lay out to dimensions furnished by manufacturer.

### PART 2 - PRODUCTS

2.01 Handrails and Guards:

a. Manufacturer: InPro Corporation- IPC.

b. Material: Wood and high impact vinyl

c. Handrail: HR-1- Maple with cherry stain & ¾" x 5-1/2" back board stained to match.

d. Wall Guard: Model #1600- 6" wall guard- color to be selected by architect.

e. Corner guard: Model 150- surface mounted bullnosed 90 degree. Color to be selected by architect.

### PART 3 - EXECUTION

3.01. Installation:

a. Locate blocking and stud line behind gypsum board finish to receive mounting screens.

b. Install all units in accordance with the location and dimensions as shown on drawings.

END OF SECTION

A. Penetrations: Fill cutouts and openings around fixtures and penetrations with joint compound. Penetrations in UL rated assemblies to be per referenced UL assemblies noted on the Drawings.

3.04 TEXTURING

A. General: Ensure that surfaces to receive textured finish are clean, dry and smooth.

B. Spray Texturing: Apply textured finish to ceilings where indicated by means of powered spray equipment acceptable to the manufacturer, at recommended application rate.
   1. If applicable, modify texture by means of appropriate tools while surface is still wet, to match approved samples.

3.05 CLEANING

A. Promptly remove any residual gypsum drywall materials from adjacent or adjoining surfaces, leaving spaces broom clean for subsequent finishing operations and decorating.

END OF SECTION 09010

## SECTION 10520 - FIRE EXTINGUISHERS AND CABINETS

## PART 1 - GENERAL

1.01 SUBMITTALS

A. Product Data.

1.02 QUALITY ASSURANCE

A. Labels: Provide only fire extinguishers which are listed and labeled by Underwriters Laboratories Inc.

## PART 2 - PRODUCTS

2.01 FIRE EXTINGUISHERS

A. Manufacturers: Products of the following manufacturers, provided they comply with requirements of Contract Documents, will be among those considered acceptable:
   1. Fire extinguishers:
      a. Amerex Corporation.
      b. Ansul Fire Protection/A Grinnell Company.
      c. J.L. Industries.
   2. Cabinet or wall mounted.
   3. Red enamel tank with chrome valves and a large pressure gauge.
   4. See architectural drawings for types and locations.

2.02 CABINETS AND CABINET ACCESSORIES

A. Manufacturers: Products of the following manufacturers, provided they comply with requirements of Contract Documents, will be among those considered acceptable:
   1. Cabinets and accessories:
      a. J.L. Industries.
      b. Larsen's Manufacturing Company.
      c. Thomas Enterprises.

B. Cabinets:
   1. To house one (1) extinguisher.
   2. Style: Semi-recessed mounted or surface mount; refer to the Drawings.

3. Single flat door.
   a. Narrow vertical glazing panel.
      1. Double strength glass.
      2. Clear.
   b. Door material: Steel, factory painted.
   c. Friction or roller catch.
   d. Door handle.
4. No lettering on door or trim.
5. Box: Manufacturer's standard material and construction.
6. Provide wall bracket for extinguisher, inside cabinet.

C. Hinges: Concealed or continuous type; allow full 180 degree opening of door.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

A. Perform installation in accordance with the manufacturer's instructions except where more stringent requirements are shown or specified.

B. Install brackets for wall mounted extinguishers at height indicated on the Drawings.

C. Install cabinets at locations indicated on the Drawings.

END OF SECTION 10520

## SECTION 10810 - TOILET AND BATH ACCESSORIES

## PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
1. Paper towel dispensers.
2. Toilet paper dispensers.
3. Grab bars.
4. Shower curtain rods.
5. Soap dispensers.
6. Mop and broom holder.
7. Mirrors.

1.02 SUBMITTALS

A. Product Data.

B. Manufacturer's Instructions.

## PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. All manufacturers and model numbers specified are Owner's standard.

2.02 TOILET ACCESSORIES

A. Paper Towel Dispenser:
1. By Owner.

B. Toilet Paper Dispenser:
1. Moen DN6808BN

C. Grab Bar
1. Bobrick B-6806

D. Soap Dispenser :
1. By Owner.

E. Shower Curtain Rod:
1. Bobrick B-6107

F. Utility Mop and Broom Holder:
1. By Owner

G. Mirrors
1. 23 1/2-inch x 31 1/2-inch Gatco 4339 Satin Nickel Finish

H. Towel Bars
1. 24-inch Moen Y2608BN-24"
2. 18-inch Moen Y2608BN-18"

I. Robe Hooks
1. Moen DN6803BN

J. Privacy Curtain Track
1. ARNCO 1200

K. Shower Seat
1. Bobrick B-517 (R), B-518 (L)

L. Tub Seat
1. By Owner

2.03 MATERIALS Mounting Devices and Fasteners: Provide the toilet accessory manufacturer's recommended items for substrates and conditions indicated.

**PART 3 - EXECUTION**

3.01 INSTALLATION

A. Perform installation in accordance with the manufacturer's instructions, except where more stringent requirements are shown or specified, and except where Project conditions require extra precautions or provisions to ensure satisfactory performance of the Work.

END OF SECTION 10810

## SECTION 10350—FLAGPOLE

## PART 1 - GENERAL

1.01. Related Documents
Drawings and General Provisions of Contract including General Conditions, Supplementary Conditions, and Division 1 Specification Sections.

1.02. Refer to the site and building drawing for extent, location, and foundation details.

1.03. Submit shop drawings in accordance with Section 01340: "Shop Drawings, Product Data, and Samples".

1.04. Handling: Uncrate pole and remove all wrappings. Store in dry place off the ground.

## PART 2 - PRODUCTS

Manufacturers

- Concord Industries, Inc.
- Bartol Company
- Babcock Davis
- Acme / Lingo

2.01 Flagpole, base, and anchorage devices shall be designed to withstand an 80-mph wind velocity in a flagged condition.

2.02. Aluminum to be 6063T6 alloy. Carbon steel to conform to ASTM A-53, Type S, Grade B.

2.03. Taper: Pole to be cove tapered aluminum, ground set, (1) at 30' exposed height (2) at 24' height, with rate of taper 1" to every 5'-6" of length. Wall thickness to be .188", butt diameter to be 6", and top diameter to be 3". Ball diameter to be 6".

2.04. Finish of pole to be anodized black.

2.05. Provide six inch spherical ball as flagpole finial. Finish shall be black.

2.06. Flagpole truck shall be standard, revolving double 2-3/8" diameter sheaves. Truck material to be same as pole. Halyards and snap hooks to be standard No. 10 multi-filament braided polypropylene with two bronze snap hooks for each halyard. Cleats to be standard 9" aluminum.

2.07. Provide a flashing collar of aluminum with foundation sleeve of 16 gauge corrugated galvanized steel. Provide a lightening spike of galvanized steel as detailed.

2.08. Two-section pole to be furnished with precision filed splicing sleeve, which require **NO** welding or tension rod.

## PART 3 - EXECUTION

3.01. Flagpole to be installed in accordance with approved shop drawings and by a crew experience in pole handling, assembly, and erection.

END OF SECTION




07/17/2024

DIVISION FIFTEEN

SECTION 15000 - PLUMBING

15001 GENERAL

A. Work under this section includes, but is not necessarily limited to, furnishing and installing the following:

1. Plumbing fixtures and trim.
2. Waste and vent piping systems.
3. Hot and cold water piping systems.
4. Fuel gas piping systems.

15002 CODES, STANDARDS AND REGULATIONS

A. All work shall be in accordance with all applicable federal, state, and local codes, standards and regulations.

B. When these drawings and specifications call for materials or construction of a better quality or larger sizes than required by the above mentioned rules and regulations, the provisions of the drawings and specifications shall take precedence.

C. Codes are minimum standards and if the codes require a more stringent method or material than the drawings or specifications require, then the codes shall govern.

D. The Contractor shall furnish, without extra charge, any additional materials and labor which may be required for compliance with the above laws, rules and regulations, even though the work is not mentioned in these specifications or shown on the drawings. The Contractor shall secure all required permits, inspection, licenses and tests required for this work and pay all fees in connection therewith.

15003 DRAWINGS AND SPECIFICATIONS

A. The drawings accompanying these specifications are generally diagrammatic and do not show all details of bolts, nuts, fittings, connections, etc., required for the complete system, and do not indicate the exact locations of piping, fixtures, ducts, equipment, etc., unless definitely dimensioned. While these drawings shall be followed as closely as possible, all dimensions shall be checked and verified at the building, and any necessary changes shall be made to accord with structural conditions, equipment to be installed, other systems, etc., without

additional cost to the Owner and as directed by the Project Architect.

B. 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. Any details which are omitted and which are necessary for the proper installation or operation of the system included under this contract, must be supplied and installed by the Contractor without extra charge.

C. It shall be understood that where the words "The Contractor" or "This Contractor" appear in either the drawings or specifications, it shall mean the Plumbing Contractor.

D. Any omissions from either the drawings or these specifications are unintentional, and it shall be the responsibility of the Contractor to call to the attention of the Architect any pertinent omissions before submitting a bid. Complete working systems are required whether every small item of material is shown and specified or not.

E. It shall be understood that where the words "provide, furnish and/or install" are used, it is intended that this Contractor shall purchase and install completely any and/or all materials necessary and required for this particular item, system, equipment, etc.

F. Some items of equipment are specified in the singular; however, the Contractor shall provide and install quantity of items indicated on the drawings, and as required for complete systems.

G. The term "as approved" in this division of the specifications shall mean as approved by the Project Architect in writing.

15004 COORDINATION OF WORK

A. It is understood and agreed that the Contractor has by careful examination satisfied himself as to nature and location of work, conformation of the ground and building structure, the character, quality and quantity of materials to be encountered, general and local conditions and all other matters which can and may affect the work under this contract. The Contractor shall be held responsible for visiting the site and thoroughly familiarizing himself with existing conditions. No extras will be allowed because of additional work necessitated by evident job conditions that are not indicated on the drawings.

B. The Contractor shall compare the drawings and specifications for this contract with the drawings and specifications for other trades, and shall report any discrepancies between them to the Project Architect and obtain from him written instructions for changes necessary in the work. The work shall be installed in cooperation with other trades installing interrelated work. Before installation, the Contractor shall make proper provisions to avoid interference in a manner

approved by the Project Architect. All changes required in the work of the Contract caused by his neglect to do so shall be made by him at his own expense. Coordinate work in this division with work of other divisions.

1. Location of pipes, ducts, electrical raceways, switches, panels, equipment, fixtures, etc., shall be adjusted to accommodate the work to interferences anticipated and encountered. The Contractor shall determine the exact route and location of each pipe, duct and electrical raceway prior to fabrication.

2. Installation and Arrangement: The Contractor shall install all work to permit removal (without damage to other parts) of all parts and equipment requiring periodic replacement and maintenance. The Contractor shall arrange pipes, ducts, raceways, and equipment to permit ready access to valves, starters, motors, control components, and to clear the opening of swinging and overhead doors and of access panels.

15005 ACCESSIBILITY

A. The Contractor shall locate all equipment which must be serviced, operated, or maintained in fully accessible positions. Equipment shall include, but not be limited to, valves, traps, cleanouts, motors, controllers and drain points. If required for better accessibility, furnish access doors for this purpose. Minor deviations from drawings may be made to allow for better accessibility.

B. The Contractor shall apprise the General Contractor of exact locations and size of access panels for each concealed device requiring service. Access panels shall be provided by this Contractor and installed by the General Contractor. Access panels shall be all steel construction with 16 gauge frames and 18 gauge panels. Units shall be Milcor, Miami Carey, or American Hatch Corporation. Panels and frames shall be factory primed with rust inhibiting paint; finish coat by General Contractor. Provide suitable UL listed doors where installed in rated construction.

C. Locations of access panels shall be submitted in sufficient time to be installed in the normal course of work.

D. Access panels will not be required for access to work located above a lift-out "T" bar type ceiling.

15006 MATERIALS AND WORKMANSHIP - GENERAL

A. All materials shall be new and shall bear the manufacturer's name, trade name and the UL label in every case where a standard has been established for the particular material. The equipment furnished under this specification shall be essentially the standard products of a manufacturer regularly engaged in the production of the required type of equipment and shall be the manufacturer's

latest approved design.

1. Delivery and Storage: Equipment and materials shall be delivered to the site and stored in original containers, suitably sheltered from the elements, but readily accessible for inspection by the Project Architect until installed. All items subject to moisture damage (such as controls) shall be stored in dry, heated spaces.

2. Equipment and materials of the same general type shall be of the same make throughout the work to provide uniform appearance, operation and maintenance.

3. Protection: Equipment shall be tightly covered and protected against dirt, water and chemical or mechanical injury and theft. At the completion of the work, fixtures, equipment, and materials shall be cleaned and polished thoroughly and turned over to the Owner in a condition satisfactory to the Project Architect. Damaged or defects developing before acceptance of the work shall be made good at the Contractor's expense.

4. Dimensions: It shall be the responsibility of the Contractor to insure that items to be furnished fit the space available. He shall make necessary field measurements to ascertain space requirements, including those for connections, and shall furnish and install such sizes and shapes of equipment that the final installation shall suit the true intent and meaning of the drawings and specifications.

5. Manufacturer's directions shall be followed completely in the delivery, storage, protection and installation of all equipment and materials. The Contractor shall promptly notify the Project Architect in writing of any conflicts between any requirements of the contract documents and manufacturer's directions and shall obtain the Project Architect's written instructions before proceeding with the work. Should the Contractor perform any work that does not comply with the manufacturer's directions or such written instructions from the Project Architect, he shall bear all cost arising in correcting the deficiencies.

B. The Contractor shall furnish the services of an experienced superintendent who shall be constantly in charge of installation of the work together with all skilled workmen, fitters, metalworkers, welders, helpers and labor required to unload, transfer, erect, connect-up, adjust, start, operate and test each system.

C. Unless otherwise specifically indicated on the drawings or specifications, all equipment and materials shall be installed with the approval of the Architect in accordance with recommendations of the manufacturer. This includes the performance of such tests as the manufacturer recommends.

A. Certain models and manufacturers of materials and equipment are specified. The Contractor shall submit his proposal on the specified materials and equipment or their equivalent. Equivalent shall be interpreted to mean an item of material or equipment similar in quality to that named and which is suitable for the same use and capable of performing the same function as that named, the Project Architect being the judge of equality.

B. Equipment model numbers noted in this specification or on the drawings are intended to denote a minimum standard of quality and do not necessarily relate to specific options or arrangement as shown. Contractor shall provide equipment with all standard features plus all optional features as stated and in the arrangement shown or as directed by the Architect if not shown.

C. The Contractor shall submit to the Project Architect, within 10 days following award of the contract, a list of materials and equipment for approval that he proposes for use on the project. Such list shall include the manufacturer and the trade name, type, series or model of equipment proposed. When this list is approved by the Project Architect no further substitutions will be permitted except in unusual or extenuating circumstances. If no list is submitted within the specified time, the Contractor shall supply materials and equipment as specified.

15008 SHOP DRAWINGS, SUBMITTAL DATA AND PROCEDURES

A. The Contractor shall submit to the Architect copies of certified prints, catalog data and specification sheets for all items of equipment and material specified or required for this job. Composite wiring diagrams shall be submitted for approval. The Contractor shall furnish the number of copies specified in general sections of the contract. All shop drawings for the project shall be submitted at the same time, reasonably promptly after the material list has been approved.

B. The Contractor shall analyze all shop drawings before submittal to the Architect and certify that they meet requirements of the contract drawings and specifications. Certification to be in form of suitable approval stamp placed on each shop drawing. Data submitted for approval without Contractor's stamp of approval will not be considered.

C. The Project Architect will review submittal data, and if found acceptable, will return all except two (2) sets marked "Approved" or "Approved as Noted".

D. If the Project Architect deems submittal data is either incomplete or incorrect, one copy will be returned for correction and a new submittal set will be required.

E. At least one set of all "Approved" shop drawings, certified prints, etc., shall be maintained at the job site and available to representatives of the Project Architect.

F. Items that require submittals shall be:

1. All items of equipment
2. Insulation
3. Piping specialties
4. Plumbing fixtures

G. Approval by the Project Architect of shop drawings for any materials, apparatus, devices and layouts shall not relieve this Contractor from the responsibility from furnishing same of proper dimensions, size, quantity, quality and all performance characteristics to efficiently perform the requirements and intent of the contract documents. Such approval shall not relieve the Contractor from responsibility for errors of any sort on the shop drawings.

H. If the submitted items or arrangement deviate from the Contract Documents, the Contractor shall advise the Project Architect of the deviations in writing accompanying the shop drawings, including the reason for the deviation.

I. Failure of the Contractor to submit shop drawings in ample time for checking shall not entitle him to an extension of contract time, and no claim for extension by reason of such default will be allowed.

15009 EQUIPMENT DATA AND PERFORMANCE RECORDS

A. The Contractor shall provide, in suitable loose leaf binders, a compilation of catalog data of each manufactured item of equipment used in the work and shall present his compilation to the Project Architect for transmittal to the Owner before final inspection and payment is made. Two copies are required.

B. The following items shall be included in the binders:

1. Standard catalog data, descriptive brochures, etc.
2. Installation instructions and diagrams.
3. Wiring diagrams for appropriate equipment.
4. Operating and maintenance data.
5. Recommended spare parts list that should be stocked by Owner.
6. Performance data test results as outlined hereinafter.

15010 RECORD DRAWINGS

A. The Architect shall furnish the Plumbing Contractor one (1) set of drawings covering the plumbing contract upon which the Plumbing Contractor shall mark all changes, modifications, or revisions effected during construction such that the Architect may prepare record drawings from the information contained thereon upon completion of the work.

15011 VIBRATION ISOLATION

A. All systems shall operate under all conditions of load without any sound or vibration which is objectionable in the opinion of the Architect. In case of moving machinery, sound or vibration noticeable outside of room in which it is installed or annoyingly noticeable inside its own room will be considered objectionable. Sound or vibration conditions considered objectionable by the Architect shall be corrected in an approved manner by the Contractor at his expense.

B. Where connections are made to pieces of equipment containing rotating or reciprocating machinery, suitable approved means shall be provided as required to prevent transmission of noise and vibration.

C. Suspended equipment shall have steel spring vibration mounting with adjustable snubbers.

D. Floor mounted equipment shall be mounted on vibration eliminators.

15012 EQUIPMENT STANDS, FOUNDATIONS AND MISCELLANEOUS STEEL OR HANGERS AND SUPPORTS

A. Provide all equipment stands and supports for equipment as shown or required. Provide miscellaneous steel for hanging piping or other items as shown or required. Provide lintels as indicated or as directed by the Architect for wall openings larger than 12" x 12".

B. All concrete foundations and all concrete pads shown under pumps and equipment shall be provided by this Contractor, unless otherwise noted. Pads shall be placed under each piece of equipment so that no equipment base rests directly on the concrete floor.

C. All stands shall be adequately cross-braced to provide rigid supporting foundation. All stands shall be adequately anchored to wall or floor as required. All miscellaneous steel shall have one coat of shop paint and two finished coats of rust resistant paint if not furnished with a galvanized finish.

D. Construction of foundations, supports, pads, bases and piers where mounted on the floor shall be of the same material and same quality of finish as the adjacent and surrounding flooring material. All pads shall be extended beyond machine base in all directions with top edge chamfered. Inset 6-inch steel dowel rods into floors to anchor pads. Concrete shall develop strength of 3,000 psi at 28 days.

E. All equipment, unless shown otherwise, shall be securely attached to the building structure in an approved manner. Attachments shall be of a strong durable nature and any attachments that are, in the opinion of the Architect, inadequate shall be replaced as directed.

15013 CONCEALMENT OF PIPE, CHASES AND HOLE

A. Unless otherwise indicated, all piping and/or ductwork shall be run in concealed spaces between floor and ceilings or in chases. Piping and/or ductwork in equipment rooms, crawl space and unfinished storage areas shall be installed exposed and as high as practical. This Contractor shall be responsible for the location and size of holes required for pipe and other equipment and shall advise the General Contractor of chase spaces and holes required as building progresses.

15014 CUTTING AND PATCHING

A. This Contractor shall have an experienced mechanic upon the job before concrete floors, concrete or masonry walls are set in place; whose duty it shall be to locate the exact position of any and all sleeves and holes for the future installation of his pipe or duct work. This Contractor shall locate and size all openings required for his equipment and give this information to the General Contractor in time to not delay the building construction.

B. If it becomes necessary to cut holes in concrete floors or concrete or other masonry walls, this Contractor shall call the General Contractor or his Superintendent of Construction and inform him of position and size of the hole or other opening to be provided and he shall determine the method to be used. Under no condition shall this Contractor make any cuts without permission from the General Contractor, nor shall he cut any green floors or walls.

C. This Contractor shall arrange proper openings in the building to admit his equipment. If it becomes necessary to cut any portion of the building to admit any equipment, the portion cut must be restored to their former condition by this Contractor through agreeable arrangement with the General Contractor.

15015 SLEEVES AND INSERTS

A. This Contractor shall provide and locate all sleeves and inserts required before the floors and walls are built or shall be responsible for the cost of cutting and patching required for pipes where sleeves and inserts were not installed, or where incorrectly located. This Contractor shall do all drilling required for the installation of his hangers.

B. Sleeves shall be provided for all piping passing through concrete floor slabs and concrete, masonry, tile and gypsum wall construction. Sleeves shall not be provided for piping installed under concrete slabs on grade or paving unless specifically noted.

C. Where sleeves are placed in exterior walls below grade, the space between the pipe or conduit and the sleeves shall be packed with oakum and lead and made completely watertight.

D. Where pipe motion due to expansion and contraction will occur, make sleeves of sufficient diameter to permit free movement of pipe. Where sleeves pass insulated pipes, the sleeves shall be large enough to pass the pipe and insulation. Check floor and wall construction finishes to determine proper length of sleeves for various locations; make actual lengths to suit the following:

1. Terminate sleeves flush with walls, partitions and ceiling.

2. In areas where pipes are concealed, as in chases, terminate sleeves one inch above finished floor.

3. In all areas where pipes are exposed, extend sleeves 1/4-inch above finished floor, except in rooms having floor drains where sleeves shall be extended 4 inches above floor.

E. Sleeves shall be constructed of Schedule 40 galvanized steel pipe.

F. Fasten sleeves securely in floors, walls, etc., so they will not become displaced when concrete is poured or when other construction is built around them. Take precautions to prevent concrete, plaster or other materials being forced into the space between pipe and sleeves during construction.

G. All piping and/or ductwork passing thru sleeves in fire walls, fire partitions or floor acting as fire separation shall have opening around pipe or duct caulked smoke tight with approved fireproof material to form a fire and smoke stop. Each sleeve shall contain a minimum of one-inch of packing. At the Contractor's option, "Pyro-Pac" seals as manufactured by Thunderline Corporation may be used to seal around piping through fire and smoke walls. Any sleeves provided and not used shall be sealed with concrete or other approved fireproof material.

H. Escutcheon plates shall be provided for all exposed pipes, insulated pipes and all exposed conduit passing thru walls, floors and ceilings in finished areas. Plates shall be nickelplated, of the solid ring type, of size to match the pipe or conduit. Where plates are provided for pipes passing thru sleeves which extend above floor surface in finished areas, provide deep recessed plates to conceal the pipe sleeves.

I. Escutcheon plates will not be required in equipment rooms unless specifically noted on drawings.

15016 EXCAVATION, TRENCHING AND BACKFILL

A. Perform all excavating, trenching and backfilling necessary to install work. Trenches are to be excavated so that pipe will have a solid bearing. Trenches are to be at least 12 inches wider than the diameter of the pipe. Furnish pumps as required to keep trenches dry during laying and jointing of mains. Provide shoring where required to maintain trench against settlement until final

acceptance. After work is installed, inspected, tested and approved, trenches shall be refilled in 6-inch layers with clean damp earth, and thoroughly tamped and brought to proper grade.

B. Excavation:

1. Excavation work under this contract shall be bid unclassified.

2. Where it is necessary to cut existing paving, sidewalks, etc., for the installation, the Contractor shall patch such paving to smooth finish with equal type paving construction as that cut.

3. Wherever shrubs, flowers, hedges and/or sod are removed, they shall be preserved and reset according to good nursery practice. In areas where sod is not suitable to preserve and replace, this Contractor shall provide top soil as required. Areas shall be backfilled and well tamped and brought up to finish grade. Re-seed all disturbed areas as required to equal surrounding grass types already established.

15017 ELECTRICAL WORK

A. All electrical wiring for this contract will be performed by the Electrical Contractor.

B. This Contractor shall coordinate electrical requirements and scheduling of wiring with the Electrical Contractor.

C. All items of electrical equipment provided under this contract shall be in compliance with the electrical specifications for this project.

15018 KITCHEN AND LAUNDRY EQUIPMENT

A. Plumbing rough-in and final connections for kitchen and laundry equipment shall be performed by the Plumbing Contractor.

B. Kitchen and laundry equipment shown on the drawings are based on assumed manufacturers. Plumbing Contractor shall coordinate with the actual suppliers and provide appropriate plumbing connections for equipment installed. Complete, properly operating systems installed in accordance with equipment manufacturer's requirements are required.

15019 PLUMBING EQUIPMENT

A. Domestic Water Heater:

1. Indoor tankless rack system utilizing multiple commercial condensing, multiple point-of-use, gas fired, direct vent, ANSI Z21.1 water heater(s), Rinnai design basis.

2. Tankless Heater: Modular unit with primary and secondary stainless steel heat exchangers, fiber mesh burners, brass water control valve, brass inlet and outlet, microprocessor controlled and utilize a direct electronic ignition system (with no standing pilot), fully modulating gas control valve, turbine flow meter, automatic electro-mechanical water flow control valve, and water temperature thermistors to maintain outlet water temperature between ± 2°F of set point temperature.

3. Rack system: Floor mounted factory assembled structural frame with multiple tankless water heaters; cold water, hot water, gas and drain manifolds; single point power supply; integrated cascade control system.

4. Recirculation Pump: Inline centrifugal, stainless steel with aquastat control.

5. See drawing schedules and details for equipment arrangement, performance, options and accessories.

15020 PLUMBING FIXTURES

A. All exposed piping and metal parts shall be chrome-plated. Slip joints will not be permitted except on fixture side of trap. Rigid supplies are specified for certain fixtures and it is intended that they shall be installed true and plumb from fixtures to wall rough-in. Connections for water closets shall be made by use of heavy plastic closet flanges and verminproofed wax gaskets.

B. All floor mounted closets shall be set and grouted with white grout between floor and closet.

C. All wall hung fixtures shall be sealed between wall and fixtures with white silicone caulking.

D. All counter mounted fixture rims shall be sealed with clear silicone caulking.

E. All wall hung fixtures shall be furnished with suitable wall hangers and/or carriers. Fixtures shall be properly supported. Provide floor support uprights for carriers or additional wall bracing as required.

F. Fixtures shall be as scheduled on the drawings.

15021 PIPING

A. Pipe Installation:

1. General: Arrange and install piping approximately as indicated, straight, plumb and as direct as possible. Pipes to be kept close to walls, partitions, ceilings and run at right angles or parallel lines with building walls. They shall be offset only where necessary to follow walls as directed. Groups of pipes shall be located parallel to each other. Pipes to be spaced to permit full application of insulation and access for servicing valves. The Contractor shall be responsible during his guarantee for tightness of all joints made by him.

2. Greatest care shall be taken at all times to keep earth and rubbish out of piping system. The Contractor shall be responsible for any and all trouble which may develop after systems are in use, cause of which can be traced to dirt in pipes. All threads on piping shall be full and clean cut. Ends shall be reamed after cutting to remove all fins and burrs. Each length of pipe shall be up-ended as erected and rapped to dislodged dirt or scale. Short lengths of pipe coupled together shall not be used. Coupling shall be in runs of pipe only when distance is greater than a full length of pipe.

3. Supports: All piping shall be supported in such a manner so that all piping will be centered in sleeves. No water piping shall be in contact with masonry. All vertical pipe lines shall be supported at each floor. All piping shall be run plumb and parallel with building walls.

4. Grade all water piping uniformly to drain points allowing sufficient slope for proper drainage. Provide necessary valves for draining. Grade waste and drainage piping 3-inch and smaller at a minimum of 1/4-inch per foot, larger than 3-inch at a minimum of 1/8-inch per foot unless otherwise noted.

5. Concealed Piping: Where so indicated or specified, conceal piping in building construction or underground. Install such piping in time so as to not cause delay of work of other trades and to allow ample time for tests and approval. Do not cover before approval is obtained. Expose only as much as necessary for final connection.

6. The Contractor shall make provisions for expansion and contraction of all piping by using swing joints and expansion loops where necessary whether or not shown on the drawings. Anchor piping as necessary between expansion loops, etc.

B. Piping:

1. Domestic Water:

a) Below grade, sizes 1/2" thru 3", Type "K" soft copper (ASTM B-88) with wrought copper (ASA-B-16.22) fittings and 95-5 tin antimony

soldered joints.

b) Above grade, Sizes 1/2" thru 3", any of the following:
   (1) Type "L" hard copper (ASTM B-88) with wrought copper (ASA-B16.22) fittings and 95-5 tin antimony soldered joints.
   (2) Uphonor PEX-a, NSF certified, with manufacturer recommended cold expansion fittings.
   (3) Schedule 80 CPVC (ASTM D2846) with solvent weld fittings and joints.
   (4) SDR 7.4 Polypropylene (PP-R), (ASTM F2389) with manufacturer recommended fusion weld fittings and joints.

c) Other alternate piping materials, in compliance with Code and suitable to application may be considered. All substitutions shall be approved in advance by the Engineer.

2. Waste and Vent:

   a) Above grade (interior), Schedule 40 PVC DWV pipe (ASTM D-2335 or D-2665) with DWV fittings (ASTM-2665) and solvent weld (ASTM D-2564) joints.

   b) Below grade (interior), same as specified for above grade.

3. Fuel Gas (natural or LP) Piping:

   a) Interior, Schedule 40 black steel (ASTM A53 or ASTM A120) with Class 150 malleable iron threaded fittings (ANSI B16.3). Piping shall be installed in compliance with Code and NFPA 54.

   b) Exterior, plastic gas tubing as approved by gas supplier. Piping shall be installed in compliance with NFPA 54 and gas supplier requirements.

C. Piping Specialties:

1. Nipples: Nipples shall conform to the requirements of U.S. Department of Commerce Commercial Standard CS5, "Pipe Nipples Brass, Copper, Steel and Wrought Iron". Use nipples from packages bearing manufacturer's statement "Guaranteed pipe nipples conforming to CS5, made from new pipe". Make nipples of same material and weight as pipe where used, except when length of unthreaded part of nipple is less than 1-1/2", then use extra strong pipe nipples. Do not use close nipples unless individually approved.

2. Unions:

a) For 2-1/2" and smaller copper tubing, use screwed brass unions with solder joint ends.

b) 3" copper tubing, use flanged brass body unions with brass bolts and rubber gaskets.

c) Install unions where indicated on the drawings, at tank and equipment connections, and in long runs of piping at intervals as directed to permit convenient disassembly for service and alterations.

d) Use dielectric unions for connecting copper tubing with tanks, equipment and piping made of ferrous materials.

3. Air Chambers: Provide 18" high air chamber at water connection to each fixture.

4. Gas regulators: Listed regulator, approved by gas supplier and gas equipment manufacturer. Regulate high pressure supply to low pressure as required by gas equipment. Install strictly per Code and manufacturer requirements.

15022 HANGERS, INSERTS AND SUPPORTS

A. Support all interior piping from building structure by means of hangers or inserts to maintain required grading and pitching of lines, to prevent vibration and secure piping in place and arrange to provide for expansion and contraction.

B. Swing joints, turns, expansion loops and long offsets to be provided wherever necessary to allow for expansion of piping. Broken pipe or fittings due to stiff connections shall be removed and replaced at the Contractor's expense. Any damages to other work caused by this failure shall be repaired by Plumbing Contractor at his expense.

C. All horizontal piping to be supported by means of all metal hangers or brackets of design provided with individual means of vertical adjustment for each leveling of lines after piping is in place. All hangers to be locked in place by means of separate locknut on hanger rod after line is properly leveled.

D. Hangers on insulated lines shall encompass pipe insulation and shall have a 16 gauge steel saddle 12 inches long attached to hanger to protect insulation. All hangers shall be adjustable clevis type, Grinnell Fig. 260, Fee and Mason Fig. 239 or Modern Fig. 590.

E. All hangers shall be supported by steel rods of the following sizes:

| Size of Pipe | Size of Rod |
|---|---|

| | |
|---|---|
| 2" and smaller | 3/8" |
| 2-1/2" and 3" | 1/2" |
| 4" and 5" | 5/8" |
| 6" and larger | 3/4" |

F. Hanger rods shall be solid and have machine threads.

G. Horizontal distance between hangers shall not exceed values indicated in the following table:

Maximum Hanger Spacing (Feet)

| | Pipe Size (Inches) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | <1 | 1-1/4 | 1-1/2 | 2 | 2-1/2 | 3 | 3-1/2 | 4 | 5 | 6 |
| Plastic Pipe | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| Copper Pipe | 6 | 6 | 6 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |

H. Brackets shall be used to support piping runs along walls. Brackets shall be standoff type to allow for insulation.

I. Soil, waste and vent stacks shall be well supported at the base by means of piers or heavy hangers close to the bottom of riser and secured at each floor by means of heavy iron riser clamps.

15023 CLEANOUTS

A. Cleanouts must be accessible. In general, install cleanouts in the following locations:

1. At base of each soil and waste stack.

2. At change or more than 45 degrees in direction of soil and waste lines.

3. At intervals not to exceed fifty feet in all straight horizontal runs of soil and waste lines.

B. In finished spaces of building, extend cleanouts flush with floors, partitions, walls and furred spaces in locations readily accessible for cleaning the lines. Cleanouts shall be of same size as line served up to 4 inches.

C. Cleanouts shall be plastic body models by Plastic Oddities or equal.

1. Floor cleanouts shall have access housing with heavy duty round nickel bronze cover.

2. Wall cleanouts shall have heavy duty stainless steel cover.

D. All exposed portions of cleanouts in finished areas shall be nickel bronze alloy. All cleanouts shall have vertical adjustment. Any cleanout installed through floor slab with membrane waterproofing shall have flashing clamp devices. All plugs shall be recessed type to receive a common "T" handle.

15024 FLASHING AND WATERPROOFING

A. The Plumbing Contractor shall coordinate flashing requirements for all plumbing piping passing through roof with General Contractor. General Contractor shall install flashing into the roofing system.

15025 VALVES AND COCKS

A. All valves and cocks furnished throughout under this contract shall be of one make or manufacturer, best of their respective kind. Valves shall be Jenkins, Nibco, Milwaukee or approved equal.

B. Valves and cocks, unless otherwise shown on the drawings or specified herein, shall be as listed in the following schedule. Locate valves for easy access and operation. Provide access panels where valves are inaccessible. Do not locate valves with stems below horizontal.

Size 3" and smaller:

| | Gate | Globe | Check | Ball |
|---|---|---|---|---|
| Nibco | S-111 | S-235-Y | S-413-B | S-595-Y |
| Jenkins | 1242 | 1200 | 1222 | 902-T |
| Milwaukee | 149 | 1590T | 1509 | BBI-350 |

C. Shut-off valves shall be installed in runouts to all water risers, in branches to fixtures as shown or as required by Code, in supplies to all fixtures which are not provided with stops and in branches to all equipment.

D. Drain valves shall be of brass construction with 3/4-inch hose thread outlet and vacuum breaker.

E. Gas cocks shall be Code approved 125 psi rated bronze flat head design.

F. See Identification Section of specifications for labeling method.

15026 PLUMBING INSULATION

A. Insulate all above ground domestic cold water piping, domestic hot water piping, except exposed chrome plated piping at the fixture.

B. Domestic cold water, hot water and hot water recirculating piping shall be insulated with mineral wool with all service jacket, 1" thick.

C. All joints shall be taped in accordance with manufacturer's recommendations to maintain vapor barrier seal. Fittings in concealed locations shall have miter cut and taped joints. Fittings in exposed areas shall have pre-formed PVC snap-on fitting covers to match insulation thickness. Insulation installed outdoors shall have 8 ounce canvas jacket with 2 coats lagging and continuous weatherproof PVC, aluminum or stainless steel covering.

D. At Contractor' option, equivalent seamless flexible foamed elastomeric plastic tubing may be used in lieu of polyisocyanurate or mineral wool. Adhere strictly to manufacturer's recommendations to maintain vapor seal. No gaps at adhesive joints will be allowed.

E. Installation shall comply with NAIMA (North American Insulation Manufacturers Association) standards and details.

15027 STERILIZING

A. General: All water service, cold and hot piping, shall be sterilized with chlorine solution.

B. Description: All water piping shall be thoroughly flushed for at least 30 minutes before chlorine solution is added. Chlorine solution shall be introduced in the water piping so that every portion of the piping system contains water with a chlorine residual of at least 75 ppm. An adequate number of tests for chlorine residual shall be made during the initial dosing period to prove that equal distribution of chlorine solution throughout the piping system has been accomplished. After 12 hours of retention of the solution water, the chlorine residual shall be not less than 15 ppm; if the residual is less than 15 ppm, the piping shall be drained and fresh solution with chlorine residual of at least 75 ppm shall be introduced. When the piping has been sterilized satisfactorily, the piping shall be thoroughly flushed with clear water to obtain 2 ppm residual. Sterilization shall include piping provided by final connections of casework fixtures and specialties.

C. A record of the entire sterilization shall be submitted to the Architect and shall include a record of each water sample tested showing the hour tested, chlorine residual and point of collection.

D. The Plumbing Contractor shall notify the Board of Health in writing 7 days in advance of system sterilization.

E. The Plumbing Contractor shall furnish a letter of acceptability of the system from the local Board of Health to the Architect.

15028 TESTING AND INSPECTION

A. The Plumbing Contractor shall make all necessary preliminary tests to insure a tight system. The Plumbing Contractor shall notify the Architect 24 hours in advance of all tests. Any joint found to leak under test shall be broken, cleaned and remade.

B. All tests shall be applied before any work is concealed or covered in any manner.

C. All waste and vent piping shall be tested in the following manner: Plug all openings and fill entire waste and vent system to overflow with water and sustain a constant level for a minimum period of three hours. All portions of the system shall be tested under a minimum of a 10-foot head.

D. All water piping, hot and cold, shall be made tight under a hydrostatic test pressure of 125 pounds per square inch and maintained without pressure loss for a minimum of 4 hours. No caulking of joints will be permitted. Any joint found to leak under this test shall be broken, remade and new test applied.

E. The Plumbing Contractor shall furnish all necessary equipment, materials and labor to perform the above specified test.

F. This Contractor shall have boiler installed under this contract inspected and approved by the State Fire Marshal. Comply with all State installation rules and requirements.

15029 DIAGRAMS, VALVE SCHEDULE AND TAGS, PIPING IDENTIFICATION AND PAINTING

A. The Contractor shall obtain from the Architect a print of each plumbing floor plan. These prints shall be used to mark the exact location and valve number of each valve on the job. A typewritten list of all valves shall be made giving valve number, fluid carried, and rooms or spaces(s) served. The valve list numbers and the numbers of the drawings shall correspond. At completion of the project, the prints and valve list shall be turned over to the Owner. Valves on lines serving individual fixtures or pieces of equipment where use is obvious, and drain valves with exposed discharge need not be tagged. Valve listing shall be approved by Architect.

B. Valve tags shall be 1-1/2 inch diameter brass with depressed black filled numbers not less than 1/2-inch high and black filled letters not less than 1/4-inch high. Lettering on valves shall identify line service. Tags shall be attached to valve stems or body (not wheel handle) with brass "S" hooks or brass jack chain. Brass tag shall be Style 205 BL as manufactured by Seton Name Plate Company.

C. All piping, exposed and concealed, shall be identified at intervals not exceeding 25 feet, on each side of wall, floor or ceiling which piping penetrates. Identification shall consist of color-coded directional flow arrow adjacent to a

color coded label with letters of contrast identifying piping.

D. Labels shall be of the snap-on "coil" type equal to Seton Name Plate Company, "Set Mark." Colors and lettering shall conform to the following schedule:

Pipe Marker Wording Background Color Valve Tag Abbreviation

| | | |
|---|---|---|
| Cold Water | Green | C.W. |
| Hot Water | Yellow (110'F) | H.W. |
| Hot Water | Yellow (140'F) | H.W. 140deg |
| Hot Water Return | Yellow | H.W.R. |
| Fuel Gas | Yellow | Gas |

15030 CLEANUP, PLACING IN SERVICE AND INSTRUCTIONS

A. It is the Plumbing Contractor's responsibility to turn over to the Owner all fixtures in a clean and first-class condition. It is the Plumbing Contractor's responsibility to see that all pipe lines are free from debris when the job is turned over to the Owner. Any damage to finished plumbing work before final acceptance, regardless of by whom caused, shall be repaired or replaced by the Plumbing Contractor without additional cost to the Owner. No additional payment will be made for work damaged during construction. The Plumbing Contractor will not be responsible for damage to, or cleaning requirements for fixtures and specialties furnished by other contractors or the Owner unless otherwise noted.

B. Prior to final inspection and upon completion of the installation, the entire system and all equipment shall be tested by actual operation to prove the same will function as intended. Adjustments and/or repairs shall be made at that time.

C. When all of the requirements of the plans and specifications have been met and prior to final inspection, the Contractor shall then arrange to instruct the Owner or his representative in the correct and proper procedures for the operation and maintenance of the system.

15031 GUARANTEE

A. The Contractor shall guarantee the entire plumbing system subject to the General Conditions of these specifications.

END OF SECTION 15000

## 1. GENERAL

1.1 Scope: Provide an automatic sprinkler system for the building complete wi... piping, fire hydrants, fire department Siamese, water gong, backflow preventer, press... tamper switches and all interconnecting piping, valves, fittings, inspector's test, drips and all other necessary auxiliaries for a complete system. Wall post indicator valve and all gate valves shall be electrically supervised. Provide switch to be made when valves are fully open. Wiring shall be by Electrical Subcontractor for supervisory switch and pressure switch. Work shall begin at the tap to the Utility Company water service. System shall be design build by the Contractor.

System shall be design build and Contractor shall obtain all permits and design the system to NFPA-13, NFPA 24, and NFPA-101 standards minimum.

Provide backflow preventer as required as per specifications of local water authority. As a minimum backflow preventer shall be a Watts 709.

The system protecting the occupied/conditioned area shall be wet and the system protecting the attic/unconditioned area shall be dry and as required by all State reviewing agencies, state and local Fire Marshals and all other nursing home requirements. System shall be light hazard with ordinary hazard for the kitchen as a minimum.

1.2 Plans: Contractor shall provide design and detailed shop drawings for the system. Refer to architectural and structural drawings for building dimensions; sprinkler plans shall include both first floor, canopy and attic protection.

1.3 Workmanship: Workmanship shall be of the best trade practices and procedures as described in N.F.P.A. Pamphlet No.13. Proper sleeves shall be provided as required. Pipe shall be supported in accordance with N.F.P.A. Pamphlet No.13. Only first class pipe fitters shall be employed in this work. Site water piping shall be in accordance with N.F.P.A. 24.

1.4 Permits and Requirements:

1.4.1 Secure all necessary permits, inspection certificates, etc., and pay all charges therewith.

1.4.2 1.4.2 Comply with requirements of N.F.P.A. Pamphlet No.13 and No. 24, including modifications and amendments thereto. Sprinkler system shall also conform to recommendations of the insurance consultants for the Owner, the local Fire Marshall, and all State and Local review Agencies.

1.4.3

1.4.3.1 The Contractor shall provide a documented hydrant test as per the requirements of the State Fire Marshall's Office.

1.4.3.2 Contractor shall complete all forms needed by the engineers for the

submission of plans to the State of North Carolina.

1.4.3.3 The Contractor shall retain the services of a registered Seismic Engineer as needed to develop the details needed in the plans for seismic control.

1.5 Space Conditions

1.5.1 All materials shall fit the space available. Verify all dimensions at building before commencing work.

1.5.2 Maintain maximum head room and accessibility at all points and provide adequate access to all equipment requiring service.

1.5.3 Minor deviations from plans required to conform to space limitations shall be made at no additional cost, subject to approval of Architect.

1.5.4 All valves, devices, etc., shall be so located and installed as to permit access for servicing without damage to building structure or finishes.

1.6 Guarantee: All work shall be guaranteed for a period of one year. Guarantee shall include prompt repair of leaks and replacement of defective equipment.

1.7 Shop Drawings: Shop drawings shall be submitted in accordance with the following:

1.7.1 Detailed and dimensioned shop drawings for the installation of the work shall be prepared and submitted for approval. In preparing shop drawings, check project drawings to avoid interference with structural features, and the work of other trades, and immediately call to the attention of the Architect and Engineer any interferences for clarification in writing.

1.7.2 All shop drawings submitted shall be reviewed by the insurance company having jurisdiction for conformance with NFPA #13 for Sprinkler Systems and approved by the local Fire Marshall prior to submittal to the Architect and Engineer for approval. Submit one set of reproducible sepias and a minimum of one set of prints.

1.8 Test and Inspection:

1.8.1 Before acceptance of his work by the architect, the Sprinkler Contractor shall test and adjust all work installed by him. All piping shall be tested and proved tight with 200 lbs. water pressure, test to be conducted in the presence of the Architect and/or representative of the Owner. The interior piping system shall be cleaned free of all loose scale and other foreign matter.

1.8.2 Certificate copies of sprinkler system approval shall be furnished to Architect along with Material and Test Certificate signed by test witness as mentioned above in 1.8.1.

1.9 License

Contractor shall be a licensed Sprinkler Contractor in the State where work takes place. Contractor shall provide any required State Registered Engineer Seals if required.

1.10 Flow Test

Contractor shall have verified water flow test that has been conducted within the last six (6) months.

1.11 All piping, controls and components shall be installed, supported, and restrained in accordance with the State Building Code requirements for seismic design. It shall be the responsibility of the Contractor to retain a Professional Engineer competent in this field for this design. All required inspections for these designs shall be performed by the Seismic Engineer and paid for by the Contractor. For one possible source for this service contact Seismic Control and Isolations, Inc. Phone: 910 799-5204.

## 2. MATERIALS INSIDE BUILDING

2.1 Piping Systems:

2.1.1 Piping: Schedule 40 black steel conforming to ASTM A53, and ANSI B36.20, schedule 10 piping with grooved fittings may be used for mains.

2.1.2 Fittings: 150 lb. cast iron screw fittings conforming to ANSI B16.5. Adjacent to flanged valves, etc., shall be ANSI 150 lb. flanges.

2.1.3 Joints: Screwed joints shall be made with pipe dope applied to male threads only. Gaskets for flanged fittings shall be 150 lb. rubber ring type, including machine bolts of accurate length, conforming to Federal Specification HH-G-156B. Piping in general shall be shop fabricated, machine-cut, with American Standard taper threads, chamfered and reamed free of all burrs. Nipples shall be machine-cut of the same materials as adjoining piping. Joints for Schedule 10 pipe shall be rolled to accommodate grooved fittings and couplings.

2.1.4 Unions: Unions shall, in general, be of flange and gasket type with approved type gasket, including machine bolts of accurate length. Malleable ground joint unions of railroad pattern with brass-to-iron seat may be supplied for auxiliary connection of 2" and smaller size at valve location.

2.2 Valves:

2.2.1 Gate Valves of 2-½" and larger nominal size shall be approved Underwriters pattern suitable for 175 lbs. water working pressures (non-shock), of wedge gate pattern, iron-body, brass trimmed, with non-rising brass stem and outside screw and yoke, flanged ends, faced and drilled to American Standard, Class 125, similar and equal to Crane No.467. Valves of 2" and smaller size shall be of bronze construction with wedge disc, OS&Y pattern, Underwriters approved, similar and equal to Crane No. 459, with threaded ends. Valves must be UL and FM approved.

2.2.2 Check Valves: Iron body flange ends swing check valves, bronze mounted with bronze face disc. Underwriters approved for 175 psig WWP, Kennedy Fig. 126. Valves must be UL and FM approved.

2.3 Equipment and Accessories:

2.3.1 Sprinklers shall be dry type 212 degrees Fahrenheit and/or for attic protection, new attic spray with 17/32" diameter discharge orifices and/or standard upright 1/2" diameter discharge orifice. In patient sleeping areas provide chrome plated dry pendant type quick response heads with chrome plated escutcheons and rating of 165 degrees Fahrenheit unless otherwise noted. Any exterior pendent head shall be a dry type pendent and shall have a temperature rating of 165 degrees Fahrenheit. Provide dry type freeze-proof 165 degrees Fahrenheit heads in the freezer/cooler and 212 degrees Fahrenheit heads near the range in the kitchen. Sprinkler head in ceilings shall clear the surface mounted lights.

2.3.2 Sprinkler Guards: Of approved type, rust-resistant construction, shall be provided where required to prevent damage to sprinkler.

2.3.3 Extra Sprinklers: Four (4) extra sprinklers of each type shall be furnished in suitable cabinet, including special sprinkler wrench, stored in the Mechanical Room.

2.3.4 Fire Department Siamese: Shall be 2-½"x2-½"x4" wall Siamese. Hose threads shall conform to the local fire department standards.

2.3.5 System Drain Connection: Shall be extended to floor through outside wall. Terminate with elbow and wall escutcheon.

2.3.6 Inspector's Test Connection: Inspector's test connection shall be provided where required, complete with drain valve and inspector's test gauge connection. Flushing connections shall be provided at ends of all cross mains.

2.3.7 Electric Alarms: Electrical Contractor to be responsible for all wiring required for electrical pressure alarms, valve tamper alarms, and bells necessary in accordance with state and local requirements. Sprinkler Contractor shall provide pressure switch and tamper switches on all valves.

## 3. EXECUTION:

3.1 Work shall be carried out according to the best trade practices. Proper sleeves, hangers, and other appurtenances shall be provided as required by good workmanship.

3.2 Take special precautions to support and grade pipe for draindown. Provide double drain valves at low points in the system. Sagging piping will not be allowed. Drainage shall be in accordance with NFPA 13 for dry pipe systems.

3.3 All piping, such as at sprinkler heads, that cannot be effectively drained down shall be located within the building insulation. Adjust and rearrange insulation to cover any joints, piping, etc., that could freeze during winter temperatures. Initial insulation installation shall be by Insulation Contractor and they shall be responsible for covering piping as shown on plan details.

3.4 Upon completion instruct the owner/operator in the use of the system. Provide three (3) copies of instruction manual and list all steps in starting, shutting down and reactivating the system. Verify that all work and operations are in conformance with local fire department requirements.

3.5 Penetration of Fire Rated Wall:

Contractor shall seal around fire rated walls with 3M sealant complying with UL System #147 for single pipe and single pipe with insulation. Use 3M sealant complying with UL System #570 for multiple pipe penetrations.

4. SITE

4.1 Contractor shall provide and install pipe, fire hydrants and post indicating valve at building. Provide tap and pay any associated fees. Provide any required pits, meters, backflow preventer etc.

4.2 Contractor shall verify acceptance of backflow preventer with the local authority.

4.3 Site pipe and fittings shall comply with the requirements of NFPA-24 and AWWA Standard shall be rated to operate at 150 psi minimum. Pipe shall also comply with the requirements of the local authority. Pipe shall be thrust blocked and rated per NFPA 24. Pipe shall be installed and tested per NFPA 24.

4.4 As a minimum site pipe beyond 5'0" of the building shall meet the requirements of the local authority. As a minimum this pipe shall be C-900 with D.I. fittings rated at 150 psi.

4.5 Contractor shall provide site fire hydrant. Hydrant installation and threads shall comply with the requirements of the local fire department.

4.6 Underground pipe shall be installed per the requirements of NFPA-24 as a minimum. Pipe shall have a minimum burial depth of 3'-0". Trench shall be clear of all rocks and other abrasive materials. Bottom of trench shall be compacted to 98% of Standard Proctor per ASTM-D-698, or per the instructions of the Soils Engineer. Fill shall be placed in 6" lifts and each lift shall be compacted to 98% Standard Proctor, per ASTM-D-698, or per the instructions of the Soils Engineer. Compacted fill shall be flush with grade and the excavation shall be seeded and fertilized.

4.7 Minimum burial depth shall be 3'-0". Contractor shall refer to final grade to determine the minimal burial depth.

4.8 Contractor shall cut and patch all areas where lines are run under asphalt. Follow 4.6 in backfilling area. For the last 8" provide 6" of ABC base followed by 2" of asphalt top. Asphalt mix shall comply with State DOT regulations.

4.9 Pipe shall be hydrostatically tested at 200 psi minimum for 2/hours minimum. contractor shall follow guidelines outlined in the AWWA C-600-82 Standards, Section IV, for Hydrostatic Testing. Pipe shall be filled with water slowly and all air shall be removed before testing. All pipe, fittings, valves, hydrants and joints shall be examined carefully during the test. Any damaged or defective pipe, fittings, valves or hydrants that are discovered following the pressure test shall be repaired or replaced with sound material and the test shall be repeated until satisfactory to the Owner. Allowable leakage shall be .64 gph per 1000 feet of pipe for 6" diameter pipe.

4.10 Water system shall be disinfected per AWWA C-601-81 Standards, minimum for "Disinfecting Water Mains". As a minimum, system shall be chlorinated to 50 ppm and held for 24/hours minimum. Acceptable procedures shall be Tablet Method, Continuous Feed Method or Slug Method as outlined by AWWA. Samples for bacteriological analysis shall be collected in sterile bottles treated with sodium thiosulfate as required by Standard Methods. No hose or fire hydrant shall be used in collection of samples. A corporation cock may be installed in the main with copper tube gooseneck assembly. After samples have been collected, the gooseneck assembly may be removed and retained for future use. Refer to AWWA Standards for tap details.

END OF SECTION




DIVISION SIXTEEN

SECTION 16000 – ELECTRICAL

16001 GENERAL 7/17/24

A. The Instructions to Bidders, General Conditions of the Contract, Supplementary General Conditions and Division 1 bound herewith are a component part of this section of the specifications and shall apply to this section with equal force and shall be consulted in detail for instructions pertaining to the work.

B. Furnish all labor, materials and equipment and incidentals required to make ready for use complete electrical systems as shown on the Drawings and specified herein.

C. It is the intent of these Specifications that the electrical systems shall be suitable in every way for the service required. All material and all work which may be reasonably implied as being incidental to the work of this Division shall be furnished at no extra cost.

D. The Electrical Contractor assumes total responsibility for any portion of the work provided by his subcontractors.

E. Each bidder (or Representative) shall, before preparing a proposal, visit all areas of the existing site. If the work includes demolition, restoration, renovation and/or addition; then existing buildings and structures should be carefully inspected. The submission of the proposal by this Bidder shall be considered evidence that the Bidder (or Representative) has visited the site and noted the locations and conditions under which the work will be performed and that the Bidder takes full responsibility for a complete knowledge of all factors governing the work.

F. The work shall include complete testing of all equipment and wiring at the completion of work and making any minor correction changes or adjustments necessary for all the proper functioning of the system and equipment. All work shall be of the highest quality; substandard work will be rejected.

G. Field verify all existing underground electrical and mechanical piping.

H. The project shall be bid based on the equipment listed in these specifications and on the Drawings. After award of the Electrical Contract the Contractor may wish to substitute equipment other than that specified, subject to approval. The Electrical Contractor shall bear the "burden of proof" for demonstrating substitute equipment equivalency and suitability.

I. The Electrical Contractor shall be required to replace installed "equivalent" equipment if the operation of this equipment does not meet the full design intent of the specified system.

J. Physical size of equipment used in the design layout are those of reputable equipment manufacturers. The Contractor is responsible for providing equipment which will fit the space provided. If the Contractor elects to use other manufacturer's equipment, any resulting conflicts with space clearance or codes shall be the responsibility of the Contractor to correct at the Contractor's expense.

K. The Contractor assumes all responsibility for providing code clearances. Submit a scale drawing of each electrical equipment room showing exact size and location of all proposed electrical equipment with code clearances and working space clearly indicated.

## 16002 SCOPE OF WORK

It is the intent and meaning of these Drawings and specifications to provide a complete and operable electrical power and lighting systems and associated related electrical systems for the work as shown on the Drawings and/or herein specified. This includes furnishing all labor, equipment, devices, appliances, materials and appurtenances as required, and in performing all functions to completion and leave ready for operation and installation of electrical work in strict accordance with these specifications and applicable Drawings and subject to the conditions of the contract.

All electrical work shall be in full compliance with NFPA 70 (specifically including Art. 517), the North Carolina State Building Code (NCSBC), the Rules and Regulations of the Division of Health Services Regulation, North Carolina Department of Human Resources (DHSR), all local Codes and Ordinances in accordance with the requirements of the local Authority Having Jurisdiction (AHJ), and the Codes and Standards listed hereinafter.

Major items of work are:

A. Electrical service from utility company transformer to service equipment.

B. Electrical service and distribution system for power, lighting, receptacles and miscellaneous power as shown on the Contract Drawings.

C. Electrical lighting system as shown on the Contract Drawings, complete with indicated switching, circuiting, etc.

D. Electrical receptacle system as shown on the Contract Drawings. Including redundant grounding paths per NEC article 517.

E. Exit and emergency lighting systems.

F. Power supplies and associated electrical work for equipment furnished by others as detailed hereinafter.

G. Standby Emergency Power System.

H. Power, grounding, raceway and box systems for telephone, data, CATV, mag lock system, Aiphone system, security camera system, and other special systems.

I. Fire Detection and Alarm System.

J. Nurse Call System.

K. Raceway and box systems and power for paging, access control, cable television, Aiphone, data and telephone systems.

L. Grounding.

M. Seismic restraint systems.

N. Other special requirements and/or systems where shown.

16003 CODES AND STANDARDS

Materials installed in this construction shall conform to the latest edition of the Codes and Standards listed below where such are applicable, and shall be new and unused, unless specifically indicated to be salvaged and reused from existing construction.

A. American Association of Edison Illuminating Companies (AEIC)
B. American National Standards Institute (ANSI)
C. American Society for Testing and Materials (ASTM)
D. Building Officials Code Administrators (BOCA)
E. Energy Code 90.1 (ASHRAE/IES)
F. Institute of Electrical and Electronic Engineers (IEEE)
G. Insulated Cable Engineers Association (ICEA)
H. International Code Council (ICC)
I. International Conference of Building Officials (ICBO)
J. National Electrical Code (NEC) 2020 edition, with emphasis on applicable portions of Article 517
K. National Electrical Contractor's Association (NECA)
L. National Electrical Installation Standards (NEIS)
M. National Electrical Manufacturer's Association (NEMA)
N. National Electrical Safety Code (NESC)
O. National Fire Protection Association (NFPA)
P. Occupational Safety and Health Act (OSHA)
Q. Requirements of the Americans with Disabilities Act (ADA), latest edition.
R. Underwriters Laboratories Inc (UL)
S. Toxicity Characteristics Leaching Procedure (TCLP)

T. North Carolina State Building Code (NCSBC)
U. Rules and Regulations of the Division of Health Services Regulation, North Carolina Department of Human Resources (DHSR)
V. Guidelines for Design and Construction of Health Care Facilities, Facilities Guidelines Institute

16004 PERMITS AND INSPECTIONS

A. The Contractor shall obtain from the authority having jurisdiction the required construction permit and shall arrange, at the proper time, for all inspections required by such authority.

B. A certificate of approval from the Electrical Inspector having jurisdiction shall be delivered to the Architect/Engineer prior to final acceptance of the work.

C. The Contractor shall pay all fees and/or expenses accruing from all required permits and/or inspections.

16005 RECORD DRAWINGS

As the work progresses, legibly record all field changes on one set of project Contract Drawings, herein after called the "Record Drawings." The Electrical Contractor shall mark all changes, modifications, or revisions effected during construction such that the Architect/Engineer may prepare record drawings from the information contained thereon upon completion of the work.

16006 APPROVAL OF MATERIALS

A. The Architect/Engineer has, wherever possible, specified the required performance and design characteristics of all materials utilized in this construction. In some cases it is impossible to specify the required performance and design characteristics and when this occurs the Architect/Engineer has specified three or more examples of equal design or equivalent design, establishing a an acceptable range for items of equal or equivalent design. Cited examples are used only to denote the quality standard of product desired and do not restrict bidders to a specific brand, make, manufacturer or specific name and are used only to set forth and convey to bidders the general style, type, character and quality of product desired. Equivalent products will be acceptable. Substitution of materials, items, or equipment of equal or equivalent design shall be submitted to the Architect/Engineer for approval or disapproval. Equal or equivalent shall be interpreted to mean an item of material or equipment, similar to that named and which is suitable for the same use and capable of performing the same functions as that named, the Architect/Engineer being the judge of equality.

B. The Contractor shall submit to the Architect/Engineer, within 10 days following award of the contract, a list of materials and equipment for approval that he proposes to use on the project. Such list shall include the manufacturer and the trade name, type, series or model of equipment proposed. When this list is

approved by the Architect/Engineer, no further substitutions will be permitted except in unusual or extenuating circumstances. If no list is submitted within the specified time, the Contractor shall supply materials and equipment as specified.

16007 SHOP DRAWINGS, SUBMITTAL DATA AND PROCEDURES

A. The Contractor shall submit shop drawings, certified prints, literature and cuts to the Architect/Engineer for all major items of equipment and materials for review and approval. Data required to be as stipulated herein and must be submitted reasonably promptly after material list above has been approved. Several items on which such data will be required are as tabulated below. All shop drawings for the project shall be submitted at one and the same time. Materials and equipment with long lead times or other materials and equipment requiring special handling, if identified and requested by the contractor, will be processed separately.

B. The Contractor shall analyze all shop drawings before submittal and certify that they meet requirements of Contract Drawings and Specifications. Certification to be in the form of suitable approval stamp placed on each shop drawing submitted for approval. Data submitted for approval without Contractor's stamp of approval will not be considered. Shop drawings are required to be submitted for the following items:

1. Circuit Breakers
2. Conductors
3. Raceways and Fittings
4. Lighting Fixtures
5. LED lamps, Light Engines and Drivers
6. Junction, Outlet and Pull Boxes
7. Nameplates
8. Panelboards
9. Switchboards
10. Safety Switches
11. Surge Protection Devices
12. Automatic Transfer Switches
13. Engine-Generator Set
14. Dual Purpose Docking Station
15. Wiring Devices and Plates
16. Fire Alarm, Paging and Nurse Call Systems

C. The Architect/Engineer will review submittal data, and if found acceptable, will return submittal review letter marked "Approved" or "Approved as Noted".

D. If the Architect/Engineer deems submittal data is either incomplete or unacceptable, a new submittal will be required.

E. At least one set of all "Approved" shop drawings, certified prints, etc., shall be maintained at the job site and available to representative of the Architect/Engineer.

F. Approval by the Architect/Engineer of shop drawings for any materials, apparatus, devices and layouts shall not relieve this Contractor from the responsibility of furnishing same of proper dimensions, size, quantity, quality and all performance characteristics to efficiently perform the requirements and intent of the contract documents. Approval shall not relieve this Contractor from responsibility for errors of any sort on the shop drawings. If the shop drawings deviate from the Contract Documents, the Contractor shall advise the Architect/Engineer of the deviations in writing, accompanying the shop drawings, including the reason for the deviations.

G. No materials or equipment shall be placed on the job site, or installed in the work, without prior written approval by the Architect/Engineer.

H. Physical size of equipment used in the design layout are those of reputable equipment manufacturers. The Contractor is responsible for providing equipment which will fit the space provided. If the Contractor elects to use other manufacturer's equipment, any resulting conflicts with space clearance or codes shall be the responsibility of the Contractor to correct at his expense.

I. The Contractor assumes all responsibility for providing code clearances. Submit a scale drawing of each electrical equipment room showing exact size and location of all proposed electrical equipment with code clearances and working space clearly indicated.

16008 INTERPRETATION OF DRAWINGS

A. The Electrical Drawings and specifications are complementary each to the other and what may be called for by one shall be as binding as if called for by both. The Drawings are diagrammatic and indicate generally the location of outlets, devices, equipment wiring, etc. While these drawings shall be followed as closely as possible, all dimensions shall be checked and verified at the building, and any necessary changes shall be made to accord with structural conditions, equipment to be installed, other systems, etc., without additional cost. All work shall suit the finished surroundings and/or trim.

B. Where the words "furnish (or provide) and/or install" are used, it is intended that this contractor shall purchase and install completely any and/or all material necessary and required for this particular item, system, equipment, etc.

C. Where the words "the Contractor" or "this Contractor" appear in either the Drawings or specifications, it shall mean the Electrical Contractor.

D. Any omission from either the Drawings or these specifications are unintentional, and it shall be the responsibility of this Contractor to call to the attention of the Architect/Engineer any pertinent omissions before submitting a bid. Complete and working systems are required, whether every small item of material is shown and specified or not.

E. Where no specific material or equipment type is mentioned, a high quality product of a reputable manufacturer may be used provided it conforms to the requirements of these specifications. These materials shall be listed or labeled by a nationally-recognized Third Party Testing Agency accredited by the State of North Carolina to label electrical equipment.

F. It is the intent of these Specifications that the electrical system shall be suitable in every way for the service required. All material and all work which may be reasonably implied as being incidental to the work of this Section shall be furnished at no extra cost. The Electrical Drawings show the general arrangement of raceways, equipment, fixtures, and appurtenances and shall be followed as closely as actual building construction and the work of other trades will permit. Some adjustment of routings and installation of conduit, boxes, fixtures, devices, etc. should be expected. The electrical work shall conform to the requirements shown on all of the Drawings. General and Structural Drawings shall take precedence over Electrical Drawings. Because of small scale of the Electrical Drawings, it is not possible to indicate offsets, fittings and accessories which may be required. The Contractor shall investigate the structural and finish conditions affecting the work and shall arrange his work accordingly, providing such fittings and accessories as may be required to meet such conditions, without additional cost to the Owner and as directed by the Architect/Engineer.

G. Each 3-phase circuit shall be run in a separate conduit unless otherwise shown on the Drawings.

H. Where circuits are shown as "home runs" all necessary fittings and boxes shall be provided for a complete raceway installation.

I. Verify with the Architect/Engineer the exact locations and mounting heights of lighting fixtures, switches and receptacles prior to installation.

J. Any work installed contrary to or without approval by the Architect/Engineer shall be subject to change as directed by the Architect/Engineer, and no extra compensation will be allowed for making these changes.

K. The locations of equipment, fixtures, outlets, and similar devices shown on the Drawings are approximate only. Exact locations shall be as approved by the Architect/Engineer during construction. Obtain in the field all information relevant to the placing of electrical work and in case of any interference with other work, proceed as directed by the Architect/Engineer and furnish all labor and materials necessary to complete the work in an approved manner.

L. Surface mounted panel boxes, junction boxes, conduit, etc., shall be supported by spacers to provide a clearance between wall and equipment.

M. Circuit layouts are not intended to show the number of fittings, or other installation details. Furnish all labor and materials necessary to install and place in satisfactory operation all power, lighting, and other electrical systems shown.

Additional circuits shall be installed wherever needed to conform to the specific requirements of equipment.

N. All connections to the equipment shall be made as required by the equipment, and in accordance with the approved shop and setting drawings.

O. Redesign of electrical work, which is required due to the Contractor's use of an alternate item, arrangement of equipment and/or layout other than specified herein, shall be done by the Contractor at his own expense. Redesign and detailed plans shall be submitted to the Architect/Engineer for approval. No additional compensation will be provided for changes in the work, either his own or others, caused by such redesign.

P. All floor mounted electrical equipment shall be placed on 4-inch thick concrete housekeeping pads. Edges shall be chamfered.

Q. The Contractor shall harmonize the work of the different trades so that interferences between conduits, piping, equipment, architectural, mechanical, plumbing and structural work will be avoided. All necessary offsets shall be furnished so as to take up a minimum space and all such offsets, fittings, etc., required by to accomplish this shall be furnished and installed by the Contractor without additional expense to the Owner. In case interference develops, the Architect/Engineer shall decide which equipment, piping, etc., must be relocated, regardless of which was installed first.

16009 SIZE OF EQUIPMENT

A. Investigate each space in the structure through which equipment must pass to reach its final location. If necessary, the manufacturer shall be required to ship his materials in sections sized to permit passing through such restricted areas in the structure.

B. The equipment shall be kept upright at all times. When equipment has to be tilted for ease of passage through restricted areas during transportation, the manufacturer shall be required to brace the equipment suitable, to insure that the tilting does not impair the functional integrity of the equipment.

16010 COORDINATION OF WORK

A. It is understood and agreed that the Contractor has, by careful examination, satisfied himself as to the nature and location of the work, the conformation of the ground, the character, quality and quantity of the materials to be encountered, the general and local conditions and all other matters which can and may affect the work under this contract. The Contractor shall be held responsible for visiting the site and thoroughly familiarizing himself with the existing conditions and also any contractual requirements as may be set forth in the other divisions of these specifications. No extras will be considered because of additional work necessitated by obvious job conditions that are not indicated on the Drawings.

B. The Contractor shall compare the Electrical Drawings and specifications with the Drawings and specifications for other trades, and shall report any discrepancies between them to the Architect/Engineer and obtain from him written instructions for changes necessary in the electrical work. The electrical work shall be installed in cooperation with other trades installing interrelated work. Before installation, the Contractor shall make proper provisions to avoid interferences in a manner approved by the Architect/Engineer. All changes required in the work of the Contractor caused by his neglect to do so shall be made by him at his expense.

C. Location of electrical raceways, switches, panels, equipment, fixtures, etc., shall be adjusted to accommodate the work to interferences anticipated and encountered. The Contractor shall determine the exact route and location of each electrical raceway prior to make up and assembly.

1. Right of Way: Lines which pitch shall have the right of way over those which do not pitch. For example, steam, condensate and plumbing drains shall normally have right of way. Lines whose elevations cannot be changed shall have the right of way over lines whose elevations can be changed.
2. Offsets and changes in direction of electrical raceways shall be made as required to maintain proper headroom and to clear pitched lines whether or not indicated on the Drawings. The Contractor shall furnish and install elbows, pull boxes, etc., as required to affect these offsets, transitions, and changes in directions. Conflicts between electrical raceways, fixtures, etc., and ductwork which cannot be resolved otherwise, will be resolved by the Architect/Engineer.

D. Installation and Arrangements: The Contractor shall install all electrical work to permit removal (without damage to other parts) of any equipment requiring periodic replacement or maintenance. The Contractor shall arrange electrical raceways and equipment to permit ready access to valves, cocks, traps, starters, motors, control components, etc., and to clear the opening of swinging and overhead doors and of access panels.

E. Do not scale Electrical Drawings. Locations shown are approximate. The contractor shall refer to the Architectural Drawings for exact measurements in the placement of equipment, fixtures, outlets, etc. The Drawings do not give exact details as to elevations and locations of various fittings, conduit, etc., and do not show all offsets and other installation details which may be required.

## 16011 EQUIPMENT AND MATERIALS (GENERAL)

A. All materials and equipment provided by the contractor shall be listed and labeled by a nationally-recognized, third party testing agency, acceptable to the authority having jurisdiction, for the conditions of installation. All material, equipment and devices shall be new current products of manufacturers regularly engaged in the production of such products. Equipment shall be suitable for its application (e.g. when installed outdoors, it shall be weatherproof, etc.). Materials and equipment furnished under this specification shall be essentially the standard product of

manufacturers regularly engaged in the production of the required type of equipment, and shall be the manufacturer's latest approved design. Equipment, materials, etc. utilized not bearing a third party testing agency certification shall be field or factory third party testing agency certified prior to equipment acceptance and use. Equipment and materials shall bear the appropriate third party testing agency's listing mark or classification marking.

B. Delivery and Storage: Equipment and materials shall be delivered to the site and stored in original containers, suitably sheltered from the elements, but readily accessible for inspection by the Architect/Engineer until installed. All items subject to moisture damage (such as lighting fixtures) shall be stored in dry, heated spaces.

C. Equipment and materials of the same general type shall be of the same make throughout the work to provide uniform appearance, operation and maintenance.
   1. Protection: Equipment shall be tightly covered and protected against dirt, water and chemical or mechanical injury and theft. At the completion of the work, fixtures, equipment, and materials shall be cleaned and polished thoroughly and turned over to the Owner in a condition satisfactory to the Architect/Engineer. Damage or defects, developing before acceptance of the work shall be made good at the Contractor's expense.
   2. Dimensions: It shall be the responsibility of the Contractor to insure that items to be furnished fit the space available. He shall make necessary field measurements to ascertain space requirements, including those for connections and shall furnish and install such sizes and shapes of equipment that the final installation shall suit the true intent and meaning of the Drawings and specifications.
   3. Manufacturer's directions shall be followed completely in the delivery, storage, protection, and installation of all equipment and materials. The Contractor shall promptly notify the Architect/Engineer, in writing, of any conflicts between any requirements of the Contract Documents and the manufacturer's directions and shall obtain the Architect/Engineer's written instructions before proceeding with the work. Should the Contractor perform any work that does not comply with the manufacturer's direction or such written instructions from the Architect/Engineer, he shall bear all costs arising in correcting the deficiencies.

D. Seismic requirements
   1. All equipment furnished under the electrical contract shall be installed in a manner to be fully compliant with the seismic restraint requirements of the North Carolina State Building Code (NCSBC). The contractor shall provide any and all seismic restraint details and calculations that may be required by the NCSBC and/or the authority having jurisdiction.
   2. Requirements for restraints are detailed in the NCSBC. All tables and references shall conform to the buildings location. Restraints and required flexible connections shall be per the criteria set forth by the NCSBC. This criteria is based on the seismic design category stated on the structural drawings.

3. The contractor shall retain the services of a Professional Engineer registered in the State of North Carolina to design seismic restraint elements required for this project. The engineer's calculations, bearing his professional seal, shall accompany shop drawings and shall demonstrate code compliance including certification that the seismic system components comply with the testing requirements of the NCSBC. Calculations and shop drawings shall be submitted for review prior to the purchasing of materials, equipment, systems and assemblies. Internal seismic restraint elements of manufactured equipment shall be certified by a Professional Engineer retained by the manufacturer. Such certificate applies only to internal elements of the equipment. All equipment anchorage requirements shall be coordinated with the building structure and shall be compatible thereto. All such anchorages shall be subject to the review and approval of the project's structural engineer
4. The Professional Engineer retained for seismic restraint calculations shall visit the job site upon completion of the seismic restraint installation to comply with the special inspections requirement of the code. This engineer shall provide written verification of compliance of the installation with the approved seismic submittal. This verification shall be submitted as a special inspections report and shall bear the engineer's professional seal. Job site inspections by other than this engineer are not acceptable.
5. Review of the seismic design computations and shop drawings by the engineer or his agent shall not relieve the contractor of his responsibility to comply with the seismic or any other requirements of the North Carolina State Building Code.

## 16012 OPERATION AND MAINTENANCE MANUALS

A. The Contractor shall provide two compilations of catalog data, bound in suitable loose leaf binders, for each manufactured item of equipment used in the electrical work. These shall be presented to the Architect/Engineer for transmittal to the Owner before the final inspection is made. Data shall include printed installation, operation and maintenance instructions for each item, indexed by product with heavy sheet dividers and tabs. All warranties shall be included with each item. Each manufacturer's name, address and telephone number shall be clearly indicated.

B. Shop drawings with Architect/Engineer's "as noted" markings are not acceptable for the above. "Approved" shop drawings are acceptable if adequate information is contained therein. Installation information packed with lighting fixtures, devices and equipment shall be retained for inclusion in the operations and maintenance manuals. Generally, shop drawings alone are not adequate.

## 16013 OPERATING INSTRUCTIONS

At the completion of the entire installation, the Contractor shall arrange to operate each component of the system and then the system as a whole. When all the requirements of the plans and specifications have been met, the Contractor shall then arrange to instruct

the Owner's operating and maintenance personnel in the correct and proper procedures for the operation and maintenance of the systems.

16014 SLEEVES, INSERTS, OPENINGS, ETC.

Anchor bolts, sleeves, inserts, supports, etc., that may be required for electrical work shall be furnished, located and installed by the Electrical Contractor. The Electrical Contractor shall give sufficient information (marked and located) to the General Contractor in time for proper placement in the construction schedule. Should the Electrical Contractor delay or fail to provide sufficient information in time, then the Electrical Contractor shall cut and patch construction as necessary and required to install electrical work. Such cutting and patching will be done by the General Contractor but paid for by the Electrical Contractor.

16015 CUTTING AND PATCHING

This Contractor shall do all cutting and patching as required for the proper installation of work under this contract. Cutting shall be kept to a minimum.

16016 PAINTING

A. All painting will be performed by the General Contractor for the project, unless specifically indicated otherwise.

B. The Electrical Contractor shall clean all exposed electrical work for painting. Should the Electrical Contractor delay in installing his exposed conduit and outlet installation until the General Contractor has begun painting, the Electrical Contractor shall be required to paint all exposed electrical work at his own expense. Such painting will be accomplished in accordance with the detailed painting specifications for the project.

C. Conductors exposed in boxes and cabinets shall be protected against painting. Devices, cover plates, trims, etc., for panelboards and cabinets shall not be installed until painting has been completed.

D. The Electrical Contractor shall be responsible for touch up painting that may be required for his own material or apparatus furnished with factory applied finish.

16017 LOCATIONS AND MEASUREMENTS

Outlets and appliances are shown and located on the Drawings as nearly as possible. All measurements shall be verified on the project and in all cases the work shall suit the surrounding trim and/or decoration and construction. The locations of outlets for special appliances shall be installed so that when extended, they are flush with the finished wall or ceiling and permit the proper installation of fixtures and/or devices. Heights of all outlets shown on the Drawings are approximate only. Slight relocations of outlets, devices and equipment shall be made by the Contractor as required or as directed by the Architect/Engineer at no additional cost to the Owner.

16018 WORKMANSHIP

All work shall be executed as required by this specification and the accompanying Drawings and shall be done in a workmanlike manner by skilled mechanics, and shall present a neat, trim, and mechanical appearance when completed. All work shall be performed as required by the progress of the job.

16019 ELECTRICAL IDENTIFICATION

A. Furnish and install engraved laminated phenolic nameplates for all safety switches, panelboards, switchboards, automatic transfer switches, and electrical equipment supplied under this contract for identification of equipment, controlled, served, phase, voltage, etc. Nameplates shall be securely attached to equipment with metal screws, and shall identify by name the equipment controlled, attached, etc. Letters shall be approximately 1/4-inch high minimum. Embossed, self-adhesive plastic tape is not acceptable for marking equipment. Nameplate material colors shall be:
   1. Black surface with white core for all normal (utility) power distribution equipment.
   2. Yellow surface with black core for all life safety branch power distribution equipment.
   3. Orange surface with black core for all critical branch power distribution equipment.
   4. Green surface with white core for all delayed equipment branch power distribution equipment.

B. All empty conduit runs and conduit with conductors for future use shall be identified for use and shall indicate where they terminate. Identification shall be by tags with string or wire attached to conduit or outlet.

C. Paint junction and outlet boxes and covers of accessible raceway systems the following colors:
   1. Normal Power Systems: Black.
   2. Emergency Power Systems: Life safety: Yellow, Critical: Orange, Delayed Equipment: Green.
   3. Data and Telephone: Brown.
   4. Nurse Call: Blue.
   5. Fire Alarm: Red.
   6. CATV: Field determined.
   7. Paging: Field determined.
   8. Door Locking System: Field determined.

D. Legibly mark conduits at junction boxes above accessible ceilings and in the attic with the panelboard and circuit numbers of the circuits contained in the raceway using a permanent black, bold marking pen.

E. Install approved marking tape above all underground cables and conduits.

F. Wire markers: Provide wire markers on each conductor at panelboard gutters, pull boxes, outlet and junction boxes, and each load connection. Legend: (1) power and lighting circuits: branch circuit or feeder number as indicated on Drawings (2) control circuits: control wire number as indicated on schematic and interconnection diagrams on Drawings.

G. Receptacle circuit identification: Provide adhesive backed, laminated plastic receptacle device plate labels identifying the panel and circuit number feeding the device (i.e., RPA-24). Labels shall be label machine printed, black lettering on a clear background, to indicate panel and circuit number and shall be Casio, Brother, T&B or approved equal. Location: each receptacle device plate, centered on the lower portion below the receptacle, parallel to the lower surface.

16020 SUPERVISION

A. The Contractor shall personally, or through an authorized and competent representative, constantly supervise the work from the beginning to completion and final acceptance. So far as possible, he shall keep the same foreman and workmen throughout the project duration.

B. During the progress of the work it shall be subject to inspection by representatives of the Architect/Engineer, the Owner, and all inspection authorities, at which time the Contractor shall furnish such required information and data on the project as requested.

16021 EXCAVATION, TRENCHING AND BACKFILLING

A. The Electrical Contractor shall do all excavating, trenching and backfilling in connection with this contract in strict compliance with Division 2 of these specifications. All such excavation shall be done in a manner as not to endanger or damage existing utility lines and other structures. If damage occurs, the Contractor shall repair damage at his expense and to the satisfaction of the Architect/Engineer.

B. It shall be the responsibility of the Contractor to investigate conditions before excavation and to exercise care during the excavation to avoid any utilities or other objects which may not be shown. Whether or not utilities, etc., are shown on the Drawings shall not relieve the Contractor from his responsibility to repair any damage caused by this work. Location of all ditching shall be laid out at grade and shall be approved by the Architect/Engineer before excavating and no work shall be done until such approval has been obtained.

C. All surplus earth shall be removed by the Contractor from the site and disposed of at his own expense.

D. Backfilling shall be in 6" layers with each layer tamped. No boulders or debris shall be used for backfill material. Where trenching passes through areas designated

as streets, driveways, walkways, or parking areas, backfill shall be tamped with power tamps to 95 percent compaction.

E. Excavation shall be bid unclassified with no extra payment for removal of rock.

16022 CLOSING IN WORK

Work shall not be covered up or enclosed until it has been inspected, tested and approved by the authorities having jurisdiction over this work. Should any of the work be enclosed or covered up before such inspection and test, the Contractor shall uncover the work at his expense; after it has been inspected, tested and approved, he shall restore the work to its original condition.

16023 BASIC MATERIALS AND METHODS

A. In general, all wiring shall consist of individually insulated copper conductors installed in metallic raceways. Alternately, Type MC cable with separate green insulated ground conductor may be used in lieu of conduit and wire for branch circuits where permitted by Codes, the AHJ and DHSR. If permitted, Health Care Rated MC Cable with green insulated ground conductor may be used for branch circuits in patient care areas, as defined by the AHJ, to conform to the grounding requirements of NEC Article 517. Where the word "conduit" is used on the Drawings, or in these specifications, it shall mean rigid galvanized steel, rigid polyvinylchloride conduit or electrical metallic tubing, installed in general locations as indicated below.
   1. Rigid galvanized steel conduit shall be used for:
      a. Exposed circuits, from floor to 4'-0" above floor and for those instances where raceways are exposed to the weather or to mechanical injury of one sort or another.
      c. Branch circuits concealed in exterior masonry walls.
      d. Branch circuits in wet locations above or below grade.
   2. Electrical metallic tubing may be used for feeders, concealed or exposed, where not subject to severe physical damage and all branch circuit work not included above and as indicated in the specifications and/or on the Drawings. EMT may be used in interior walls and in the space above furred ceilings, and in exposed areas except as described in subparagraph above. EMT shall not be installed where it will be:
      a. subject to severe physical damage.
      b. installed nearer than 4 feet from finished floor in exposed areas
      c. subject to severe corrosive influence
      -or-
      d. Where tubing, elbows, couplings, and fitting would be in concrete or in direct contact with the earth.
      e. For service entrance use.
      f. Where not allowed by Codes, the AHJ or DHSR.
   3. Where conduit is installed underground, conduit may be Schedule 40 PVC.

B. Rigid galvanized steel conduit shall be installed in accordance with the NEC, except the maximum spacing of supports and/or anchorage shall be 8 feet for conduits 1/2" through one inch and 10 feet for conduits 1-1/4" and larger. EMT shall be installed in accordance with the NEC, except the maximum spacing of supports and/or anchorage shall be 8 feet for all sizes. Where concentric or eccentric knockouts are encountered, a grounding bushing shall be installed with a copper bonding jumper securely attached to the bushing and solid metal of the box or cabinet. "Grounding wedges" or "washers" are not acceptable. Conduit ends shall be cut square with the longitudinal axis of the conduit, reamed and filed smooth, and threaded long enough to jam together in a conduit coupling, or come up hard and tight against the bushed shoulder of a cast conduit fitting. Field threads shall be of same type and have same effective lengths as factory cut threads. Raceway joints shall be made with approved couplings or unions. Bends and offsets shall be made with a hickey or power bender without kinking the raceway. Deformed raceway shall be replaced. Where metallic conduits are exposed to the weather, buried in concrete, or installed below grade, the threads shall be treated with Crouse Hinds "STL", or approved equal, before screwing up into final position. Where conduit is installed across structural expansion joints, conduit expansion joints shall also be installed.

C. Non-metallic conduit shall be installed in accordance the NEC except the maximum spacing of supports and/or anchorage shall be three feet for all sizes. Conduit ends shall be cut square with the longitudinal axis of the conduit, reamed and filed smooth, and jammed together in a conduit coupling, or come up hard and tight against the bushed shoulder of a conduit fitting. Raceway joints shall be solvent welded in accordance with the recommendations of the manufacturer and made with approved couplings and fittings. Bends and offsets shall be made with an approved bender without kinking the raceway. Deformed raceway shall be replaced. Where conduit is installed across structural expansion joints, or in lengths of 200 feet or more, conduit expansion joints shall also be installed.

D. Raceways may not be installed laterally in concrete floor slabs where the outside diameter of the conduit, measured at a coupling, exceeds one third the thickness of the concrete. Conduit shall occupy the middle third of the slab when practical and leave at least 3/4" concrete cover. Where reinforcing bars occur at the 3/4" level, the conduit shall be run inside them towards the center of the slab. Raceways shall be tied to the reinforcing rods or otherwise supported when necessary to prevent sagging when concrete is poured. Raceways shall be laterally spaced not closer than three diameters on centers to allow complete concrete coverage.

E. Raceways indicated or required to extend underground outside the building shall be extended to 5'-0" minimum beyond all paving, walks, etc., that abut the building.

F. Openings for raceways passing through outside walls, floors or roofs shall be made watertight. Pierced vapor barriers shall be made vaportight.

G. Raceways shall be installed in walls as they are erected.

H. During installation, raceway ends shall be capped or plugged to prevent the entrance of foreign matter. All raceways shall be clean and free from any foreign matter inside before any conductors are pulled in. Raceways that have been clogged shall be entirely freed or shall be replaced.

I. Where architectural construction does not permit concealed raceways and where indicated on the Drawings, raceways shall be run exposed. Exposed raceways shall be run parallel to, or at a right angle with the building walls. Outlets, junction, taps, etc., on exposed rigid metal conduit shall be cast metal conduit fittings or cast metal boxes of the type and size appropriate for the location. Sheet steel outlet boxes shall not be permitted on exposed raceway runs except at or near a ceiling for interior construction.

J. Raceways shall be sized as indicated on the Drawings and/or as required by the National Electrical Code, whichever is larger. Minimum size for raceways shall be 3/4".

K. All raceway systems shall be installed complete before any conductors are pulled.

L. Circuiting is shown schematically. Exact routing of branch circuits may be varied to suit building construction; however, the combination of circuits within raceways and panelboard connections shall not be changed from those shown on the Drawings.

M. All circuits shall contain an insulated, green, copper grounding conductor sized in accordance with Table 250-122 of the NEC. The grounding conductor shall be connected to the equipment ground bus in panelboards and securely attached and grounded to the device or enclosure at the other end of the run.

N. Grounding type convenience outlets and switches shall be solidly grounded to equipment grounding system with a green colored insulated conductor. Electrical connections shall be continuous from equipment ground bus in panelboard to the hex-nut on convenience outlet and/or switch.

O. Flexible metal conduit shall be installed in accordance with the NEC. When flexible metal conduit is used at any point in the electrical raceway system, an insulated, green, copper grounding conductor sized in accordance with Table 250-122 of the National Electrical Code shall be installed within the flexible conduit and securely attached and grounded to the electrical raceway system at each end of the flexible section. Flexible metal conduit may be used for work above lay-in ceilings only.

P. Liquidtight flexible metal conduit shall be installed in accordance with the NEC. An insulated, green, copper grounding conductor sized in accordance with Table 250-122 of the NEC shall be installed within the flexible conduit and securely attached and grounded to the electrical raceway system at each end of the flexible section. Liquidtight flexible metal conduit shall be used for all work except as specified in previous paragraphs.

Q. All motors with conduit connection thereon shall be connected to conduit system with short length (minimum length of 12" and maximum length of 24") of flexible liquidtight conduit utilizing hex-nut, steel fittings.

R. Interior metal framing systems, as shown and/or as required, shall be installed to support and/or to mount equipment. Framing systems shall be Unistrut P-1000 series, or approved equal, with necessary fittings and hardware for mounting. Exterior metal framing systems shall be hot dipped galvanized.

S. Raceways and Box Supports: Raceways and boxes shall be attached to the structure as follows with attachments spacing as indicated in subparagraph above.

1. Conduit shall be attached to the structure with one or two hole pipe straps or minerallac clamps where raceway is run against surface.
2. Raceways and boxes shall be fastened to masonry with lead anchors and machine screws or toggle bolts. Raceways shall be fastened to structural steel with beam clamps, conduit hangers, trapeze hangers, or other devices approved for such usage. Perforated iron shall not be used to support raceway. Threaded studs driven by a power charge are acceptable in lieu of lead anchors and machine screws, provided power charge used is recommended charge for material penetrated.
3. Where raceway is of necessity supported horizontally away from the surface of the structure it shall be supported on threaded steel rods of sufficient diameter to carry the weight of the raceway(s), 1/4 inch being the minimum size rod permitted. In the case of single raceways, a minerallac clamp shall be attached to the end of the rod with two nuts top and bottom of the clamp. The upper end of the rod shall be attached to the structure by beam clamps or other approved hanging method. All nuts used in the assembly of a hanger shall be installed with lock or star washers.
4. Where multiple runs of raceways are installed parallel, whether horizontally or vertically, they shall be attached to the flat side of a steel angle or channel of sufficient rigidity by any one of the methods indicated above, and the angle attached to the structure surfaces by bolting or welding. Unistrut and Unistrut clamps may be used in lieu of the above angle and clamps. Where runs are horizontal, support of the angle shall be as described above.
5. Where runs of flexible conduit both liquidtight and non-liquidtight of necessity exceed six feet in length and permission is obtained from the Architect/Engineer to exceed six feet, the flexible conduit shall be supported in cable trays or other approved method.

T. All equipment shall be firmly and solidly secured to structural members of the building walls, floors, etc., with suitable hangers, clamps, bolts, and supports designed for service required.

U. Outlet and/or junction boxes installed in concealed locations shall be set flush with the finished surfaces and shall be provided with the proper type extension rings or plaster covers where required. Boxes shall be installed in rigid manner and properly supported. Do not install boxes back-to-back.

V. Electrical Contractor shall be responsible for locating and providing anchors, inserts, supports, etc., and maintaining them in position during construction.

W. All rotating and vibrating equipment installed under this contract shall have vibration isolators of type and loading density to prevent noise and/or vibration from being transmitted to the building.

X. Lighting Fixtures, Supports and Grounding:

1. Each lighting outlet shall be equipped with a fixture stud for support of the lighting fixture where required.
2. Recessed fixtures shall be installed as indicated in suspension ceiling construction. The Electrical Contractor shall be responsible for coordination work with the ceiling contractor; however, the ceiling contractor will provide framed openings for reception of lighting fixtures. Recessed fixtures shall be furnished with all necessary mounting accessories. They shall be firmly attached and rigidly braced at each (of the four) corners from the structural ceiling. Furnish and install mounting clips for all recessed fixtures. Where a recessed or downlight fixture replaces a section or part of a ceiling tile, supports will be provided by the ceiling contractor with the same type of wire as used to support the lay in ceiling track. Four (4) supports will be provided, one at each corner of the fixture. The ceiling contractor will attach one end of the wire to the lay in ceiling track and the other end to the building's structural system. The Electrical Contractor shall then screw the lay in fixture to the main runners at all four corners using sheet metal screws. All recessed fixtures shall be furnished with all necessary mounting accessories.
3. Surface type lighting fixtures shall be mounted against suspension type ceilings by extending bolts or rods from fixtures wireway to steel channels which in turn are to be firmly attached to the structural ceiling. All hanging accessories such as channels, bolts, rods, etc., shall be furnished by this contractor. Provide two supports per 4 foot unit; three supports per 8 foot unit; and equivalent for continuous row mounting.
4. All lighting fixtures, without a direct rigid steel metal conduit connection thereto, shall be bonded to the conduit system with #12 AWG green grounding conductor. Fixture stems are not considered rigid conduit. All lighting fixtures shall be bonded to the green grounding conductor running within the e raceway feeding the fixture.

Y. Raceways and ducts penetrating rated floor, ceiling or wall assemblies shall be properly sealed in accordance with the corresponding Underwriters Laboratories approved method utilizing approved and listed materials.

Z. At each flush mounted panelboard location, install three empty 1" conduits from panelboard to the space above the adjacent ceiling. All empty conduits from panelboards shall be capped, tagged and left accessible.

A. Rigid conduit shall be standard weight, mild steel pipe, galvanized and shall bear the Underwriter's Laboratories, Inc. label of approval.
   1. Rigid steel conduit, couplings and elbows shall be iron pipe size, threaded. All steel conduit shall be hot dipped galvanized, UL approved and meet the latest NEMA Standards.
   2. Conduit fittings shall be corrosion resistant steel, threaded type as manufactured by Appleton, Crouse Hinds, Killark or O.Z. Gedney.

B. Electrical metallic tubing (EMT) shall be cold-rolled steel tubing, hot dipped galvanized, and shall bear the Underwriter's Laboratories, Inc. label of approval.
   1. Electrical metallic tubing shall meet the latest NEMA standards.
   2. EMT fittings shall be steel and of the hex-nut compression type, Series 5123 as manufactured by Thomas & Betts. Equals by O.Z. Gedney, Steel City or Raco will be accepted. EMT fittings shall have insulated throats. No pot metal, set screw, or indenter fittings shall be used.

C. Rigid polyvinylchloride conduit (PVC) shall be Schedule 40, manufactured and tested in accordance with NEMA TC-2, Federal Specification WC-1094A, UL-651 and shall be rated and labeled for use with 90 degrees C. rated conductors. PVC shall be installed in compliance with Article 347 of the National Electrical Code. Conduit shall be manufactured from a virgin polyvinylchloride compound meeting ASTM Cell Classification 13364. Smoke emissions shall be less than 6 grams per 100 grams of material when tested in a standard Araphoe Smoke Chamber. PVC conduit, fittings and cement shall be produced by the same manufacturer.

D. Flexible metal conduit and liquidtight flexible metal conduit shall bear the Underwriter's Laboratories, Inc. label of approval and shall meet all applicable NEMA standards requirements.
   1. Standard flexible steel conduit shall be as manufactured by Electri-Flex, Alflex, Anamet or Guardian. Fittings shall be "Tite-Bite" nylon insulated, as manufactured by T&B or equal by Crouse-Hinds, O.Z. Gedney or Raco.
   2. Liquidtight flexible steel conduit shall be as manufactured by Alflex, Anamet, Appleton or Electri-flex. Fittings shall be Series 6000 "Super-Tite" as manufactured by T&B or equal by Crouse-Hinds, O. Z. Gedney or Raco.

E. Junction and outlet boxes for interior use in dry locations shall be zinc coated or cadmium plated sheet steel 4" square and 2-1/8" deep, unless otherwise indicated on the Contract Drawings. Smaller and shallower outlet boxes will be permitted only by special permission of the Architect/Engineer where such boxes are necessary due to structural conditions encountered. Where larger junction boxes are required, they shall be fabricated from No. 10, 12, 14 or 16 gauge sheet steel as required by the Underwriter's Laboratories, Inc., and galvanized after fabrication. All junction boxes shall have screw fastened covers. Junction and outlet boxes exposed to the weather or in wet or damp locations shall be of cast malleable ferrous metal, or bronze with threaded connections, external mounting lugs, and gasketed covers. Ferrous metal boxes shall be galvanized. Outlet boxes

shall be provided with extension plaster rings where required by structural conditions. Sheet steel boxes shall be as manufactured by Appleton, Raco, Steel City or Spring City. Cast boxes shall be by Crouse-Hinds, Appleton, O. Z. Gedney or Killark. All boxes shall be UL approved.

F. Set wall mounted boxes at elevations to accommodate mounting heights indicated and specified in section for outlet device. Boxes are shown on Drawings in approximate locations unless dimensioned. Adjust box location up to 10 feet if required to accommodate intended purpose. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only. Install boxes to preserve fire resistance rating of partitions and other elements, using approved materials and methods. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes. Use flush mounting outlet box in finished areas. Use Erico Caddy RBS series, Raco 9001 or Cooper B-Line BB8-16 box mounting brackets to support flush mounting outlet boxes between studs.

G. Arrange stub-ups so curved portions of bends are not visible above finished slab.

H. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches of changes in direction.

I. Conceal conduit and EMT within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.

J. Insulated bushings shall be O.Z. Gedney, Type B or equal by T&B, Appleton or Crouse-Hinds.

K. Insulated bonding and grounding bushings shall be T&B Series 3882 or equal by Appleton, O.Z. Gedney or Crouse-Hinds.

L. Pull boxes shall comply in mechanical construction and material aspects to junction boxes, subparagraph above.

M. Wiring trough shall be fabricated from No. 10, 12, 14 or 16 gauge sheet steel as required by the Underwriter's Laboratories, Inc. and galvanized after fabrication and shall have screw fastened covers. Wiring troughs exposed to the weather or located on wet or damp areas shall have gasketed covers and threaded gasketed hubs and be listed as NEMA 3R.

N. Pull boxes, troughs and junction boxes larger than 5 inches square shall have no preformed knockouts.

O. Handholes and boxes for exterior underground wiring shall be designed and identified as defined in NFPA 70, for intended location and application. Boxes installed in wet areas shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application. Polymer-Concrete Handholes and Boxes with Polymer-Concrete Cover: Molded

of sand and aggregate, bound together with polymer resin, and reinforced with steel, fiberglass, or a combination of the two.

1. Standard: Comply with SCTE 77.
2. Configuration: Designed for flush burial with open bottom unless otherwise indicated.
3. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure and handhole location.
4. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
5. Cover Legend: Molded lettering, "ELECTRIC." or other appropriate lettering.
6. Conduit Entrance Provisions: Conduit-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall.

16025 CONDUCTORS

A. Conductors shall be single conductor copper, 600V insulated building wire. The minimum wire size for current carrying conductors, neutrals, equipment grounds and bonding jumpers shall be #12 AWG copper, maximum size 600 KCMil. Conductors No. 10 AWG copper and smaller shall be solid. Conductors No. 8 AWG copper and larger shall be stranded. Wire sizes, insulation type and manufacturer's name shall be permanently marked on conductor jacket at regular intervals. All wire and cable shall be delivered to job in complete coils and be color coded as hereinbefore specified.

B. All wire and cable shall be installed in conduit, except where MC Cable and/or free run lighting control cable, data and telephone, nurse call, paging, mag lock, CATV, Aiphone, etc. low voltage systems is specifically permitted by the AHJ and DHSR. This includes all power wiring; fire alarm, emergency systems control conductors, etc. and other electrical systems required by Codes to be installed raceways. Lighting control cable is permitted above accessible ceilings, in attics and in conduit to the switch location.

C. Conductors shall be color coded as follows:

<u>120/208 volts</u>

| | |
|---|---|
| Phase A | Black |
| Phase B | Red |
| Phase C | Blue |
| Neutral | White* |
| Ground | Green |

*Provide branch circuit neutral conductors with factory color coded markings or stripes identified for their associated phase conductor (white-black, white-blue, white-red) where individual neutral conductors are required.

D. Conductors shall be color identified at each outlet box, switchbox, junction box, pull box, cabinet, switchboard, transfer switch, distribution panel, etc.. Phase and neutral conductor sizes #6 AWG and smaller shall be factory color coded. Conductors #4 AWG and larger shall be identified by applying a 1" band of the proper colored waterproof plastic marking tape to each conductor 2" from the end

of the conductor. Low voltage and/or control wiring may be color coded also, but the colors shall not be those allocated to the main wiring system.

E. Common neutral branch circuits are not permitted. Provide separate, individual neutral conductors for all branch circuits, including receptacle and lighting circuits.

F. Metal Clad (MC) Cable with aluminum interlocked armor, copper conductors and an internal green insulated equipment grounding conductor may be used for branch circuits 30 amperes and less. Conductors shall be solid and stranded as specified herein, minimum #12 AWG, maximum #10 AWG with dual-rated THHN/THWN or XHHW 600V insulation, conductor color coding the same as Building Wire above. Use cable with individual neutral conductors where specified and/or required. Cable with individual neutral per phase design neutral conductors shall be provided with factory color coded neutral markings or stripes identified for their associated phase conductor (white-black, white-red, white-blue). MC cable with integral power and low voltage cable for lighting control is permitted. Connectors shall be zinc plated malleable iron or steel body with locknut, dual cable gripping saddle design with set screw and insulated throat. Pressure cast (pot metal) connectors are not permitted.

G. MC cable may be used exposed in electrical equipment rooms where branch circuits originate at panelboards, but cable shall be supported and neatly arranged above panelboards on steel ladder rack, width as required. Cable shall be strapped to ladder rack using approved, UV resistant plastic cable ties. Alternately, MC cable shall be transitioned to building wire and metallic raceway outside of the electrical equipment rooms in a junction box or wiring trough concealed above an accessible ceiling. If this method is utilized to convert MC cable to building wire and metallic raceway, provide screw connection, feed-through, modular type DIN rail terminal blocks for termination and extension of circuit conductors. Terminal blocks shall be rated 30A, 300VAC minimum, and higher as required by circuit ampacity and voltage, quantity as required for phase, neutral and equipment ground conductors. Wirenut and similar terminations are not permitted in splice boxes or panelboard interiors. All splices shall be clearly labeled and neatly trained as judged acceptable by the Engineer.

H. MC cable shall be supported in straight lines using approved supporting means and in compliance with the NEC. Dedicated support wires may be used above finished ceilings and shall be painted red prior to installation. Do not support cable with ceiling grid supports wires. Do not drape cable over ceilings, lighting fixtures, conduit, ductwork, piping or equipment. Do not "daisy-chain" connect lighting fixtures with MC cable.

I. Lighting control cable for dimming and occupancy sensor control shall be provided as required. Lighting control cable may be provided integral to MC cable, or discrete, as approved by the lighting controls manufacturer and as required by NEC Article 725. If discrete, cable shall be NEC Type CMP, in raceway from the switch outlet box to the accessible ceiling cavity, then free run to follow the lighting power system raceways to the fixtures controlled, be secured to the structure to

the plane of the lighting power raceway system, then supported by the lighting power raceway system using NEC approved cable ties installed on no more than six foot intervals, or less if required by Codes and the AHJ. Lighting control cable shall be plenum rated and be approved by the lighting controls manufacturer. It shall consist of a 2#18 AWG solid, violet and gray insulated conductors minimum with an outer jacket rating of 600V minimum. Cable outer jacket shall not be red. Cable shall be daisy chain connected to lighting fixtures or be taped in junction boxes installed at the same plane of the lighting power raceway system. Do not support cable with ceiling grid supports wires. Do not drape cable over ceilings, lighting fixtures, conduit, ductwork, piping or equipment. Daisy chaining cable at the ceiling level is not permitted.

J. The Contractor may provide aluminum conductors for service entrance and large feeders. Such conductors shall result in equal ampacity to the copper service entrance and feeders they replace. The contractor is responsible for obtaining written approval from the Architect/Engineer for all proposed changes prior to installation. Raceways shall be upsized and quantities increased as required to maintain service entrance and feeder ampacity. Installation shall conform to conductor and connector manufacturer's recommendations including oxide inhibitor use and properly torqued connections. Maintain all NEC required spacing inside cabinets at terminations.
   1. AA-8000 series aluminum conductors may be substituted for copper service entrance and feeder conductors in size #1/0 AWG and larger (i.e.; #3 AWG copper replaced with #1/0 AWG aluminum. Copper conductors in size #4 AWG and smaller shall remain copper.). Note typically smaller circuit conductors such as equipment ground conductors may be required to be copper.
   2. The maximum aluminum conductor size shall be 750 KCMil.
   3. All aluminum conductor terminations shall be made with machine applied compression connectors and individually field verified and certified in writing by the contractor to be installed per the conductor and equipment manufacturer's recommendations. Insulation shall be removed by "penciling" or using a manufacturer-approved insulation removal tool that does not nick the underlying conductor. Do not "ring cut" insulation. Wire brush the conductor and apply conductor manufacturer approved oxide inhibitor prior to terminating, unless the compression connector is prefilled with inhibitor, all as recommended by the manufacturer.

K. Do not bundle metal clad cable in a manner that requires the conductors be derated.

L. Conductors shall be spliced and tapped as follows:
   1. Solid branch circuit conductors shall be spliced in junction boxes and lighting fixtures using Ideal "Wing Nuts", T&B "Piggy" connectors or equal by Buchanan or AMP. Connectors rated at 150 degrees C. shall be used for recessed lighting fixture lead splices to branch circuit conductors. All compression type connectors shall meet requirements of applicable NEMA

standards and shall be UL approved. Crimp type connectors are not permitted.

2. Conductors #8 AWG and larger shall be stranded and joined by approved compression connectors. Joints shall be smoothly covered and shaped with rubber gum tape with a final cover of vinyl plastic electrical tape. In lieu of rubber gum and vinyl plastic tape, factory fabricated heat shrink tubing may be used. Connectors and insulating materials shall be Underwriter's Laboratories, Inc. approved. Compression lugs may be used in lieu of mechanical connectors on circuit breaker terminals, panelboard and switchboard line connections, etc., provided they are installed with properly sized Belleville type compression washers. In cases where long shank connectors extend from the point of connection and present a sizable amount of energized metal, a length of 90 degrees C. heat shrink tubing shall be installed to completely insulate the connector body. Taps may be insulated with adhesive insulating covers in lieu of rubber gum and vinyl plastic tape. Compression connector installing tools and dies, of hexagonal or circumferential type and made by the connector manufacturer, shall be used for installation. Tooling with color coded or die/connector coding systems for inspection purposes shall be used. Where UL listing is applicable for the connectors, the manufacturer's recommended tooling shall be used. Connector installing methods and compression pressure shall be as recommended by the connector manufacturer.
3. Joints in stranded conductors shall be spliced by approved mechanical connectors and insulated with vinyl mastic tape and covered with vinyl electrical tape, 3M Scotch Vinyl Mastic Tape 2210 and Scotch Vinyl Electrical Tape Super 88, respectively, or approved equal. Solderless mechanical connectors for splices and taps, provided with UL approved insulating covers, may be used instead of mechanical connectors plus tape.
4. Conductors shall not be spliced or tapped in interior wiring systems of any description using "split bolt" connectors. All conductors in interior wiring systems shall be continuous without splice between junction, outlet, or switch boxes. No splicing will be permitted in panelboard cabinets, safety switches, etc.

M. If the contractor elects to install junction boxes between branch circuit panelboard homeruns and the panelboard, conductor splices in the junction box must be via screw connection, feed-through, modular type DIN rail terminal blocks for termination and extension of circuit conductors. Terminal blocks must be physically secured t the junction box with metallic hardware, rated 30A, 300VAC minimum, and higher as required by circuit ampacity and voltage, quantity as required for phase, neutral and equipment ground conductors. Wirenut and similar terminations are not permitted in splice boxes or panelboard interiors. All splices shall be clearly labeled and neatly trained as judged acceptable by the Engineer.

N. Wire and cable shall meet the latest requirements of NEMA and IPCEA and shall be approved by the Underwriter's Laboratories, Inc.

O. Conductors in switchboards, panelboards, junction boxes, etc., shall be grouped together and laced with plastic cable ties in neat, substantial and approved manner. Do not tightly bundle conductors. Each conductor in junction boxes, etc., shall be permanently marked showing panelboard and circuit number in panelboard, room served, etc., with wire markers.

P. Conductors shall not pass through cabinets, switch enclosures, etc., unless intended for specific use within the cabinet or enclosure. Junction boxes or auxiliary gutters shall be used in such cases.

Q. Junction and/or pull boxes shall be furnished and installed where necessary to avoid excessive runs and/or too many bends between outlets. Not more than the equivalent of two (2) 90 degree bends will be allowed in any feeder circuit run or more than the equivalent of three (3) 90 degree bends will be allowed in any branch circuit run without junction or pull boxes being installed.

R. Where any conduit run passes a building expansion joint, furnish and install an expansion fitting, complete with copper bonding jumper.

S. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

T. A pull wire shall be left in each run of empty conduit. Pull wire shall be 14 gauge steel or approved nylon cord.

U. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.

V. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips that will not damage cables or raceway.

W. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

X. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.

Y. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

Z. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

16026 ELECTRICAL SERVICE SYSTEMS

Electrical service to the facility shall be 120/208 volts, three phase, four wires from the local utility company. Coordinate connections, location of utility company facilities, metering arrangement, etc. with the utility company. Provide empty conduits as directed by the utility.

16027 GROUNDING SYSTEMS

A. The neutral of each secondary electrical distribution system shall be grounded at one point only which shall be at the main disconnecting device(s). From the main disconnecting device(s), a copper grounding conductor sized in accordance with the NEC shall be extended to the earth electrode. Main grounding conductors #8 AWG through and including #4 AWG shall be insulated and identified by a green colored insulation. All grounding conductors shall be installed in conduit sized in accordance with the NEC. Conduit carrying a grounding conductor shall also be grounded at the earth electrode.

B. The earth electrode shall be:

1. The metallic domestic water piping system of the building. Install insulated copper grounding conductors, in conduit, from building's main service ground bar, to main metal water service entrances to building. Connection of the grounding conductor shall be made by an approved grounding clamp. The point of connection to the water system shall be within 6 inches of the entrance of the pipe inside the building or structure. Where dielectric unions are used in the water piping system, the grounding connection shall be made on the "street side" of the first such union in the system. A bonding jumper the same wire size as the grounding conductor shall be installed across the water piping connection such that the water meter may be removed without interrupting the grounding system continuity. Where no metallic domestic water piping system exists, the earth electrode shall be a ground rod with supplemental ground electrodes as defined below.
2. Ground Rods: ¾" Copper-clad steel, driven 11 feet into the earth where shown on the contract drawings or as required. The rods shall be connected to the system ground point on the water pipe by an insulated, green copper jumper in conduit. The jumper shall be sized in accordance with the NEC and the connection at the rod shall be brazed or exothermically welded. The points of connection to the earth electrode system shall be visible and accessible upon completion of construction. Sectional rods of the same size and length shall be used in multiple rod installations, if required by soil conditions.
3. The building steel and slab reinforcing steel as shown and as required by the NEC. Connection points shall be as directed by the Architect/Engineer.

C. The ground resistance of the earth electrode shall not exceed 5 ohms. The Electrical Contractor shall test the earth electrode using a standard three point ground resistance tester and shall advise the Architect/Engineer of the results of such tests in writing. Where tests show the resistance to ground exceeds 5 ohms, appropriate action shall be taken to reduce the resistance to 5 ohms, or less, by

driving additional ground rods or other approved methods. Compliance shall be demonstrated by retesting.

D. Grounding conductors shall be installed as to permit the shortest and most direct path from equipment to ground. All connections to ground conductors shall be accessible for inspection and made with approved solderless connectors, brazed or bolted to the equipment or structure to be grounded. All contact surfaces shall be thoroughly cleaned before connections are made to insure good metal to metal contact.

E. Equipment grounding continuity shall be maintained through flexible conduit as required in previous sections.

F. All wiring devices equipped with grounding connections shall be permanently and securely connected to the enclosure in which they are mounted with a copper grounding jumper.

G. The frame of all lighting fixtures shall be securely grounded to the equipment ground system with grounding conductors.

H. An equipment ground bus shall be installed in each panelboard for terminating equipment grounding conductors.

I. All equipment housings and/or enclosures, and all non-current carrying metallic parts of electrical equipment, raceway systems, etc., shall be effectively and adequately bonded to ground.

J. Provide separate, insulated conductor within each feeder and branch circuit raceway.

K. Equipment Grounding Conductor: The raceway system shall not be relied on for ground continuity. A green grounding conductor, properly sized per the NEC shall be run in all raceways. Terminate each end on suitable lug, bus, or bushing.

L. Boxes with concentric, eccentric or over-sized knockouts shall be provided with bonding bushings and jumpers. The jumper shall be sized per the NEC and lugged to the box. All metallic raceways entering or leaving panelboards (branch circuits less than 30 amperes in lighting and appliance branch circuit panelboards excepted), switchboards, transfer switches, enclosed circuit breakers, safety switches, transformers, pull boxes, splice boxes, etc. shall be provided with insulated grounding and bonding bushings and each separate piece of raceway shall be individually bonded to the equipment ground bus or metallic enclosure, as applicable, by means of copper conductor sized in accordance with the NEC.

M. Bonding bushings shall be steel or malleable iron, insulated, threaded type, zinc plated for interior use and galvanized for exterior use. Provide with dual rated tin plated saddle for use with bonding conductors and resilient plastic insulation throat liner with 150°C rating molded on over the metallic stop. All bushings shall be third

party testing agency approved and listed. Die cast zinc bushings are not acceptable.

N. An equipment ground bus shall be installed in each switchboard, panelboard, safety switch, etc. for terminating equipment grounding conductors.

O. Electrical Power Grounding Busbars: Third party testing agency listed and labelled. Grounding busbars shall be provided for single point termination of power distribution system grounding and bonding conductors as shown on the Drawings. Grounding busbars shall be tin plated solid copper factory drilled with a NEMA hole size and pattern for termination of two hole lugs, quantity as required with 25% spare, and be of the minimum dimensions shown on the Drawings. Provide with 600V standoff insulators, stainless steel mounting brackets and stainless steel hardware. Provide clear Lexan cover over connections.

P. Telecommunications Grounding Busbars: Comply with TIA-607-C and BISCI Standards. Grounding busbars shall be provided for single point termination of telecommunications system grounding and bonding conductors as shown on the Drawings. Grounding busbars shall be tin plated solid copper factory drilled with a BISCI hole size and pattern for termination of two hole lugs, quantity as required with 25% spare, and be of the minimum dimensions shown on the Drawings. Provide with 600V standoff insulators, stainless steel mounting brackets and stainless steel hardware. Provide clear Lexan cover over connections.

Q. Patient Care Areas Grounding: Wiring methods used in patient care areas (bedroom and bathrooms of each patient unit, patient treatment and exams rooms, etc.) shall be as defined and as required by NEC Article 517 with redundant grounding paths. Where Type MC cable is utilized in these areas, HCF Type MC cable shall be used.

R. Bond grounding terminal buses of the normal and essential branch circuit panelboards in accordance with NEC Art. 517.14.

S. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.

16028 FEEDER CIRCUITS

Feeder circuits shall be installed in conduit with 600V insulated conductors, size and number as indicated on the Contract Drawings. Conductors sizes #8 and larger are considered feeders.

16029 BRANCH CIRCUITS

Branch circuits shall be installed in conduit with 600V insulated conductors, size and number as indicated on the Contract Drawings. Conductor sizes #10 and smaller are considered branch circuits.

A. Toggle switches shall be single pole, three way or four way as indicated on the Contract Drawings. Switches shall be the grounding type, rated 20A, 120/277V, AC only. Switches shall be in color selected by Owner, coordinate device and device plate colors with other wiring devices, including telecom outlets, receptacles, etc. Devices on generator power shall be red in color. All switches shall have quiet operating mechanisms without the use of mercury switches. All switches shall be UL approved for the voltage and amperage indicated. Switches shall be Hubbell Model 1221/2/3/4 Series, Leviton 1221/2/3/4 or Pass and Seymour PS20AC1/2/3/4.

B. Wall box type rocker/decorator (Decora) style white plastic rocker switch with 0-10V dimmer preset slider for LED loads. Decora style white plastic with preset slider. Ratings: 120 277 volts AC, 8A minimum. Provide with 16A power pack for loads greater than 8A. Lutron DVSTV and DVTV or equal by Sensor Switch or Wattstopper.

C. Receptacles:
   1. Duplex receptacles in interior finished areas shall be in color selected by Owner, coordinate device and device plate colors with other wiring devices, including switches, telecom outlets, etc. (devices on generator power shall be red in color), of the grounding type, arranged for back and side wiring, with separate single or double grounding terminals. Receptacles shall be straight blade, rated 20A, 125V, and the face configuration shall conform to the NEMA Standard No. WDI.1-1968 and shall be UL approved.
   2. Self grounding or automatic type grounding receptacles are not acceptable in lieu of receptacles with separate grounding screw lugs and a green jumper connection to the grounding system.
   3. Receptacles shall be specification grade, mounted vertically and shall be Hubbell HBL5362, Leviton 5362 or Pass and Seymour 5362A. Receptacles in patient care areas shall be hospital grade, Hubbell #8300 series or equal by Leviton or Pass and Seymour. Ground fault circuit interrupting receptacles shall be Hubbell GFRWRST20, Leviton GFWT2 or Pass and Seymour 2097TRWR. Receptacles installed over counters, back-splashes, etc., shall be mounted horizontally.
   4. Provide tamper proof receptacles where required by Codes.

D. Occupancy Sensors: The Occupancy Sensor system shall sense the presence of human activity within the spaces indicated and fully control the "On" / "Off" function of the lighting loads automatically. Sensors shall turn "On" the load upon entrance into the room and shall not initiate "On" outside of entrance. Occupancy sensors shall utilize dual technology sensing. Acceptable technology is passive infrared (PIR), ultrasonic and microphonic. Dual technology is required utilizing PIR and one of the other technologies. Sensors shall automatically adjust time delays and sensitivity based on the activity level in the space. All switches shall be approved by a third party agency and approved for the voltage and current indicated. Sensors shall be compatible with all load types, including LED, electronic and

compact fluorescent ballasts and incandescent and require no minimum load. Match device body and handle type and colors specified above. Lutron, Sensor Switch or Wattstopper.

1. Wall switch line voltage sensors for small areas: Line voltage, single gang, wall mounted occupancy sensor switch with one override switch. Sensor shall recess into single gang switch box and fit a standard GFI receptacle plate opening. Provide in same colors as toggle switches. Switches shall be compatible with standard three and four-way toggle switches. Provide hard lens switches in storage rooms and other location subject to abuse. Adjustable time delay of 20 minutes, 180 degree field of view, minimum coverage area of 900 sf. Voltage: 120-277 volts ac, minimum load rating 800 watts at 120 vac, 1200 watts at 277 vac.
2. Ceiling mounted low voltage sensors for large areas: Low voltage, recess ceiling mounted occupancy sensor switch shall operate in conjunction with a line voltage power pack to control the connected lighting loads. Sensors shall operate on a Class 2, three-conductor cable system. Multiple sensors shall be connectable to a single power pack. Sensor shall recess into a two gang outlet box. Adjustable time delay of 1 - 15 minutes. Power packs shall be rated 20A at 120-277 volts and shall be compatible with all load types including LED, electronic and compact fluorescent ballasts and incandescent and require no minimum load. They shall have the capacity to power additional remote heads or additional relays. Power packs may be paralleled to accommodate extra load or more than three heads or additional relays. Additional relay shall be used where there is more than one circuit being controlled or where there is a need to control multiple voltages.
3. Wall box low voltage sensor/dimmer switches for small areas: Low voltage, single gang, wall mounted occupancy sensor switch 0-10v dimmer with one override or two (as shown) switch(es). Switch shall recess into single gang switch box and fit a standard GFI receptacle plate opening. Switches shall be compatible with standard three and four-way toggle switches. Provide hard lens switches in storage rooms and other location subject to abuse.

E. Cover plates for flush mounted wiring devices and for telephone outlets shall be single and combination, of types, sizes and with ganging and cutouts as indicated. Provide plates which mate and match with wiring devices to which attached. Material shall be white smooth nylon as manufactured by the device vendor. Cover plate mounting screws shall be slotted head oval and shall match the finish of the plate.

F. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets. Use cast box covers and plates on cast boxes.

G. Exterior mounted receptacles, and those noted to be weatherproof, shall be provided with weatherproof PVC transparent cover plates, standard size, and shall be single or ganged as indicated on the contract drawings. Weatherproof plates

shall be "approved" third party listed as "raintight while in use". Special wiring devices shall be as shown on the Drawings.

H. Connect receptacles by utilizing back wiring provisions only. Do not use side wire terminals.

I. Provide adhesive backed, laminated plastic receptacle device plate labels identifying the circuit feeding the device. Labels shall be label machine printed to indicate panel and circuit number and shall be Casio, Brother, T&B or approved equal.

J. All wiring devices shall be installed at heights as required by the ADA.

K. All wiring devices on Life Safety or Critical power shall be red in color.

L. Patient locations. Receptacles at the bed locations, patient room headwalls, patient treatment areas and exam rooms shall be hospital grade.

16031 SAFETY SWITCHES AND MOTOR CONTROL DEVICES

A. Safety switches shall be general duty (residential plug-type not acceptable) and heavy duty where noted, and shall be sized as indicated on the Contract Drawings. Fusible switches shall have rejection clips when fuses are specified to be rejection type. Current carrying components, lugs, bus, etc. shall be copper, brass, bronze or similar alloy. Aluminum material is not acceptable. Fusible disconnect switches supplying motor loads shall be provided with dual element fuses, and all fuses shall be sized as indicated on the Contract Drawings or as required by the load. Fuses in switches supplying power to mechanical equipment shall be furnished and installed by the Mechanical Contractor. Switches shall be so designed that the access door cannot be opened with the switch in the "on" position. This safety lock on the access door shall be provided with an override mechanism arranged to release the door when operated with a screwdriver or knife blade. The exterior operating handle shall be provided with a means of padlocking in either the "off" or "on" positions. Safety switches shall be UL approved for the voltage and amperage of the circuit on which they are used and shall be as manufactured by ABB/General Electric, Eaton, Siemens or Square D Schneider. Electrical distribution equipment including switchboards, panelboards, safety switches, enclosed circuit breakers, surge protection devices, etc. shall be furnished by the same manufacturer.

B. Where a safety switch or an enclosed circuit breaker is installed ahead of a motorized piece of equipment having a separate source of power for the control circuit, the safety switch or circuit breaker shall be equipped with an auxiliary contact (interlock) for the control circuit.

C. Motor controls shall be as indicated on the Drawings and as manufactured by ABB/General Electric, Eaton, Siemens or Square D Schneider. Each controller shall have a replaceable bimetallic thermal overload relay of proper rating in each phase leg. Furnish and install push buttons, pilot lights, HOA switches, auxiliary

contacts, control circuit transformers, etc., as shown and/or required. Control voltage shall be 120 VAC unless otherwise noted.

D. Fractional horsepower motor disconnect and starter switches shall be flush mounted and/or surface mounted and shall have steel cover plates. The switch enclosure shall be NEMA Type 1. The switches shall be one or two pole and shall be provided with overload motor running protection if required by the equipment. Overload relay units shall be furnished and installed by Electrical Contractor to suit the motor controlled. An indicating pilot light shall be provided in the cover plate of the voltage to suit the circuit on which the switch is used. Switches shall be motor rated and shall be UL approved and as manufactured by ABB/General Electric, Eaton, Siemens or Square D Schneider.

16032 SWITCHBOARDS

A. Switchboards shall comply with UL 891 and NEMA PB 2. Switchboards shall be dead front type, completely metal enclosed, self-supporting structure independent of wall supports. Ratings shall be as indicated on the Drawings. They shall consist of the required number of vertical sections bolted together to form one rigid switchboard. Engraved nameplates shall be furnished for all main and feeder circuits. All bus bars shall be tin-plated copper. All bus work shall be rated to withstand maximum short-circuit stresses when connected to a supply system having fault capacity of indicated on the Drawings. Provide full capacity neutral and ground bus. Furnish cable pull sections or top cable pull boxes, where required, complete with cable tie down supports.

B. Main Circuit Breakers and Circuit Breakers 1200A and larger shall be solid-state trip insulated case type, stationary mounted, with electronic sensing, timing and tripping circuits for adjustable current settings. Electronic trip units shall be provided with external, permanently-mounted power supplies in the gear where required to program trip units while the breakers are deenergized. Trip units shall be field-programmable with an internal display for programming and display and have:
   1. Adjustable instantaneous trip.
   2. Adjustable long time pickup and delay.
   3. Adjustable short time pickup and delay.
   4. Arc energy reduction mode with external switch and indicator (all 1200A circuit breakers in compliance with NEC Art. 240.87).
   5. Include shunt trip, undervoltage release, and other accessories where indicated. See Section 16036.
   6. Display line currents and cause of trip.

C. Branch Circuit Breakers (less than 1200A and where required by the Coordination Study) shall be solid-state trip molded case type, panel mounted, NEMA AB 1, with electronic sensing, timing and tripping circuits for adjustable current settings. Electronic trip units shall be provided with external, permanently-mounted power supplies in the gear where required to program trip units while the breakers are deenergized. Trip units shall be field-programmable with an internal display for

programming and display and have:

1. Adjustable instantaneous trip.
2. Adjustable long time pickup and delay.
3. Adjustable short time pickup and delay.
4. Include shunt trip, undervoltage release, and other accessories where indicated.
5. Display line currents and cause of trip.

D. All circuit breakers shall be fully rated.

E. Line and Load Terminations: Accessible from the front of the switchboard for maintenance and suitable for the conductor materials and sizes indicated. Provide auxiliary sections as shown or as required for terminations.

F. Ground Bus: Extend full length of switchboard.

G. Provide Kirk Key interlocks as shown on the Drawings.

H. Future Provisions: Fully equip spaces for future devices with bussing and bus connections, suitably insulated and braced for short circuit currents. Provide continuous current rating as indicated.

I. Enclosure: Type 1 - General Purpose.

1. Align sections at front only.
2. Switchboard Height: 96 inches, excluding floor sills, lifting members and pull boxes.
3. All exterior and interior steel surfaces of the switchboard shall be properly cleaned and finished with gray enamel over a rust-inhibiting phosphatized coating. Color shall be ANSI 61 gray.
4. Finish: Manufacturer's standard light gray enamel over external surfaces. Coat internal surfaces with minimum one coat corrosion-resisting paint, or plate with cadmium or zinc.
5. Mimic Bus: Show bussing, connections and devices in single line form on the front panels of the switchboard using blue color factory painting, or approved equivalent means.

J. Switchboards and switchboard circuit breakers shall be manufactured by ABB/General Electric, Eaton, Siemens or Square D Schneider. Electrical distribution equipment including switchboards, panelboards, safety switches, enclosed circuit breakers, surge protection devices, etc. shall be furnished by the same manufacturer.

K. Connections: Tighten field connected connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL 486A.

L. The switchboard shall be provided with a front mounted, digital power quality meter / analyzer package connected to the main service conductors. The metering shall include a lighted LCD display of voltage, current, power, kVA, kVAR, power factor, frequency, total harmonic distortion, kW demand, amperes demand, kWH, kVARH, auxiliary voltage input and neutral current. Phase switching shall be provided and the display shall indicate the phase being displayed. The meter shall have an RS485 Modbus port for Owner interface. Provide all voltage and current transformers required to provide the above data. The metering/analyzer package shall be Eaton PXM 1000 or equivalent by General Electric/ABB, Siemens or Square D/Schneider. Install at 60" AFF to bottom of the meter.

M. Adjust circuit breaker trip and time delay settings to values as prescribed by the Coordination Study. Prior to final settings, adjust circuit breaker trip and time delay settings to minimum values that do not cause false tripping.

16033 PANELBOARDS

A. GENERAL

1. Panelboards shall be of the totally enclosed, dead front type provided with main disconnecting and protective devices and/or lugs only as indicated on the Contract Drawings or as required. Panelboard bus bars shall be of copper, rated as indicated on the Contract Drawings, and one and two and three pole branch circuit breakers shall be provided as indicated in the panel schedules.

2. Panelboard cabinets shall be fabricated from materials meeting the requirements of the NEC and UL and shall be so marked or labeled. Cabinets shall not have pre-punched concentric or eccentric knockouts. Trims shall be designed for flush or surface mounting, as noted in the panel schedules, be of the hinged type, and shall be provided with flush latches and locks.

3. All panelboards shall have locks and all locks shall be keyed alike. Deliver all keys to the Owner at the time of final inspection.

4. A typewritten schedule shall be provided for and installed in each panelboard. Schedule shall indicate location and usage of circuits such as "Receptacles Room 101", "Lobby Lights", "Exhaust Fan EF-1-3/4 HP", etc. The schedule shall be installed in a framed clear plastic holder permanently attached to the back of the hinged access door. Final typed panelboard directories installed in the panelboard door pocket shall include final actual room names and numbers in addition to the general description shown on the panel schedules on the drawings. Revise directory to reflect circuiting changes required to balance phase loads.

5. Ground and bond panelboard enclosure per NEC Art. 517.

6. Description: NEMA PB 1, circuit breaker type.

7. Service Conditions:
   1. Temperature: 104° F. (40° C.).
   2. Altitude: N/A.
   3. Terminal Rating: 75° C. minimum.

8. Panelboard Bus: Copper, ratings as indicated. Provide 100% copper ground and neutrals buses in each panelboard. Provide insulated ground bus where scheduled.

9. Minimum integrated short circuit rating: 10,000 amperes rms symmetrical for 208 volt panelboards, or as indicated.

B. Distribution Panelboard Circuit Breakers: NEMA AB 1, bolt-on or plug-on (Square D I-Line and similar only) type.
   1. Circuit breakers in distribution panelboards shall be fully rated.
      a. Solid state Trip Molded Case Main and Branch Circuit Breakers (100 amperes and larger or where required by the coordination study): Panel mounted, NEMA AB 1, with electronic sensing, timing and tripping circuits for adjustable current settings. Electronic trip units shall be provided with external, permanently-mounted power supplies in the gear where required to program trip units while the breakers are deenergized. Trip units shall be field-programmable with an internal display for programming and display and have:
      b. Adjustable instantaneous trip.
      c. Adjustable long time pickup and delay.
      d. Adjustable short time pickup and delay.
      e. Arc energy reduction mode with external switch and indicator (all 1200A and larger circuit breakers in compliance with NEC Art. 240.87).
      f. Include shunt trip, undervoltage release, and other accessories where indicated. See Section 16036.
      g. Display line currents and cause of trip.
   2. Molded Case Circuit Breakers: Circuit breakers with integral thermal and instantaneous magnetic trip in each pole.
   3. Circuit Breaker Accessories: Trip units and auxiliary switches as indicated.

C. Branch Circuit Panelboard Circuit Breakers: NEMA AB 1, bolt-on type.
   1. Circuit breakers shall be fully rated.
   2. Solid-state Trip Molded Case Main Circuit Breakers: Panel mounted, NEMA AB 1, with electronic sensing, timing and tripping circuits for adjustable current settings. Electronic trip units shall be provided with external, permanently-mounted power supplies in the gear where required to program trip units while the breakers are deenergized. Trip units shall be field-programmable with an internal display for programming and display and have:

a. Adjustable instantaneous trip.
b. Adjustable long time pickup and delay.
c. Adjustable short time pickup and delay.
d. Include shunt trip, undervoltage release, and other accessories where indicated.
e. Display line currents and cause of trip.

3. Molded Case Branch Circuit Breakers: Thermal magnetic trip circuit breakers, with common trip handle for all poles, listed as Type SWD for lighting circuits and Class A ground fault interrupter circuit breakers where scheduled. Do not use tandem circuit breakers. Provide arc fault circuit breakers as indicated and/or required by Codes.

D. Enclosure: NEMA PB 1, Type 1 or Type 3R.

E. Cabinet Box: 6 inches deep, 20 inches wide for 240 volt and less panelboards.

F. Cabinet Front: Flush and Surface cabinet front door-in-door type with concealed trim clamps, concealed hinge, metal directory frame, and flush lock all keyed alike. Finish in manufacturer's standard gray enamel. Distribution panelboards larger than 400 amperes are not required to have hinged trims.

G. Panelboards and panelboard circuit breakers shall be manufactured by ABB/General Electric, Eaton, Siemens or Square D Schneider. Electrical distribution equipment including switchboards, panelboards, safety switches, enclosed circuit breakers, surge protection devices, etc. shall be furnished by the same manufacturer.

H. Adjust circuit breaker trip and time delay settings to values as prescribed by the Coordination Study. Prior to final settings, adjust circuit breaker trip and time delay settings to minimum values that do not cause false tripping.

16034 ENCLOSED CIRCUIT BREAKERS

A. Circuit breakers shall be molded and/or insulated case type, UL and CSA listed, IEC 157-1 rated and shall meet NEMA Standard AB1-1975 and Federal Specification W-C-375B/GEN as applicable. Circuit breakers shall be rated as shown on the Drawings with appropriate withstand ratings and current limiting characteristics as required to safely function and protect the distribution system. Breakers shall be ABB/General Electric, Eaton, Siemens or Square D Schneider. Electrical distribution equipment including switchboards, panelboards, safety switches, enclosed circuit breakers, surge protection devices, etc. shall be furnished by the same manufacturer.

B. Enclosed circuit breakers shall be sized as indicated on the Contract Drawings. Enclosures shall be NEMA-1 for interior use and NEMA-3R galvanized for exterior applications, unless noted otherwise. Interior enclosures in finished areas shall be provided with flush trim.

C. Enclosed circuit breakers shall be molded case type with overcenter toggle type mechanisms, providing quick make, quick break action. Breakers shall be calibrated for operation in an ambient temperature of 40 degrees C. Each circuit breaker shall have trip indication by handle position and shall be trip free. Two and three pole breakers shall be common trip. Each circuit breaker shall have a permanent trip unit containing individual thermal and magnetic trip elements in each pole. Circuit breakers with frame sizes greater than 100 amperes shall have variable magnetic trip elements set by a single adjustment. A push-to-trip button shall be provided on the cover for mechanically tripping the circuit breaker. The circuit breaker shall have reverse connection capability and be suitable for mounting and operating in any position.

D. Where required by the Coordination Study, enclosed circuit breakers shall be solid state trip molded or insulated case type with electronic sensing, timing and tripping circuits for adjustable current settings. Electronic trip units shall be provided with external, permanently-mounted power supplies in the gear where required to program trip units while the breakers are deenergized. Trip units shall be field-programmable with an internal display for programming and display and have:
   1. Adjustable instantaneous trip.
   2. Adjustable long time pickup and delay.
   3. Adjustable short time pickup and delay.
   4. Arc energy reduction mode with external switch and indicator (all 1200A and larger circuit breakers in compliance with NEC Art. 240.87).
   5. Include shunt trip, undervoltage release, and other accessories where indicated.
   6. Display line currents and cause of trip.

E. Provide with arc flash reduction mode with external switch and indicator (all 1200A circuit breakers in compliance with NEC Art. 240.87).

F. Circuit breakers shall have removable lugs. Breakers shall be UL listed for installation of mechanical or compression type lugs.

G. Accessories shall be provided as noted or required and shall be UL listed and field installable.

16035 ENGINE-GENERATOR SET

A. Provide a packaged diesel engine-generator set in a sound-attenuating, weather-protective enclosure. The set shall be UL 2200 listed and the installation shall comply with NFPA 70, NFPA 99, NFPA 101 and NFPA 110. The Engine-Generator Set shall be manufactured by Caterpillar, Cummins or MTU.

B. Shop Drawings: Indicate electrical characteristics and connection requirements. Show plan and elevation views with overall and interconnection point dimensions, fuel consumption rate curves at various loads, ventilation and combustion air requirements, electrical diagrams including schematic and interconnection diagrams. Also provide:

1. A complete Bill of Materials for all components.
2. Dimensioned plan and elevation drawings of the engine-generator set.
3. Dimensioned plan and elevation drawings of the sub-base fuel tank.
4. Dimensioned plan and elevation drawings of the gen set enclosure. Provide dimensions from the centerline of the top control panel switch and the output circuit breaker handle(s).
5. Dimensioned plan, details and elevation drawings and proposed materials of the access platform and stairs, if required.

C. Product Data: Provide data showing dimensions, weights, ratings, interconnection points, and internal wiring diagrams for engine, generator, control panel, battery, battery rack, exhaust silencer, vibration isolators, sub-base fuel tank, weather resistant housing, remote annunciator, etc.

D. Test Reports: Indicate results of performance testing.

E. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of Product.

F. Manufacturer's Certificate: Certify that Products meet or exceed specified requirements.

G. The engine-generator set shall have been manufactured and successfully operated in similar service for a period sufficient to thoroughly establish its reliability.

H. The engine-generator set shall provide back-up power for the emergency and normal power distribution systems during utility power outage. Power outage sensing, generator starting, transfer of load, re-transfer to normal power and engine cool-down running time shall be completely automated and shall not require attended operation.

I. Engine:
1. Type: Water-cooled inline or V-type, two or four stroke compression ignition Diesel engine.
2. Fuel System: No. 2 diesel fuel oil (ASTM D396).
3. Engine speed: Not to exceed 1800 rpm.
4. Governor: Isochronous type to maintain engine speed within 0.25 percent, steady state, and 5 percent, no load to full load, with recovery to steady state within 2 seconds following sudden load changes.
5. Engine shutdown on high water temperature, low water level, low oil pressure, overspeed, and engine overcrank. Limits as selected by manufacturer.
6. Engine Starting: DC starting system with positive engagement, number and voltage of starter motors in accordance with manufacturer's instructions. Include remote starting control circuit, with MANUAL-OFF-REMOTE

selector switch on engine-generator control panel.

7. Engine Jacket Heater: Thermal circulation immersion type water heater with integral thermostatic control, contactor in a NEMA rated enclosure, sized to maintain engine jacket water at 120°F, and suitable for operation on 120 or 208 volts AC as shown. Heater shall be disconnected while the engine is running.
8. Radiator: Provide a closed recovery cooling system with sufficient capacity to cool the engine when the generator set is delivering full rated load at a minimum ambient temperature of 110°F (43°C). Radiator, fan, engine driven centrifugal water pump and thermostatic valve shall be provided and the system protected against freezing and corrosion. Radiator air flow restriction 0.5 inches of water (1.25Pa) maximum, external to the radiator.
9. Engine Accessories: Fuel filter, lube oil filter, intake air filter, lube oil cooler, manual fuel priming pump, fuel shut-off solenoid, gear-driven water pump, a fuel transfer pump (if needed to lift the fuel from the fuel tank) and a replaceable fuel filter element conveniently located for servicing. Include fuel pressure gauge, water temperature gauge, and lube oil pressure gauge on engine/generator control panel.
10. Lubricating System: The engine shall have a lubricating oil pump for supplying oil under pressure to the main bearings, crank pin bearings, pistons, piston pins, timing gears, camshaft bearings and valve rocker mechanism. Full flow oil filters, conveniently located for servicing shall be provided. Lube oil drain extension and valve terminated on the outside of the generator base shall be provided.
11. Mounting: Provide unit with manufacturer's designed vibration isolation for mounting on structural steel base, which shall allow mounting to a raised concrete pad or to a sub-base fuel tank. Anchor bolts and vibration isolators shall be used to mount the steel base to the concrete pad. Vibration isolators shall be one piece units, resistant to corrosion and environmental degradation. When sub-base fuel tanks are specified, vibration isolators shall be located between the generator set and the sub-base fuel tank.

J. Generator: NEMA MG1, three phase, four wire, reconnectible brushless synchronous generator with brushless exciter, revolving field type, close coupled or directly coupled to the engine flywheel. The generator shall have a single ball bearing support for the rotor and the rotor shall be dynamically balanced up to 25% overspeed.

1. Standby rating: No less than 750 kW/937.5 kVA, at 0.8 power factor, 208/120 volts, 60 Hz at 1800 rpm.
2. Insulation Class: H.
3. Temperature Rise: 125°C Standby.
4. Enclosure: NEMA MG1, open drip proof. Provide with anti-condensation heater.
5. Voltage Regulator: Shall be of solid state design and provide voltage-per-hertz operation to match engine and generator characteristics, with voltage regulation plus or minus 1 percent from no load to full load. Steady state voltage modulation shall not exceed one cycle per second. For any addition of load up to and including 90% of rated, the voltage shall recover

to and remain within the steady band in not more than 1.5 seconds. Frequency regulation from no load to rated load shall conform with engine governor performance. For any addition of load up to 90% of rated load, the frequency shall recover to the steady state frequency within 5 seconds. Include manual controls to adjust voltage droop, voltage level (plus or minus 5 percent) and voltage gain. Regulator to be mounted on top or side of the generator and enclosed in a NEMA rated enclosure. An isolation transformer in the voltage regulator circuit shall be provided, or a permanent magnet exciter.

K. The minimum rating of the engine-generator set specified is estimated. The Contractor shall provide an engine-generator set of sufficient capacity for starting and continuous operation of the loads shown in the Engine-Generator Set Load Summary on the Drawings in three steps (Step 1: all Life Safety loads, Step 2: all Delayed Critical loads, Step 3: Equipment loads), not to exceed twenty (20) percent voltage dip and without set overload. Provide detailed documentation of set capacity and voltage dip calculations with shop drawings.

L. Sound attenuated, weather protective enclosure: UL2200 listed, non walk-in, reinforced, 14 gauge minimum aluminum powder painted housing with locked, hinged side (and end, if required) access panels providing maintenance access to the engine and generator, output circuit breakers, control panel and all service points, with tamper resistant, lockable side and rear doors and panels.

1. Include spring open, motor shut intake and exhaust air louvers, battery rack, and internally-mounted silencer. Provide non-hydroscopic sound insulated interior panels with metal perforated skin. Provide thermal Insulation, manufacturer's standard materials and thickness selected in coordination with block heater to maintain winter interior temperature within operating limits required by engine-generator-set components.
2. Enclosures shall be primed and finish painted in a color as selected by the Architect. Hardware, latches and hinges shall be stainless steel. Roof shall be peaked to allow drainage of rain water. Unit shall have sufficient guards to prevent entrance by rodents and small animals.
3. Sound attenuation shall be Level II (maximum of 73 dbA maximum at 7 meters). Exhaust gasses and cooling air shall be discharged vertically.
4. Provide weatherproof exterior emergency stop pushbutton and exterior oil and coolant drains with interior valves.
5. Provide a minimum of three watertight, impact-resistant, general illumination, 120VAC LED lighting fixtures with a minimum 5,000 lumens output each, a weatherproof GFCI convenience receptacle and a weatherproof switch for the lighting. Position the lighting fixtures to illuminate the housing interior and controls. Power from the circuits indicated on the Drawings.
6. Provide a minimum of three watertight, impact-resistant, general illumination, 12VDC LED lighting fixtures with a minimum 2,000 lumens output each, switched with a 0-60 minute adjustable timer switch. Position the lighting fixtures to illuminate the housing interior and controls. Power from the generator DC battery bus.

7. Provide space heating as required to maintain no less than 40°F in the enclosure. Heating shall be deenergized when the generator is operating and during cool down.
8. Provide permanent access platform, stairs and handrails for access to controls and circuit breakers to maintain no greater than 6'-7" to top of any control device or circuit breaker handle, and for maintenance access via enclosure access panels. Stair and platform shall be hot dip galvanized, aluminum and/or structural fiberglass and shall comply with OSHA and all local jurisdiction requirements. Platform shall provide for 180 degree "full swing opening" of all side (and end, if required) service doors and at least 135 degree opening of the control panel door.
9. Enclosure housing and sub-base fuel tank shall be suitably constructed to withstand debris impact and 150 mph wind loads. Provide documentation of wind rating with shop drawings.

M. Skid-Mounted Sub-base Fuel Tank: UL 142 listed, welded steel tank, with fill and vent, minimum capacity 96 hours engine-generator run time at full load, or 7,000 gallons, whichever is greater. The tank shall be factory installed, piped and connected in accordance with the manufacturer's installation instructions, NFPA 37 and the North Carolina State Building and Mechanical Codes. Provide all Code-required accessories. The unit shall have the structural integrity to support the generator set and associated components. It shall include, but not be limited to, the following: heavy gauge steel double wall tank with all welded construction, prime coated and non-corrosive finished gloss black painted outside, 110% primary tank capacity secondary containment, internal baffles to separate hot fuel return from the engine from cooler fuel supplied to the engine, fuel fill containment device, lockable fuel filler cap, low fuel level alarm switch, fuel level gauge, inter-tank leak detection alarm switch, fuel line check valve, tank drains for primary and containment, threaded pipe connections and all other accessories required for proper operation. Normal and emergency venting ports. Tank shall have proper number and size fittings with proper overhead clearance to accommodate the remote fill system, tank probe, and remote vents. Tank shall have a minimum interior height of 18" and shall have a tank extension a minimum of 18" beyond the footprint of the generator and be the full width of the tank. Also, all vents and other required fittings shall be located in this tank extension area with no internal bracing or other interior obstructions below the fill and probe fittings. Provide and install a spill containment device at the end of the fill pipe in accordance with North Carolina State Building Code (NCSBC).

N. Exhaust Silencer: Super critical grade silencer to reduce engine exhaust noise in accordance with dBA requirements listed above, with muffler companion flanges and seamless flexible stainless steel exhaust connector, sized in accordance with engine manufacturer's instructions. The silencer shall be all-welded heavy duty carbon steel construction and shall include a compressed thermal/acoustical insulation packed shell. In addition to its acoustical values, the two (2) inch minimum thick packed shell shall be provided to reduce the outer surface temperature.

O. Exhaust Piping: Manufacturer's standard for factory supplied enclosure.

P. Batteries: Heavy duty, diesel starting type lead-acid storage batteries capable of four 15 second cranks followed by a 15 second rest period at 0°F. Match battery voltage to starting system. Include necessary cables and clamps. Provide battery heater with integral thermostatic control sized to maintain battery at manufacturer recommended temperature. Heater shall be disconnected while the engine is running.

Q. Battery Tray: Treated for electrolyte resistance, constructed to contain spillage.

R. Battery Charger: Automatic solid state, current limiting, float equalizing type designed to float at 2.17 volts per cell and equalize at 2.33 volts per cell. Minimum continuous output of 10 amperes DC. Charger shall be capable of recharging a completely discharged battery in a maximum of 8 hours. Include overload protection, voltage surge suppressors, full wave rectifier, DC voltmeter and ammeter, low DC voltage alarm relay, malfunction alarm contact, and 120 volt AC fused input. Provide in NEMA-1 enclosure installed inside the generator set enclosure.

S. Remote Emergency Stop Switch: Weatherproof, surface wall mounted, unless otherwise indicated, remote from and in sight of the engine-generator set and labeled with an engraved, three layer, laminated plastic nameplate "GENERATOR EMERGENCY STOP". Push button shall be protected from accidental operation. The switch and installation shall be compliant with NFPA 110, section 3-5.5.6

T. Line Circuit Breaker: A single insulated case circuit breaker on generator output, as shown on the Drawings, with integral LSI solid state trip unit, sized in accordance with NFPA 70. Include battery-voltage operated shunt trip, connected to open circuit breaker on engine failure and as commanded by the automatic transfer switches (see Section 16036). Provide with Kirk Key interlock with Dual Purpose Docking Station and arc energy reduction mode with external switch and indicator for 1200A and larger circuit breakers in compliance with NEC Art. 240.87. Unit mount circuit breaker in enclosure to meet NEMA 250, Type 1 requirements.

U. Provide systems to electrically supervise starting controls as required by Codes.

V. Engine-Generator Control Panel: NFPA-110 Table 5.6.5.2 compliant, NEMA 250, Type 1 generator mounted control panel enclosure with engine and generator controls and indicators. Include provision for padlock and the following equipment, features and functionality:
   1. Frequency Meter: Digital, 45-65 Hz. range.
   2. AC Output Voltmeter: Digital, 2 percent accuracy, with phase selector switch.
   3. AC Output Ammeter: Digital, 2 percent accuracy, with phase selector switch.
   4. AC wattmeter, digital.
   5. Output voltage adjustment.

6. Push-to-test indicator lamps, one each for low oil pressure, high water temperature, low water level, overspeed, and overcrank.
7. Engine start/stop selector switch.
8. Engine running time meter.
9. Oil pressure gauge.
10. Water temperature gauge.
11. Auxiliary Relay: 3PDT, operates when engine runs, with contact terminals prewired to terminal strip.
12. Additional visual indicators and alarms as required by NFPA 110.
13. Remote Alarm Contacts: Pre-wire SPDT contacts to terminal strip for remote alarm functions required by NFPA 110 for a Level 1 system.

W. Remote Annunciator Panel: NFPA-110 Table 5.6.5.2 compliant, flush mounted panel with painted finish and silk-screened lettering, in manufacturer's standard color. Provide alarm horn, and indicators and alarms as follows:
1. High battery voltage (alarm).
2. Low battery voltage (alarm).
3. Low fuel (alarm).
4. Intertank leakage.
5. Battery charger malfunction.
6. System ready.
7. Anticipatory-high water temperature.
8. Anticipatory-low oil pressure.
9. Low coolant temperature.
10. Mode switch not in auto position (alarm).
11. Overcrank (alarm).
12. Emergency stop (alarm).
13. High water temperature (alarm).
14. Overspeed (alarm).
15. Low oil pressure (alarm).
16. Line power available.
17. Generator power available.
18. Lamp test and horn silence switch.
19. Emergency stop switch.
20. Additional visual indicators and alarms as required by NFPA 110 for a Level 1 system.

X. Load Bank Test: Comply with NFPA 110 testing requirements and sequence. Provide a full load test utilizing a portable resistive load bank for four hours minimum for each engine-generator set. Each test shall be performed at the job site in the presence of the Owner and Architect. The capability of the system to pick up full standby service load within 10 seconds of power outage shall also be demonstrated. After testing is complete:
1. A copy of the generator test report shall be submitted to the Architect/Engineer and the Owner.
2. Test results shall record the following parameters in 20 minute intervals during four hour test:
   1) Kilowatts.

2) Amperes.
3) Voltage.
4) Coolant temperature.
5) Ambient temperature.
6) Frequency.
7) Oil pressure.
8) Fuel flow.

Y. Building Loads Test: Comply with NFPA 110 testing requirements and sequence. Simulate power outage, including operation of the automatic starting cycle, and automatic shutdown and return to normal, by interrupting normal source, and demonstrate that system operates with actual building loads to provide standby power. The test shall demonstrate the capability of the engine-generator set to operate the loads stated on the Drawings. Test all alarm and shutdown circuits by simulating conditions. Test duration shall be one hour minimum.

Z. A full tank of fuel shall be provided, replacing any fuel used for testing. Diesel fuel shall be treated with an alcohol-free additive to disperse water and clean injectors.

AA. Demonstrate NEC required supervision of generator sets starting circuits.

BB. Training: Prior to final acceptance, the manufacturer's authorized representative shall provide comprehensive training and thoroughly and competently instruct the Owner's designated personnel in proper operation of the system and in all required periodic maintenance. Training shall include, but not be limited to, operation (all aspects including normal and emergency modes), maintenance and troubleshooting of the equipment. A minimum of eight (8) hours on-site time, in addition to load bank testing, shall be allocated for this purpose.

CC. Documentation: Upon final completion of the system, a documentation package shall be provided and shall include three (3) bound (in three ring binders with index tabs) copies of complete manufacturer's operation and instruction manuals. Provide one bound original (no photocopies) and two additional bound copies (photocopies are acceptable) of the total documentation package. The manuals shall include operation and maintenance procedures, complete parts lists, dimensional drawings, unit wiring diagrams and schematics, and interconnection wiring drawings. Include instructions for routine maintenance requirements, service manuals for engine and day tank, oil sampling and analysis for engine wear, and emergency maintenance procedures. The following shall also be provided:
1. System record drawings.
2. Instruction manuals as supplied by the manufacturer for all components and electronics.
3. Product specification sheets for all equipment without instruction manuals.

DD. Cleaning: Clean installed work under provisions of the General and Supplemental General Conditions and Division 1 Specifications Sections.
1. Touch up scratched or marred surfaces to match original finish.

2. Clean engine and generator surfaces. Replace oil and fuel filters.

EE. Warranty: The Contractor shall provide the following minimum manufacturers factory warranty for each engine-generator set and associated equipment:
1. All equipment shall be new and warranted free of faulty workmanship and damage.
2. The warranty shall include all parts, labor (including travel with no travel time or distance limitations), expenses and equipment necessary to perform replacement and/or repairs.
3. The total system (parts and labor) shall be warranted free of defects for a period of one (1) year from date of final acceptance.
4. Replacement of defective materials and repair of faulty workmanship shall take place within 48 hours of notification by Owner and shall be guaranteed at no cost to the Owner during the warranty period.
5. The minimum warranty provisions specified above shall not diminish the terms of individual equipment manufacturer's warranties.
6. The printed warranty shall be included in the O&M manual.

FF. Final Acceptance: The installation shall be supervised, checked and tested by a qualified representative of the engine-generator set manufacturer. Written certification, by the qualified manufacturer's representative, verifying manufacturer's startup procedures were followed and full system functionality was achieved shall be submitted to the Architect and Owner prior to final acceptance.

GG. Maintenance service: Provide service and maintenance of generator set for one year from date of substantial completion. A minimum of two visits to site for inspection of unit shall be completed during this time period. A written report of these visits shall be provided to the owner.

## 16036 AUTOMATIC TRANSFER SWITCHES

A. Automatic transfer switches shall be electrically operated, mechanically held, closed transition. Switches shall conform to the requirements of UL 1008, NFPA 70, NFPA 99, NFPA 110, IEEE 446 and NEMA Standard ICS10-1993. Automatic transfer switches shall be manufactured by ASCO, ABB/Zenith or by the generator set manufacturer.

B. Transfer switches shall be closed transition and operate in a make before break fashion. The transfer switch logic will limit the source parallel time to less than 100 ms. Closed transition transfer switches shall include a time delay utility parallel relay, external to the controller, to shunt trip the source 1 breaker in the event that the transfer switch remains closed on both sources for a period greater than 0.5-1 second. Closed transition transfer switches shall have the option to default to an open in-phase and/or delayed transition.

C. Ratings: As shown on the Drawings (continuous duty). UL 1008 listed. Three pole, solid neutral. Interrupting capacity: 600 percent of continuous rating. Three cycle withstand current rating shall be as defined by UL 1008. Withstand rating

shall exceed available fault current values determined by the Short Circuit and Coordination Study. Transfer time: Not to exceed 1/6 second. NEMA-1 floor or wall mounted enclosure as indicated.

D. Service conditions: NEMA ICS 1.

E. The transfer switch manufacturer shall be responsible for providing the coordinating wiring diagrams showing the electrical connections between the transfer switch, electrical distribution equipment and the engine-generator set for use by the E-G set service personnel during installation and checkout of the equipment.

F. Construction: Transfer switches shall be rigidly constructed to close into and withstand the bolted fault current available at the switch. All transfer switch coils, springs, and control elements shall be easily inspected and conveniently removable from the front of the transfer switch without major disassembly or disconnection of power conductors. All feeder lugs, relays, timers, control wiring and accessories shall be front accessible. The control module and transfer switch shall be physically separated. Main contacts shall be of silver alloy composition.

G. Controls: Microprocessor type with user control switches; front panel mounted. Provide with rechargeable battery backup, serial communications port, non-volatile eprom storing setup and calibration data, self-diagnostics, etc. The control module shall have a password protected access to programming of switch.
   1. Test switch: Mount in cover of enclosure to simulate failure of normal power source.
   2. Return to normal switch: mount in cover of enclosure to initiate manual transfer from alternate source to normal source.
   3. Transfer switch auxiliary contacts: 2 normally open; 2 normally closed.
   4. Normal source monitor: monitor each line of normal source voltage and frequency; initiate transfer when voltage drops below 85 percent or frequency varies more than 3 hertz from rated nominal value.
   5. Alternate source monitor: monitor alternate source voltage and frequency; inhibit transfer when voltage is below 85 percent or frequency varies more than 3 hertz from rated nominal value.
   6. In-phase monitor: inhibit transfer until source and load are within 15 electrical degrees.
   7. Normal and emergency position push-to-test indicating lights.
   8. Engine exerciser: fully programmable, solid state type. Start engine every 7 days (programmable); run for 30 minutes (programmable) before shutting down. Bypass exerciser control if normal source fails during exercising period. Provide load/no-load switch. Only one exerciser shall be connected on multiswitch installations.

H. Automatic sequence of operation
   1. Initiate time delay to start alternate source engine generator: upon initiation by normal source monitor when source drops below range of 70-95% of rated voltage (factory set at 85%). Time delay to start alternate source

engine generator: 0.05 to 6 seconds (factory set at 3 seconds) to allow for momentary dips.

2. Initiate transfer load to alternate source: upon initiation by normal source monitor and permission by alternate source monitor. Generator voltage has reached range of 75-100% of rated voltage (factory set at 90%) and generator rated frequency of 85-100% (factory set at 90%).
3. Time delay before transfer to alternate power source: 0 to 10 seconds, adjustable.
4. Initiate retransfer load to normal source: upon permission by normal source and in phase monitors.
5. Time delay before transfer to normal power: 0 to 30 minutes, adjustable; bypass time delay in event of alternate source failure.
6. Time delay before engine shut down: 0 to 15 minutes, adjustable, of unloaded operation. To allow engine to cool before shutdown.
7. Time delay between transfer switches: Step 1 shall be ATS-LS, Step 2 shall be ATS-C and Step 3 shall be ATS-EH.
8. Start Stop Circuit Monitoring: Provide start circuit monitoring as required by NFPA 70 Article 700.10 (D)(3). Circuit monitoring by 3 wire circuit configurations are not acceptable.

I. Testing: Demonstrate operation of transfer switch in normal and emergency modes.

J. Maintenance service: Provide service and maintenance of transfer switches for one year from date of substantial completion. A minimum of two visits to site for inspection of ATS shall be completed during this time period. A written report of these visits shall be provided to the Owner.

K. Warranty: The Contractor shall provide the following minimum manufacturers factory warranty for each automatic transfer switch:

1. All equipment shall be new and warranted free of faulty workmanship and damage.
2. The warranty shall include all parts, labor (including travel with no travel time or distance limitations), expenses and equipment necessary to perform replacement and/or repairs.
3. The total system (parts and labor) shall be warranted free of defects for a period of one (1) year from date of final acceptance.
4. Replacement of defective materials and repair of faulty workmanship shall take place within 48 hours of notification by Owner and shall be guaranteed at no cost to the Owner during the warranty period.
5. The minimum warranty provisions specified above shall not diminish the terms of individual equipment manufacturer's warranties.
6. The printed warranty shall be included in the O&M manual.

L. Final Acceptance: The installation shall be supervised, checked and tested by a qualified representative of the automatic transfer switch manufacturer. Written certification, by the qualified manufacturer's representative, verifying

manufacturer's startup procedures were followed and full system functionality was achieved shall be submitted to the Architect and Owner prior to final acceptance.

16037 DUAL PURPOSE DOCKING STATION

A. Provide a Dual Purpose Docking Station for connection of a temporary standby engine-generator set to support the facility during maintenance or a failure of the permanently installed engine-generator set and provide load bank testing connections for the permanent engine-generator set.

B. Docking Station shall be third party listed to UL 1008 standards as a Transfer Switch Accessory. The Station shall be rated 2,500 amperes, 120/208 volts, three pole, four wires and ground. Provide 100% neutral and ground connection capability. Short circuit current rating shall be 100 kA RMS symmetrical minimum. The cabinet shall be pad mounted in a NEMA Type 3R enclosure and the Type 3R rating shall be maintained with temporary cables installed with or without cables connected. Cabinet shall have tamper resistant lockable doors to prevent unauthorized entry.

C. Accessories: Provide with phase rotation monitor, auto start terminals, 20A, 120VAC, GFCI battery charger receptacle, 30A, 208V block heater receptacle and systems to electrically supervise starting controls as required by Codes.

D. Cabinet shall include two sets of color coded Crouse-Hinds J-Series Cam-Lok receptacle connectors (Male and Female). Female Cam-Loks shall be enclosed behind a pad-lockable door. Male Cam-Loks shall be enclosed behind a key interlocked trap door. Provide with Kirk Key locks installed on outer door housing male Cam-Loks and permanent generator circuit breaker to interlock the permanent generator and temporary generator. Dual Purpose Docking Station shall be Trystar GDS-6 or approved equal.

E. The enclosure shall be finished in ANSI 61 gray powder coat. Provide AL/CU compatible lugs adequate to accommodate conductor sizes and quantities shown on the Drawings. Enclosure shall be suitably constructed to withstand 150 mph wind loads and shall be approved by Miami-Dade County Department of Regulatory and Economic Resources Board and Code Administration Division with Notice of Acceptance (NOA) and shall be permanently labelled with the manufacturer's name and location and the statement "Miami-Dade County Product Control Approved". Provide documentation of NOA and wind rating with shop drawings. Comply with requirements in Specifications Section 16019 Electrical Identification.

F. The panel shall be front accessible.

G. Bus:
   1. All bus bars shall be tin-plated copper. Bus ampacity shall be based on NEMA standard temperature rise criteria of 65 degrees C over a 40 degrees C ambient (outside the enclosure).

2. Provide a full capacity neutral bus where a neutral bus is indicated on the drawings.
3. A copper ground bus (minimum 1/4 x 2 inch), shall be furnished firmly secured to each vertical section structure and shall extend the entire length of the switchboard.
4. All hardware used on conductors shall be high-tensile strength and zinc-plated. All bus joints shall be provided with conical spring-type washers.

H. Shop Drawings: Indicate electrical characteristics and connection requirements. Show dimensioned plan and elevation views with overall and interconnection point dimensions, electrical single line diagram. Also provide:
1. A complete Bill of Materials for all components.
2. Nameplate schedule.
3. Conduit entry/exit locations.
4. Short circuit, voltage and continuous current ratings.
5. Cable terminal sizes.
6. Product data sheets.
7. Seismic certification and equipment anchorage details.

I. Wiring and Terminations
1. All connections for phases, neutral, ground, accessories, etc., shall be clearly marked via permanent labeling
2. Each single pole Crouse-Hinds J-Series Cam-Lok receptacle connector shall be rated for no less than 400 amps at 90 deg C. Provide multiple receptacles per phase, neutral, and ground as required. Receptacle contact material shall be brass. Cam-type receptacles shall be suitable for use in outdoor environments and be UL 498 listed for Attachment Plugs and Receptacles and UL 1691. Provide with color coded NEMA 3R receptacle covers.
3. Small wiring, necessary fuse blocks and terminal blocks within the panel shall be furnished as required. Control components mounted within the assembly, such as fuse blocks, relays, pushbuttons, switches, etc., shall be suitably marked for identification corresponding to appropriate designations on manufacturer's wiring diagrams.
4. Where applicable all control wire shall be Type SIS, bundled and secured with nylon ties. Insulated locking spade terminals shall be provided for all control connections, except where saddle type terminals are provided integral to a device. All groups of control wires leaving the panel shall be provided with terminal blocks with suitable numbering strips. Provide wire markers at each end of all control wiring.

16038 SURGE PROTECTION DEVICES (SPDs)

A. SERVICE ENTRANCE SPDs

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Basis of Design: Eaton SPD Series.

b. ABB/General Electric.
c. Siemens.
d. Square D/Schneider.
e. Electrical distribution equipment including switchboards, panelboards, safety switches, enclosed circuit breakers, surge protection devices, etc. shall be furnished by the same manufacturer.

2. Surge Protection Devices:
   a. Comply with UL 1449, 5th Edition.
   b. Thermally protected MOVs.
   c. LED indicator lights for power and protection status of each phase and neutral.
   d. Audible alarm, with silencing switch, to indicate when protection has failed.
   e. Six-digit transient event counter with reset button and nonvolitile memory to totalize transient surges.
3. Maximum Continuous Operating Voltage: Not less than 115 percent of nominal system operating voltage.
4. Peak Single-Impulse Surge Current Rating: 400 kA per phase/200 kA per mode.
5. Short circuit current rating: 200 kA.
6. NEMA-1 enclosure.

B. PANELBOARD SPDs: Same as Service Entrance SPDs, but with a Peak Single-Impulse Surge Current Rating: 320 kA per phase/160 kA per mode.

C. SPDs shall be the external type, except in switchboards where shown to be integral.

D. Install SPD at service entrance on load side, with ground lead bonded to service entrance ground.

E. Install SPD with conductors or buses between suppressor and points of attachment as short and straight as possible. Do not exceed manufacturer's recommended lead length. Do not bond neutral and ground.

F. SPD circuit breaker and feeder conductors shall be as recommended by the device manufacturer, or #8 AWG copper, whichever is greater. Install in metallic raceway.

G. Coordinate SPD circuit breaker rating with actual SPD provided.

H. Do not perform insulation resistance tests of the distribution wiring equipment with the SDP installed. Disconnect before conducting insulation resistance tests, and reconnect immediately after the testing is over.

## 16039 LIGHTING FIXTURES AND LAMPS

A. Lighting fixture types shall be furnished as required by the Lighting Fixture Schedule as indicated on the Drawings. Catalog numbers are provided as a guide

to the design and quality of fixture desired. Equivalent designs and equal quality fixtures of other manufacturers listed will be acceptable upon approval of the Architect/Engineer. The Contractor shall verify from the Contract Drawings the type ceilings or walls the fixture is to be used with and shall provide compatible mounting attachments and trim. Provide all accessories or additional materials required to maintain the ceiling fire rating as required by regulatory authorities.

B. All lighting fixtures shall be approved by UL and NFPA and shall bear their label. Fixtures shall have a stock, or standard finish unless otherwise specified. Fixtures subject to corrosive or damp environments shall have corrosion resistant hardware and finishes.

C. All fixtures shall be installed complete with lamps or LED sources/light engines and shall be new and unused at time of final inspection of the project for acceptance. LED sources/light engines shall be field replaceable with common hand tools.

D. LED sources shall be high intensity white, single color or as noted. Provide white LEDs in the color temperature(s) specified. The color temperature in all lamps of the same type shall be consistent and remain so over the life of the lamp. Color consistency between lamps shall conform to ANSI NEMA ANSLG standard C78.377-2008. The contractor shall replace lamps/fixtures exhibiting inconsistent lamp color. Minimum lumen maintenance shall be 70% of rated initial lumen output at 50,000 hours of operation. Measurement of lumen maintenance shall be in accordance with IES LM-80-08. The lamp and/or luminaire manufacturer shall provide a minimum of five year warranty from the date of Final Acceptance against premature failure, discoloration and defects. The color or color temperature of replacement LED lamps shall match those of the same lamp types that remain in operation. The minimum color rendering index of white LEDs shall be 80. Electrical and photometric performance of LED assemblies and luminaires shall conform to IES LM 79-08.

E. LED Drivers: Provide high frequency electronic type with secondary voltages matching those required by the led source they operate. Drivers shall operate within a 0°F – 140°F ambient temperature range and shall comply with FCC Class A Standards for EMI. Minimum driver specifications:

1. Power factor ≥ 90%.
2. Efficiency ≥ 90%.
3. Current crest factor – 1.5 minimum.
4. Total harmonic distortion < 20%.
5. Rated life – 50,000 hours.
6. For indoor and building mounted fixtures, provide minimum 2-kv surge suppression integral with the driver (5-kv preferred if available).
7. For outdoor fixtures, provide minimum 10.0-kv surge suppression integral with the driver.

Manufacturers shall have been manufacturing LED drivers for at least ten years with a documentable low failure rate. The contractor shall provide a written warranty against defects in material and workmanship, including replacement for five years from the date of final acceptance.

F. Acrylic prismatic lens shall have nominal minimum lens thickness of 0.125 inch.

G. Emergency and exit lighting fixtures shall be as shown on the lighting fixture schedule on the Contract Drawings.

H. Install suspended luminaires using pendants supported from swivel hangers. Provide pendant length required to suspend luminaire at indicated height.

I. Where a recessed or downlight fixture replaces a section or part of an acoustical ceiling tile, or a section or part of a suspended gypsum board (GWB) ceiling, the fixture shall be supported at two (2) diagonal corners to the steel frame of the building. Supports shall be provided with the same type of wire as used to support the lay-in ceiling track or GWB ceiling system. Attach one end of the wire to one corner of the fixture and the other end to the building's structural system. The lay-in or flange fixture shall then be screwed to the main runners of the lay-in ceiling track or GWB ceiling system at all four (4) corners using sheet metal screws (parabolic type fixtures shall be attached to the ceiling grid with approved clips). The Electrical Contractor shall be responsible for coordination work with the ceiling contractor; however, the ceiling contractor will provide framed openings for reception of lighting fixtures. All recessed fixtures shall be furnished with all necessary mounting accessories.

J. Locate recessed ceiling luminaires as indicated on reflected ceiling plan.

K. Install surface mounted luminaires and exit signs plumb and adjust to align with building lines and with each other. Secure to prevent movement.

L. Exposed Grid Ceilings: Support surface mounted luminaires on grid ceiling directly from building structure. Provide auxiliary members spanning ceiling grid members to support surface mounted luminaires. Fasten surface mounted luminaires to ceiling grid members using bolts or screws.

M. Install recessed luminaires to permit removal from below.

N. Install recessed luminaires using accessories and firestopping materials to meet regulatory requirements for fire rating.

O. Install wall mounted luminaires, emergency lighting units and exit signs at height as indicated on Drawings.

P. Install accessories furnished with each luminaire.

Q. Connect luminaires, emergency lighting units and exit signs to branch circuit outlets provided under Section 260534 using flexible conduit.

R. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire.

S. Bond products and metal accessories to branch circuit equipment grounding conductor.

T. Clean photometric control surfaces as recommended by manufacturer. Clean finishes and touch up damage.

U. Relamp/replace luminaires that have failed lamps at Substantial Completion. Replace LED modules in which more than 5% of the LEDs have failed lamps at Final Acceptance of the Work.

16040 FIRE ALARM SYSTEM

A. Provide an NFPA 72, addressable, manual and automatic, Class A, local fire alarm system with connections to central station. The system shall be nominal 24 vdc operating voltage, non-coded, and supervised (including control circuits). All equipment supplied shall be listed for the purpose for which it is used, and installed in accordance with any instructions included in its listing. It shall also be new, with a full warranty (parts and labor) of at least one year from the date of final acceptance. The Contractor shall furnish all parts, materials, and labor required for a complete and operating system in accordance with all applicable requirements, even if each needed item is not specifically shown or described on the contract drawings or specifications. The system shall have multiple access levels to permit the disablement of individual alarm inputs or normal system responses (outputs) for alarms without changing the system's executive programming or affecting operation of the remainder of the system. The system shall be a non-proprietary system as manufactured by Notifier, Siemens or Edwards.

B. As a minimum, provide catalog cuts for all components and wiring/cable; control panel modules and configuration; system wiring diagram / floor plan showing each device and wiring connection required; wire types, sizes, numbers of conductors; transient protection devices; detailed battery capacity calculation and a description/sequence of system operation matrix. Verify and coordinate all voltage, relay, contact, etc., requirements with other equipment before submitting shop drawings. Provide electrical characteristics and connection requirements. The installing contractor's technicians shall, hold current (within previous 24 months) certifications issued by the manufacturer. These certifications shall be submitted to the engineer prior to installation showing name, photo identification, date of training and date of certification.

C. Provide detailed operation and maintenance instruction and training. Furnish four hours of instruction each for four persons, to be conducted at project site with manufacturer's representative. Use submitted operation and maintenance manual as reference during training. Supplement with training materials as required. System shall have a manufacturer warranty for a period of one year following acceptance. The warranty shall include all parts, labor, field service, travel expenses, etc.

D. Installer: Company specializing in installing the products specified in this section with minimum three years documented experience. The fire alarm contractor shall be authorized by his respective factory to ensure proper specification adherence, final connection, test, certification, warranty compliance, and service. Additionally, the fire alarm contractor shall submit a letter of authorization on official letterhead of the company product he represents stating he is an authorized distributor of that product. He shall maintain a service organization with adequate spare parts inventory within 75 miles of the installation site. He shall have training certification by the fire alarm control equipment manufacturer he represents that is not more than two (2) years old, to ensure up-to-date product and application knowledge.

E. Control Panel: The Fire Alarm Control Unit (FACU) shall be the modular type, with surface or flush wall mounted enclosure as shown, for ease of future system expansion or modification. The FACU shall display a steady "Power On" light (green), and each zone shall have separate "Alarm" (red) and "Trouble" (amber) lights. Provide additional FACU modules, or a larger capacity FACU, as required by the quantity of devices shown on the Drawings. FACU shall have a minimum of 25 percent spare capacity installed. The system shall have multiple access levels to permit the disablement of individual alarm inputs or normal system responses (outputs) for alarms without changing the system's executive programming or affecting operation of the remainder of the system. The Maintenance Building FACP shall be a single zone, addressable type, connected to the main building FACP with underground fiber. All other functions of the FACP shall be as herein specified.

F. Power supply: Adequate to serve control panel modules, remote detectors, remote annunciators, door holders, smoke dampers, relays, and alarm signaling devices. Include battery operated emergency power supply with capacity for operating system in standby mode for 24 hours followed by alarm mode for 5 minutes. A battery sizing calculation shall be submitted with the shop drawings. The battery manufacturer's battery discharge curve shall be used to determine the expected battery voltage after 24 hours of providing standby power. The calculated Notification Appliance Circuit current draw in the alarm mode shall be used to determine the expected voltage drop at the end of the line (EOL). This calculation shall be based on conductor resistance per manufacturer's data sheet of NEC 2011, Table 8; with due allowance for the voltage drop in the system's power supply and the double length of the circuit conductors. The voltage drop at EOL shall not exceed 14% of the expected battery voltage, after the required standby time plus alarm time. The resultant voltage shall not be less than the minimum listed operating voltage for the appropriate alarm notification appliance. The contractor shall use power outage testing to verify that the Notification Appliance Circuit (NAC) is compliant with design. Note if the contractor elects to provide additional remote power supplies, 120 VAC circuits required by the power supplies shall be provided by the contractor at no additional cost to the Owner.

G. System Supervision: The system shall be electrically supervised for open or (+/-) ground fault conditions in initiation, notification, and control circuits. Disconnection

or removal of any initiating device, alarm notification appliance, plug-in relay, system module, or standby battery connection shall also result in a trouble signal. Fire alarm signal shall override trouble signals, but any pre-alarm trouble signal shall reappear when the panel is reset.

H. Initiating Device Circuits: Supervised zone module with alarm and trouble indication; occurrence of single ground or open condition places circuit in trouble mode but does not disable that circuit from initiating an alarm.

I. Indicating Appliance Circuits: Supervised march time signal module, sufficient for signal devices connected to system; occurrence of single ground or open condition places circuit in trouble mode but does not disable that circuit from signaling an alarm.

J. Remote Station Signal Transmitter: Electrically supervised dual line digital alarm communicator transmitter (DACT), 4-channel (minimum), capable of transmitting alarm, supervisory and trouble signals over cellular modem to central station receiver, and integral to FACU enclosure. The Contractor shall provide a type of DACT which is compatible with the Owner's alarm receiving equipment, or the Supervising Station selected by the owner, as applicable. The Contractor shall also program the PROM, connect each DACT to the cellular modem, and verify proper signal receipt by the Supervising Station.

K. Auxiliary Relays: Provide sufficient SPDT auxiliary relay contacts for each detection zone to provide accessory functions specified.

L. Provide TROUBLE ACKNOWLEDGE, DRILL, and ALARM SILENCE switch.

M. Trouble Sequence of Operation: System or circuit trouble places system in trouble mode, which causes the following system operations:
   1. Visual and audible trouble alarm indicated by device at fire alarm control panel.
   2. Trouble signal transmitted to central station.
   3. Manual acknowledge function at fire alarm control panel silences audible trouble alarm; visual alarm is displayed until initiating failure or circuit trouble is cleared.

N. General Alarm Sequence of Operation: Actuation of initiating device places circuit in alarm mode, which causes the following system operations:
   1. Sound and display local fire alarm signaling devices with march time signal.
   2. Transmit non-coded signal to central station.
   3. Indicate location and identification of alarm device on fire alarm control panel and remote annunciator.
   4. Transmit signal to building mechanical systems to initiate shutdown of fans and damper operation.
   5. Manual acknowledge function at fire alarm control panel silences audible alarm devices; visual alarm devices remain energized until alarm reset is activated.

O. Equipment:

1. Manual Station: Semi-Flush mounted, non-coded, addressable type, double action manual station without break-glass rod. Provide manufacturer's standard backbox. Provide a protective cover with piezo sounder, and clear spacer if required, on each manual station, Safety Technology International Stopper II or equivalent.
2. Spot Heat Detector, low temperature (hostile environments only): Conventional fixed temperature type with plug-in base, rated 135°F (57°C). Provide intelligent/addressable monitor module for each detector, mounted remote from the detector in a conditioned space at 80" AFF.
3. Spot Heat Detector, high temperature (hostile environments only): Conventional fixed temperature type with plug-in base, rated 190°F (88°C). Provide intelligent/addressable monitor module for each detector, mounted remote from the detector in a conditioned space at 80" AFF Spot Heat Detector (conditioned environments): Intelligent/addressable type, combination rate-of-rise and fixed temperature type with plug-in base, rated 135°F (57°C), and temperature rate of rise of 15°F (8.3°C).
4. Ceiling Mounted Spot Smoke Detector: NFPA 72, analog/intelligent/addressable photoelectric, low profile type with separate plug-in base and visual indication of detector actuation, suitable for mounting on 4 inch (102 mm) outlet box.
5. Ceiling Mounted Spot Carbon Monoxide Detector: UL 2075, analog/intelligent/addressable, low profile type with separate plug in base and visual indication of detector actuation, suitable for mounting on 4 inch (102 mm) outlet box. CO detector operation shall initiate a fire alarm system supervisory signal and alarm via notification appliances distinctive from the fire alarm system.
6. Monitor Module. NFPA 72, addressable type with visual indication of module actuation, suitable for mounting in 4 inch (102 mm) outlet box.
7. Control Module. NFPA 72, addressable type with visual indication of module actuation, suitable for mounting in 4 inch (102 mm) outlet box.
8. Isolation Module. NFPA 72, with visual indication of module operation, suitable for mounting in 4 inch (102 mm) outlet box.
9. Aural Horn/Visual Device (non-resident areas only where specifically shown): NFPA 72 (ANSI S3.41), flush type fire alarm electronic audible signal/strobe. Minimum sound rating: 87 dB at 10 feet. Provide integral synchronized, strobe lamp and flasher with clear lens and red lettered "FIRE" on case. Provide strobe output as shown or as required by NFPA 72 and conditions. Install surface mounted devices using the manufacturer's surface mount backbox.
10. Aural Chime/Visual Device: NFPA 72 (ANSI S3.41), flush type fire alarm electronic audible signal/strobe. Provide with a minimum of 12 field selectable tones, each with 3 volume settings. Minimum sound rating at high volume: 60 dB at 10 feet (3M). Provide integral synchronized, strobe lamp and flasher with clear lens and red lettered "FIRE" on case. Provide strobe output as shown or as required by NFPA 72 and conditions. Install surface mounted devices using the manufacturer's surface mount backbox.

11. Visual Only Device: NFPA 72 (ANSI S3.41) flush type, synchronized, strobe lamp and flasher with clear lens and red lettered "FIRE" on case. Provide strobe output as shown or as required by NFPA 72 and conditions. Install surface mounted devices using the manufacturer's surface mount backbox.
12. Provide supervised LCD alphanumeric remote annunciators, at locations shown on the Drawings, including audible and visual indication of fire alarm by device, location and zone, and audible and visual indication of system trouble. Install in flush wall-mounted enclosures.
13. Cable:
    a. Fire Alarm Power Branch Circuits: Building wire as specified. Wire shall be 14 AWG minimum, stranded copper THHN/THWN. All junction boxes that are visible or accessible shall be painted red, unless in finished areas. NOTE: Conduits that penetrate outside walls or ceilings from conditioned space shall be effectively sealed to prevent condensation from infiltrating humid air.
    b. Addressable loop (signaling line) circuits shall be wired with type FPL/FPLR/FPLP fire alarm cable, AWG 18 minimum, low capacitance, twisted shielded copper pair (unless unshielded cable is recommended by the system manufacturer). Cable shield drain wires shall be connected at each device on the loop to maintain continuity, taped to insulate from ground, and terminated at the FACU. Acceptable cables include Atlas 228-18-1-1STP, Belden YQ28541, BSCC S1802s19 (same as EEC 7806LC), West Penn D975, D991 (AWG 16), D995 (AWG 14), or equal wire having a capacitance of 30pf/ft maximum between conductors. The cable jacket color shall be red, with red (+) and black (-) conductor insulation.
    c. Indicating Appliance and Door Hold-open Device Circuits: Power limited fire-protective signaling cable (type FPLR) classified for fire and smoke characteristics, twisted, unshielded copper conductor, 300 volt insulation rated 105°C, red exterior insulation. Minimum size: 2 C # 14 AWG for indicating appliance, door release and control circuits. Use larger conductors as required by the manufacturer or for voltage drop compensation.
    d. Fire alarm circuit cables in areas designated as requiring Survivability Level 2 Pathways shall utilize Type CI circuit integrity cable or equivalent approved means of fire resistance for cables as required by NFPA 72, Section 12.4.

P. Installation:
1. On AC Input: EFI E100HW120, Leviton 51020-OWM, Emerson/Northern-Technologies TCS-HWR, Transtector ACP100BW SERIES, or equal UL 1449 – 3rd Edition Listed device approved by Architect/Engineer. Install in a listed enclosure near the electrical panelboard, and trim excess lead lengths. Wind small coil in the branch circuit conductor just downstream of the suppressor connection. Coil to be 5 to 10 turns of about 1" diameter, and securely wrapped with plastic cable ties. See drawings detail.

2. On DC Circuits Extending Outside Building: Adjacent to the FACP, and also near point of entry to outlying building, provide "pi"-type filter on each leg, consisting of a primary arrestor, series impedance, and a fast acting secondary arrestor that clamps at 30V-40V. UL 497B listed. Some acceptable models: Simplex 2081-9027, Simplex 2081-9028, Transtector TSP8601, Ditek DTK 2MHLP24BWB series, Citel America B280-24V, and Northern Technologies DLP-42. Submit data on others to the Architect/Engineer for approval. Devices using only MOV active elements are not acceptable.
3. Provide an engraved label inside the FACP identifying its 120vac power source, as follows: Panelboard location, panelboard identification, and branch circuit number.
4. Alarm notification appliances (audible and visible) shall comply with NFPA 72, the North Carolina State Building Code (NCSBC), and ANSI 117 criteria for intensity and placement. The audible evacuation signal shall be the ANSI S3.41 three-pulse temporal pattern. All strobe lights installed in a single space shall be synchronized.
5. Provide zoning of notification appliance circuits as required by the NC State Building Code, DHSR and local code officials.
6. Addressable interface modules (used to monitor all contact type initiating devices) shall be located in conditioned space, unless they are tested, listed, and marked for continuous duty across the range of temperatures and humidity expected at their installed location.
7. One module may serve as many as 3 sprinkler system valve supervisory switches in a single space; otherwise provide one module per switch.
8. One module may serve as many as 6 heat detectors in a single space.
9. Sprinkler system supervisory circuits for monitoring valve position, air pressure, water temperature, pump status, etc., shall cause distinct audible and visible indications at the FACP. The audible supervisory signal shall either be a 4" diameter bell or a pulsing piezo-electric alarm. Provide the following engraved label adjacent to the bell/alarm: "SPRINKLER STATUS ABNORMAL". If only valve position is supervised, provide an engraved label reading: "SPRINKLER VALVE CLOSED"
10. The fire alarm system shall control and monitor 120VAC power to shunt trip breakers used in conjunction with fire suppression systems. Examples include a shunt trip used for cooking appliance power shut-off when the kitchen hood fire suppression system is activated, or primary elevator power shut-down upon sprinkler flow in any elevator equipment space or shaft. Use addressable control and monitor modules, for trip and supervision, respectively, with a System Sensor RE-20 multi-voltage relay, or equivalent, to accomplish the trip and supervisory functions.
11. The exterior of all junction boxes containing fire alarm conductors shall be painted red; box interiors shall not be painted. Box covers for junction boxes containing fire alarm conductors shall be painted red on both sides.
12. Box covers shall be labeled to indicate the circuit(s) or function of the conductors contained therein. Lettering shall contrast with the box cover paint and shall be neatly applied using machine generated white lettering

on a clear background. Handwritten labels or labels made from embossed tape are not acceptable.

13. All fire alarm system wiring shall be in installed in metal conduit and, if permitted by the AHJ and DHSR, cable may be free run on J hooks in the attic.
14. There shall be no splices in the system other than at device terminal blocks, or on terminal blocks in cabinets. "Wire nuts" and crimp splices shall not be permitted. Permanent wire markers shall be used to identify all connections at the FACP and other control equipment, at power supplies, and in terminal cabinets. All terminal block screws shall have pressure wire connectors of the self-lifting or box-lug type.
15. When installed in a room, detectors shall be oriented so their alarm light is visible from the nearest door to the corridor, unless Remote Alarm Indicator Light (RAIL) equipped.
16. Spot-type smoke detectors shall secure the head to the base thru the built-in locking device. For detector mounted within 12 feet of the floor, activate this lock after the system has been inspected and given final acceptance.
17. Unless suitably protected against dust, paint, etc., spot type smoke detectors shall not be installed until the final construction clean-up has been completed. In the event of contamination during construction, the detectors shall be replaced by the contractor at no additional cost to the Owner. Covers supplied with smoke detector heads do not provide protection against heavy construction dust, spray painting, etc., and shall not be used for that purpose. They are suitable only during final, minor cleanup or touchup operations.
18. A detector installed where accidental damage or deliberate abuse is expected shall be provided with a guard that is listed for use with it and is acceptable to the AHJ.
19. Identification of individual detectors is required. Assign each a unique number as follows, in sequence starting at the FACP: (Addressable Loop # -- Device #) Show on the as-built plans, and also permanently mount on each detector's base so that it's readable standing on the floor below without having to remove the smoke detector. Exception: For detectors with housings (i.e., air duct, projected beam, air sampling, flame), apply the identification to a suitable location on exterior of their housing. Device labels may not be affixed to the device. Identification labels for white detector bases, control/monitor modules and other light colored devices shall be printed labels with black lettering on a clear background. Identification labels for red notification appliance housings and other dark color devices shall be printed labels with white lettering on a clear background. Handwritten labels or labels made from embossed tape are not acceptable.

Q. Final Inspection: The fire alarm system shall be inspected, with portions of it functionally tested. This shall normally include the use of appropriate means to simulate smoke for testing detectors, as well as functionally testing the system interface with building controls, fire extinguishing systems and any off-premises supervising station. Operation of any smoke removal system shall be checked as instructed by the AHJ. This statistical (sampling) inspection is intended to assure

that the contractor has properly installed the system and performed the 100% operational test as required by NFPA 72. The electrical contractor shall provide two-way radios, ladders, and any other materials needed for testing the system, including a suitable smoke source. Upon successful completion of the Inspection and after the correction of all efficiencies, the manufacturer's authorized representative shall issue a test report to the Architect/Engineer and Owner, detailing and certifying the test.

16041 PAGING SYSTEM

A. The Owner's vendor will provide a complete, zoned public address system providing a minimum of one zone per Nurse Station plus one zone for Administrative/Kitchen area. See Drawings for zoning and control locations. The system shall be complete with preamplifiers, power amplifiers, power supplies, volume limiter/compressors, equipment racks, telephone paging adapters, tone generator, flush ceiling mounted loudspeakers, volume controls, exterior horn type loudspeakers, conductors and cables and raceways.

B. The contractor shall provide outlets as shown or as required and shall consist of a 4" square x 2-1/8" minimum deep box with an empty 1-1/4" minimum conduit to the attic/accessible ceiling cavity. Coordinate back box and raceway size and locations with the Owner's system vendor. Devices, equipment, cabling and jacks will be installed by the Owner's vendor. Provide pull strings in all empty raceways. Provide power sources as shown and as required.

C. Shop Drawings: Include plans (showing coordinated zones), elevations, sections, details, and attachments to other work.
   1. Detail equipment assemblies and indicate dimensions, weights, required clearances, method of field assembly, components, and location and size of each field connection.
   2. Console layouts.
   3. Control panels.
   4. Rack arrangements.
   5. Calculations: Provide to demonstrate system coverage and sizing backup battery. Determine speaker taps.
   6. Wiring Diagrams: For power, signal, and control wiring.
      a. Identify terminals to facilitate installation, operation, and maintenance.
      b. Single-line diagram showing interconnection of components.
      c. Cabling diagram showing cable routing.

D. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project. Personnel certified by manufacturer.

E. Comply with NFPA 70.

F. Coordinate layout and installation of system components and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

G. System Functions:
   1. Selectively connect any zone to any available signal channel.
   2. "All-call" feature shall connect the all-call sound signal simultaneously to all zones regardless of zone or channel switch settings.
   3. Telephone paging adapter shall allow paging by dialing an extension from any local telephone instrument and speaking into the telephone.
   4. Produce a program-signal tone that is amplified and sounded over all speakers, overriding signals currently being distributed.
   5. Reproduce high-quality sound that is free of noise and distortion at all loudspeakers at all times during equipment operation including standby mode with inputs off; output free of non-uniform coverage of amplified sound.

H. Conductors and Cables: Jacketed, twisted pair and twisted multipair, untinned solid copper.

I. Wiring Method: Install cables in metallic raceways except in the attic where cable may be free run on J hooks.

J. Installation
   1. Identification of Conductors and Cables: Color-code conductors and apply wire and cable marking tape to designate wires and cables so they identify media in coordination with system wiring diagrams.
   2. Wall-Mounted Outlets: Flush mounted.
   3. Conductor Sizing: Unless otherwise indicated, size speaker circuit conductors from racks to loudspeaker outlets not smaller than No. 18 AWG and conductors from microphone receptacles to amplifiers not smaller than No. 22 AWG.
   4. Weatherproof Equipment: For units that are mounted outdoors, in damp locations, or where exposed to weather, install consistent with requirements of weatherproof rating.
   5. The Owner's vendor will provide surge protection for the paging system.

K. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

L. Operational Tests: Perform tests that include originating program and page messages at microphone outlets, preamplifier program inputs, and other inputs. Verify proper routing and volume levels and that system is free of noise and distortion.

M. Inspection: Verify that units and controls are properly labeled and interconnecting wires and terminals are identified. Prepare a list of final tap settings of paging speaker-line matching transformers.

N. Public address systems will be considered defective if they do not pass tests and inspections.

O. Prepare test and inspection reports.

P. Include a record of final speaker-line matching transformer-tap settings, and signal ground-resistance measurement certified by Installer.

Q. Engage a factory-authorized service representative to perform startup service.

R. Verify that electrical wiring installation complies with manufacturer's submittal and installation requirements.

S. Complete installation and startup checks according to manufacturer's written instructions.

T. On-Site Assistance: Engage a factory-authorized service representative to provide on-site assistance in adjusting sound levels, resetting transformer taps, and adjusting controls to meet occupancy conditions.

U. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

V. Demonstration: Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain the public address system and equipment.

16042 NURSE CALL SYSTEM

A. Provide a two-way voice and tone visual Nurse/Patient Communication System with central control and power supply equipment, single and two patient bed stations with pillow speaker(s), staff stations, duty stations, emergency pull cord stations, room dome lights and corridor LED alphanumeric annunciator displays in compliance with this specification and the Owner's requirements. Also provide capability for system to communicate with Owner's remote central system for monitoring. System shall be compliant with NFPA 70 - National Electrical Code, NFPA 99 – Health Care Facilities and Underwriters Laboratories Inc. Standard 1069, latest edition.
   1. Two-way voice communication is required between the patient bed stations and nurse stations, duty stations and staff stations.
   2. Tone/visual annunciation only is required between the patient toilet and shower/tub stations and nurse stations, duty stations and staff stations.

3. Tone/visual annunciation only is required between the public toilet stations and nurse stations, duty stations and staff stations.

B. Provide shop drawings including electrical characteristics and connection requirements; cable routing; connection diagrams; and equipment arrangement. Submit catalog data showing electrical characteristics, connection requirements, component quantities, equipment manufacturer, model number, description of each component, and complete description of system operation. Certify products meet or exceed specified requirements and certify that that the supplying contractor is an authorized distributor. Provide certification showing that the installing technician(s) has completed training school for the proposed equipment.

C. Provide detailed operation and maintenance instruction and training. Furnish four hours of instruction each for four persons, to be conducted at project site with manufacturer's representative. Use submitted operation and maintenance manual as reference during training. Supplement with training materials as required. System shall have a manufacturer warranty for a period of one year following acceptance. The warranty shall include all parts, labor, field service, travel expenses, etc.

D. Cable: As recommended by the system manufacturer.

E. Wiring Method:
1. Install cables in raceways except in accessible ceiling spaces where unenclosed wiring method may be used. Conceal raceway and cables except in unfinished spaces. Install plenum cable in environmental air spaces, including plenum ceilings. Conceal conductors and cables in accessible ceilings, walls, and floors where possible.
2. Provide junction and outlet boxes for nurse call devices as shown using 4" square x 2-1/8" minimum deep boxes with an empty 3/4" minimum conduit to the accessible ceiling cavity. Coordinate back box and raceway size and locations with the system vendor. Provide power sources as shown and as required.

F. Installation
1. Identification of Conductors and Cables: Color-code conductors and apply wire and cable marking tape to designate wires and cables so they identify media in coordination with system wiring diagrams.
2. Wall-Mounted Outlets: Flush mounted.
3. Conductor Sizing: Unless otherwise indicated, size speaker circuit conductors from racks to loudspeaker outlets not smaller than No. 18 AWG and conductors from microphone receptacles to amplifiers not smaller than No. 22 AWG.
4. The contractor shall provide surge protection for the nurse call system.

G. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

H. Operational Tests: Perform tests that include originating calls at all locations and verify proper annunciation.

I. Inspection: Verify that units and controls are properly labeled and interconnecting wires and terminals are identified.

J. Prepare test and inspection reports.

K. Engage a factory-authorized service representative to perform startup service.

L. Verify that electrical wiring installation complies with manufacturer's submittal and installation requirements.

M. Complete installation and startup checks according to manufacturer's written instructions.

N. On-Site Assistance: Engage a factory-authorized service representative to provide on-site assistance.

O. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

P. Demonstration: Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain the system and equipment.

## 16043 TELEPHONE AND DATA RACEWAY SYSTEM

The Owner's vendor will provide telephone and data systems. The contractor shall provide combination telephone and data outlets as shown and shall consist of a 4" square x 2-1/8" minimum deep box with an empty 1-1/4" minimum conduit to the attic/accessible ceiling cavity. Coordinate back box and raceway size and locations with the Owner's system vendor. Devices, equipment, cabling and jacks will be installed by the Owner's vendor. Provide pull strings in all empty raceways. Provide power sources as shown and as required. The Owner's vendor will provide surge protection for telephone and data systems.

## 16044 ACCESS CONTROL/SPECIAL LOCKING (MAG LOCK) RACEWAY SYSTEM

The Owner's vendor will provide an access control system. The contractor shall provide junction and outlet boxes as shown using 4" square x 2- 1/8" minimum deep boxes with an empty 3/4" minimum conduit between devices at each door as required and to the attic/accessible ceiling cavity. Coordinate back box and raceway size and locations with the Owner's system vendor. Devices, equipment and cabling will be installed by the

Owner's vendor. Provide pull strings in all empty raceways. Provide power sources as shown and as required. The Owner's vendor will provide surge protection for access control systems.

16045 CABLE TELEVISION RACEWAY SYSTEM

The Owner's vendor will provide the cable television system. The contractor shall provide junction and outlet boxes as shown using 4" square x 2-1/8" minimum deep boxes with an empty 3/4" minimum conduit to the attic/accessible ceiling cavity. Coordinate back box and raceway size and locations with the Owner's system vendor. Devices, equipment and cabling will be installed by the Owner's vendor. Provide pull strings in all empty raceways. Provide power sources as shown and as required.

16046 SECURITY CAMERA RACEWAY SYSTEM

The Owner's vendor will provide the security camera system. The contractor shall provide junction and outlet boxes as shown using 4" square x 2-1/8" minimum deep boxes with an empty 3/4" minimum conduit to the attic/accessible ceiling cavity. Coordinate back box and raceway size and locations with the Owner's system vendor. Devices, equipment and cabling will be installed by the Owner's vendor. Provide pull strings in all empty raceways. Provide power sources as shown and as required. The Owner's vendor will provide surge protection for security camera systems.

16047 AIPHONE SYSTEM RACEWAY SYSTEM

The Owner's vendor will provide an Aiphone system. The contractor shall provide junction and outlet boxes as shown using 4" square x 2- 1/8" minimum deep boxes with an empty 3/4" minimum conduit to the attic/accessible ceiling cavity. Coordinate back box and raceway size and locations with the Owner's system vendor. Devices, equipment and cabling will be installed by the Owner's vendor. Provide pull strings in all empty raceways. Provide power sources as shown and as required. The Owner's vendor will provide surge protection for the Aiphone system.

16048 TESTS

A. Test all systems furnished under Division 16 and repair or replace all defective work. Make all necessary adjustments to the systems and instruct the Owner's personnel in the proper operation of the systems.

B. Make the following minimum tests and checks prior to energizing electrical equipment:
   1. Mechanical inspection, testing and settings of all circuit breakers, disconnect switches, motor starters, control equipment, etc., for proper operation.
   2. Check all wire and cable terminations. Verify to the Architect/Engineer that connections meet the equipment torque requirements.
   3. Check rotation of motors, obtain permission from other contractors to start motor, and proceed to check for proper rotation. If the motor rotates in the

wrong direction, correct it. Take all necessary precautions not to damage any equipment.

4. Provide all instruments and equipment for the tests specified herein.

C. All testing shall be scheduled and coordinated by the Contractor. Notify the Owner at least two (2) weeks in advance of conducting tests. The Contractor shall have qualified personnel present during all testing.

D. All tests shall be completely documented with the time of day, date, temperature, and all other pertinent test information. All required documentation of readings indicated shall be submitted to the Architect/Engineer prior to, and as one of the prerequisites for, final acceptance of the project.

E. Electrical Distribution System Tests: All current carrying phase conductors and neutrals shall be tested as installed, and before connections are made, for insulation resistance and accidental grounds. This shall be done with a 500 volt megger. The following procedures shall be as follows:

1. Minimum readings shall be one million (1,000,000) or more ohms for #6 wire and smaller, 250,000 ohms or more for #4 wire or larger between conductors and between conductor and the grounded metal raceway.
2. After all fixtures, devices and equipment are installed and all connections completed to each panel, the Contractor shall disconnect the neutral feeder conductor from the neutral bar and take a megger reading between the neutral bar and grounded enclosure. If this reading is less than 250,000 ohms, the Contractor shall disconnect the branch circuit neutral wires from this neutral bar. He shall then test each one separately to the panel and until the low reading ones are found. The Contractor shall correct troubles, reconnect and retest until at least 250,000 ohms from the neutral bar to the grounded panel can be achieved with only the neutral feeder disconnect.
3. The Contractor shall send a letter to the Architect/Engineer certifying that the above has been done and tabulating the megger readings for each panel. This shall be done at least four (4) days prior to final inspection.
4. At inspection, the Contractor shall furnish a megger and show Architect/Engineer's representative that the panels comply with the above requirements. He shall also furnish a hook on type ammeter and a voltmeter and take current and voltage readings as directed by the representatives.
5. At inspection, the Contractor shall furnish ladders, required tools, and men to open fixtures, boxes, panels, or any other equipment to enable the Architect/Engineer's representatives to see into any parts of the installation he may request.

F. Electrical Grounding System Tests: Provide documentation showing values of earth ground impedance for the system ground. See Specifications Section 16027 for testing requirements.

G. Patient Environment Electrical Grounding System Tests: Provide documentation showing values of impedance and equipotential voltage for each grounded point

in a patient care area and showing the value of current leakage (with grounds in place and lifted) of each piece of fixed electrical equipment. Grounding systems shall be tested to the extent required by the NEC, the Guidelines for Design and Construction of Health Care Facilities, by the Facilities Guidelines Institute and all local codes and ordinances. Provide written certification of tests and results in triplicate to the Owner, DHSR and the Architect/Engineer prior to final inspection. All testing shall be accomplished by competent personnel appropriately certified, accredited, and accepted by the State of North Carolina to perform the required testing. Provide testing personnel credentials to the Architect/Engineer for approval prior to commencing tests. All tests shall be performed in the presence of the Owner and Architect/Engineer.

H. Provide testing of all systems required by the National Electrical Code including Arc Energy Reduction Systems per NEC Art. 240.87 (A).

16049 ELECTRICAL WORK IN CONNECTION WITH OTHER CONTRACTS

A. The Electrical Contractor shall provide a source of power for mechanical, plumbing, sprinkler, food service, laundry, low-voltage systems, General Contractor-furnished and Owner-furnished systems and equipment shown on the Drawings. Provide pigtails, flexible connections, conductors, raceways, circuit breakers, safety switches, receptacles, junction boxes, panelboards and/or wiring troughs as detailed in this section and/or as shown on the Drawings.

B. The locations of safety switches and other electrical equipment and devices shown on the Electrical Drawings are approximate only and some adjustment of their locations should be anticipated. The locations of local disconnecting means furnished by other divisions are shown on the respective division's Drawings. Coordinate exact locations with the entity (vendor, contractor or Owner) providing the equipment. Coordinate and verify all electrical requirements, final connections, phasing and rotation, overcurrent and overload protective device sizes with the entity providing the equipment. Fuses, variable speed drives, magnetic motor starters, magnetic motor starter overload elements, control devices and sensors and control wiring and raceways for such equipment will be provided and installed by the entity providing the equipment. See other specifications divisions for further explanation of contractor responsibility. Do not apply power to equipment without the permission of the entity providing the equipment.

C. The Electrical Contractor shall coordinate with the plumbing, mechanical and general contractors, and the Owner, prior to ordering or installation of any equipment, to verify equipment requirements are provided in the electrical design. The contractor will not be compensated for costs associated with changing the electrical systems to match utilization equipment, even if the electrical work is installed per the electrical drawings.

D. The electrical contractor shall provide branch circuit power sources (designated 20A circuit breakers in selected branch circuit panelboards) as indicated in the panel schedules on the Drawings. The HVAC contractor shall extend power from

these circuit breakers as required for control power, damper power, and power for unscheduled HVAC equipment. If additional circuits are required, the contractor may use circuit breakers designated as "spare".

E. Heating, Ventilating and Air Conditioning Equipment:
   1. VRF Outdoor Units, Heat Pump Condensing Units, Air Handlers and Cassettes; Energy Recovery Units; Kitchen Exhaust Hood; Dishwasher Exhaust Hood; DOAS Unit; Boilers, Pumps, etc.: The Electrical Contractor shall provide a safety switch as shown and make power connections to the line and load side of the switch terminals and to the equipment. If the equipment is supplied with an integral disconnecting means, the Electrical Contractor shall make final connections to the line side of the disconnecting means. All control wiring will be by the Heating and Air Conditioning Contractor. See kitchen hood Reference Drawings for additional requirements.
   2. Thru-wall Heat Pumps with cord sets: The Electrical Contractor shall provide a properly sized receptacle adjacent to the unit as shown and make power connections to the receptacle. All control wiring will be by the Heating and Air Conditioning Contractor.
   4. Exhaust Fans: The Electrical Contractor shall make power connections to the line and load side of the fan's integral disconnect switch terminals. All control wiring will be by the Heating and Air Conditioning Contractor.
   5. Fuses and control wiring for heating, ventilating and air conditioning equipment will be provided and installed by the Mechanical Contractor.
   6. See Mechanical Specifications Division 17 Section "Electrical Work" for further explanation of Contractor responsibility.
   7. FA interface: See Section 16040.

F. Plumbing Equipment:
   1. The Electrical Contractor shall provide power supplies and final electrical connections to equipment provided by the Plumbing Contractor. Provide pigtails, flexible connections, disconnecting means, receptacles, etc., as required and coordinate exact locations with the Plumbing Contractor.
   2. See Plumbing Specifications Division 15 Section "Electrical Work" for further explanation of Contractor responsibility.

G. Fire Protection (Sprinkler) System: The Electrical Contractor shall interface fire alarm system devices to sprinkler flow and tamper switches, and all other fire protection system components requiring supervision by the fire alarm system, provided and installed by the Sprinkler contractor. Connections shall be made under the direct supervision of the Fire Protection Contractor. See Fire Alarm System Drawings and Specifications Section 16040 for interface requirements and details. Coordinate with the Fire Protection System Contractor and refer to the Fire Protection System Drawings and Specifications for additional details and requirements.

H. Food Service Equipment: The Electrical Contractor shall provide a power source adjacent to and final electrical power connections for equipment provided by the

Food Service Equipment Contractor. Provide pigtails, flexible connections, disconnecting means, receptacles, etc., as required and coordinate exact locations with the Food Service Equipment Vendor. See Food Service Equipment Electrical Notes and Food Service Equipment Schedule on the Drawings for electrical requirements, electrical connection details and additional details.

I. Laundry Equipment: The Electrical Contractor shall provide a power source and final electrical power connections for laundry equipment. Provide pigtails, flexible connections, disconnecting means, receptacles, etc., as required and coordinate exact locations with the Laundry Equipment Vendor. See Laundry Equipment Electrical Notes and Laundry Equipment Schedule on the Drawings for electrical requirements, electrical connection details and additional details.

J. General Contractor Provided Equipment: The Electrical Contractor shall provide a power source adjacent to equipment provided by the General Contractor. Final connections to this equipment shall be provided by the Electrical Contractor. Coordinate exact locations and requirements with the General Contractor.

1. Door Hold-Open Devices: The Electrical Contractor shall furnish and install electrical connections from the fire alarm system to each door hold-open device, furnished by the General Contractor, at locations as shown and as directed by the General Contractor. Provide connections as required and coordinate exact locations and configurations with the General Contractor and the door hardware vendor. Final connections to the equipment shall be by the Electrical Contractor in cooperation with the General Contractor.
2. Electrically-Operated Doors: The Electrical Contractor shall furnish and install a power supply to each electrically-operated door at locations as shown and as directed by the General Contractor. The Electrical Contractor shall also install and wire door activation switches provided by the General Contractor. Provide connections as required and coordinate exact locations and configurations with the General Contractor and the door hardware vendor. Final connections to the equipment shall be by the Electrical Contractor in cooperation with the General Contractor.
3. Projection Screens: The Electrical Contractor shall furnish and install a junction box and disconnect switch adjacent to each projection screen and make power connections to the screen power terminals. The Electrical Contractor shall also install and wire screen position switches provided by the General Contractor. Provide connections as required and coordinate exact locations and configurations with the General Contractor and the projection screen vendor. Final connections to the equipment shall be by the Electrical Contractor in cooperation with the General Contractor.

K. Low Voltage (LV) Systems Equipment: The Electrical Contractor shall provide boxes, raceways and power for LV equipment. Coordinate exact locations and requirements with the Owner's LV System Contractor. Final connection to the equipment will be provided by the Electrical Contractor in coordination with the LV Systems Contractor. Provide receptacle configurations as required and coordinate exact locations and configurations with the LV Systems Contractor. Do not apply power to equipment without the permission of the LV Systems Contractor.

L. Owner Provided Equipment: The Electrical Contractor shall provide a power source adjacent to equipment provided by the Owner. Coordinate exact locations and requirements with the Owner and General Contractor. Final connection to the equipment will be provided by the Electrical Contractor. Provide receptacle configurations and/or provide direct connection as required by equipment and coordinate exact locations and configurations with the Owner. Do not apply power to equipment without the permission of the Owner.

M. Make electrical connections in accordance with equipment manufacturer's instructions.

N. Make conduit connections to equipment using flexible conduit. Use liquidtight flexible conduit with watertight connectors in damp or wet locations.

O. Make wiring connections using wire and cable with insulation suitable for temperatures encountered in heat producing equipment.

P. Provide suitable strain relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.

Q. Provide interconnecting conduit and wiring between devices and equipment where indicated.

## 16050 SHORT CIRCUIT, ARC FLASH AND SELECTIVE COORDINATION STUDY

A. The Electrical Contractor shall provide a facility Short Circuit, Arc Flash and Selective Coordination Study for approval by the Architect/Engineer. The Study shall be performed by a North Carolina Registered Professional Engineer and shall include the utility company transformer and downstream devices including the switchboard and all branch circuit panelboards, engine-generator sets and automatic transfer switches.

B. The Study shall be complete with calculations to demonstrate that overcurrent devices, transfer switches, switchboards, panelboards, motor controls and feeders are adequately sized to safely withstand available phase-to-phase and phase-to-ground faults. The study shall also include an analysis of generator performance under fault conditions and a coordination study resulting in the tabulation of settings for all over-current device adjustable trips, time delays, relays and ground fault coordination.

C. The Division 16 Contractor shall be responsible to ensure proper AIC ratings for protection of electrical equipment. All switchboards, panelboards, enclosed circuit breakers, safety switches, engine-generator set, automatic transfer switches, etc. and overcurrent device ratings, and upsizing of downstream conductors and raceways, if required, shall conform to the results of this Study. Adjustment of protective device equipment, conductors, raceways, etc. to meet the approved

coordination study submittal shall be the responsibility of the Electrical Contractor at no additional cost to the Owner. The Study shall be coordinated to 0.1 seconds.

D. Provide and install equipment warning labels indicating arc flash energy, PPE requirements, etc. as required by Drawings detail, and fault current data required by NEC Article 408.6.

E. The following submittals shall be made after the approval process for system protective devices has been completed. Submittals may be in digital form.
   1. Coordination study input data, including completed computer program input data sheets.
   2. Study and Equipment Evaluation Reports.
   3. Coordination Study Report.
   4. System One Line Diagram.

16052 SCHEDULE OF WORK

The Electrical Contractor shall schedule his work as described in the Architectural Specifications.

16053 GUARANTEE

The Contractor shall guarantee the materials and workmanship covered by these Drawings and specifications for a period of one year from the date of acceptance by the Owner. The Contractor shall repair and/or replace any parts of any system that may prove to be defective at no additional cost to the Owner within the guarantee period.

END OF SECTION 16000




DIVISION SEVENTEEN

07/17/2024

SECTION 17000 - HEATING, VENTILATION AND AIR CONDITIONING

17001 GENERAL

Work under this section includes, but is not necessarily limited to, furnishing and installing the following:

A. Heating, ventilating and air conditioning equipment.

B. Duct installation and ductwork.

C. Register, grilles and diffusers.

D. Controls and control wiring.

E. Piping and insulation.

17002 CODES, STANDARDS AND REGULATIONS

A. All work shall be in accordance with all applicable federal, state, and local codes, standards and regulations (Code). See drawings.

B. When these drawings and specifications call for materials or construction of a better quality or larger sizes than required by the above-mentioned rules and regulations, the provisions of the drawings and specifications shall take precedence.

C. Codes are minimum standards and if the codes require a more stringent method or material than the drawings or specifications require, then the codes shall govern.

D. The Contractor shall furnish, without extra charge, any additional materials and labor which may be required for compliance with the above laws, rules and regulations, even though the work is not mentioned in these specifications or shown on the drawings.

E. The Contractor shall secure all permits, inspections and licenses and tests required for this work and pay all fees in connection therewith.

17003 DRAWINGS AND SPECIFICATIONS

A. The drawings accompanying these specifications are generally diagrammatic and do not show all details of bolts, nuts, fittings, connections, etc., required for the complete system, and do not indicate the exact locations of piping, fixtures, ducts, equipment, etc., unless definitely dimensioned. While these drawings shall be followed as closely as possible, all dimensions shall be checked and verified at the building, and any necessary changes shall be made to accord with structural conditions, equipment to be installed, other systems, etc., without additional cost.

B. 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. Any details which are omitted, and which are necessary for the proper installation or operation of the system included under this contract, must be supplied and installed by the Contractor without extra charge.

C. It shall be understood that where the words "The Contractor", "This Contractor" or "Mechanical Contractor" appear in either the drawings or specifications, it shall mean the Heating, Ventilating and Air Conditioning Contractor.

D. Any omissions from either the drawings or these specifications are unintentioned, and it shall be the responsibility of the Contractor to call to the attention of the Architect any pertinent omissions before submitting a bid. Complete working systems are required, whether every small item of materials is shown and specified or not.

E. It shall be understood that where the words "provide, furnish and/or install" are used, it is intended that the Heating, Ventilating and Air Conditioning Contractor shall purchase and install completely any and/or all materials necessary and required for this particular item, system, equipment, etc.

F. Some items of equipment are specified in the singular; however, the Contractor shall provide and install quantity of items indicated on the drawings, and as required for complete systems.

G. The term "as approved" in this division of the specifications shall mean as approved by the Project Architect in writing.

17004 COORDINATION OF WORK

A. It is understood and agreed that the Contractor has by careful examination satisfied himself as to nature and location of work, conformation of the ground and building structure, the character, quality and quantity of materials to be encountered, general and local conditions and all other matters which can and may affect the work under this contract. The Contractor shall be held responsible for visiting the site and thoroughly familiarizing himself with existing conditions. No extras will be allowed because of additional work necessitated by evident job

conditions that are not indicated on the drawings.

B. The Contractor shall compare the drawings and specifications for this contract with the drawings and specifications for other trades, and shall report any discrepancies between them to the Project Architect and obtain from him written instructions for changes necessary in the work. The work shall be installed in cooperation with other trades installing interrelated work. Before installation, the Contractor shall make proper provisions to avoid interference in a manner approved by the Project Architect. All changes required in the work of the Contract caused by his neglect to do so shall be made by him at his own expense. Coordinate work in this division with work of other divisions.

1. Location of pipes, ducts, electrical raceways, switches, panels, equipment, fixtures, etc., shall be adjusted to accommodate the work to interferences anticipated and encountered. The Contractor shall determine the exact route and location of each pipe, duct and electrical raceway prior to fabrication.

2. Installation and Arrangement: The Contractor shall install all work to permit removal (without damage to other parts) of all parts and equipment requiring periodic replacement and maintenance. The Contractor shall arrange pipes, ducts, raceways, and equipment to permit ready access to valves, starters, motors, control components, and to clear the opening of swinging and overhead doors and of access panels.

17005 ACCESSIBILITY

A. The Contractor shall locate all equipment which must be serviced, operated, or maintained in fully accessible positions. Equipment shall include, but not be limited to, valves, traps, cleanouts, motors, controllers and drain points. If required for better accessibility, furnish access doors for this purpose. Minor deviations from drawings may be made to allow for better accessibility.

B. The Contractor shall apprise the General Contractor of exact locations and size of access panels for each concealed device requiring service. Access panels shall be provided by this Contractor and installed by the General Contractor. Access panels shall be all steel construction with 16 gauge frames and 18 gauge panels. Units shall be Milcor, Miami Carey, or American Hatch Corporation. Panels and frames shall be factory primed with rust inhibiting paint; finish coat by General Contractor. Provide suitable UL listed doors where installed in rated construction.

C. Locations of access panels shall be submitted in sufficient time to be installed in the normal course of work.

D. Access panels will not be required for access to work located above a lift-out "T" bar type ceiling.

17006 MATERIALS AND WORKMANSHIP – GENERAL

A. All materials shall be new and shall bear the manufacturer's name, trade name and the UL label in every case where a standard has been established for the particular material. The equipment furnished under this specification shall be essentially the standard products of a manufacturer regularly engaged in the production of the required type of equipment and shall be the manufacturer's latest approved design.

1. Delivery and Storage: Equipment and materials shall be delivered to the site and stored in original containers, suitably sheltered from the elements, but readily accessible for inspection by the Project Architect until installed. All items subject to moisture damage (such as controls) shall be stored in dry, heated spaces.

2. Equipment and materials of the same general type shall be of the same make throughout the work to provide uniform appearance, operation and maintenance.

3. Protection: Equipment shall be tightly covered and protected against dirt, water and chemical or mechanical injury and theft. At the completion of the work, fixtures, equipment, and materials shall be cleaned and polished thoroughly and turned over to the Owner in a condition satisfactory to the Project Architect. Damaged or defects developing before acceptance of the work shall be made good at the Contractor's expense.

4. Dimensions: It shall be the responsibility of the Contractor to insure that items to be furnished fit the space available. He shall make necessary field measurements to ascertain space requirements, including those for connections, and shall furnish and install such sizes and shapes of equipment that the final installation shall suit the true intent and meaning of the drawings and specifications.

5. Manufacturer's directions shall be followed completely in the delivery, storage, protection and installation of all equipment and materials. The Contractor shall promptly notify the Project Architect in writing of any conflicts between any requirements of the contract documents and manufacturer's directions and shall obtain the Project Architect's written instructions before proceeding with the work. Should the Contractor perform any work that does not comply with the manufacturer's directions or such written instructions from the Project Architect, he shall bear all cost arising in correcting the deficiencies.

B. The Contractor shall furnish the services of an experienced superintendent who shall be constantly in charge of installation of the work together with all skilled workmen, fitters, metalworkers, welders, helpers and labor required to unload,

transfer, erect, connect-up, adjust, start, operate and test each system.

C. Unless otherwise specifically indicated on the drawings or specifications, all equipment and materials shall be installed with the approval of the Architect in accordance with recommendations of the manufacturer. This includes the performance of such tests as the manufacturer recommends.

17007 APPROVAL OF MATERIALS AND EQUIPMENT

A. Certain models and manufacturers of materials and equipment are specified. The Contractor shall submit his proposal on the specified materials and equipment or their equivalent. Equivalent shall be interpreted to mean an item of material or equipment similar in quality to that named and which is suitable for the same use and capable of performing the same function as that named, the Project Architect being the judge of equality.

B. Equipment model numbers noted in this specification or on the drawings are intended to denote a minimum standard of quality and do not necessarily relate to specific options or arrangement as shown. Contractor shall provide equipment with all standard features plus all optional features as stated and in the arrangement shown or as directed by the Architect if not shown.

17008 SHOP DRAWINGS, SUBMITTAL DATA AND PROCEDURES

A. The Contractor shall submit to the Architect copies of certified prints, catalog data and specification sheets for all items of equipment and material specified or required for this job. Composite wiring diagrams shall be submitted for approval. The Contractor shall furnish the number of copies specified in general sections of the contract. All shop drawings for the project shall be submitted at the same time, reasonably promptly after the material list has been approved.

B. The Contractor shall analyze all shop drawings before submittal to the Architect and certify that they meet requirements of the contract drawings and specifications.
   1. Certification to be in form of suitable approval stamp placed on each shop drawing.
   2. Data submitted for approval without Contractor's stamp of approval will not be considered.

C. The Project Architect will review submittal data, and if found acceptable, will return all except two (2) sets marked "Approved" or "Approved as Noted".

D. If the Project Architect deems submittal data is either incomplete or incorrect, one copy will be returned for correction and a new submittal set will be required.

E. At least one set of all "Approved" shop drawings, certified prints, etc., shall be maintained at the job site and available to representatives of the Project

Architect.

F. Items that require submittals shall be:

1. All items of equipment
2. Insulation
3. Piping specialties
4. Air distribution
5. Controls

G. Approval by the Project Architect of shop drawings for any materials, apparatus, devices and layouts shall not relieve this Contractor from the responsibility of furnishing same of proper dimensions, size, quantity, quality and all performance characteristics to efficiently perform the requirements and intent of the contract documents. Such approval shall not relieve the Contractor from responsibility for errors of any sort on the shop drawings.

H. If the submitted items or arrangement deviate from the Contract Documents, the Contractor shall advise the Project Architect of the deviations in writing accompanying the shop drawings, including the reason for the deviation.

I. Failure of the Contractor to submit shop drawings in ample time for checking shall not entitle him to an extension of contract time, and no claim for extension by reason of such default will be allowed.

17009 OPERATION AND MAINTENANCE MANUAL AND PERFORMANCE RECORDS

A. The Contractor shall provide, in a suitable loose leaf binder, a compilation of catalog data of each manufactured item of equipment used in the work. Two copies are required.

B. The following items shall be included in the binders:

1. Catalog data, descriptive brochures, etc.
2. Installation instructions and diagrams.
3. Control and wiring diagrams for appropriate equipment and systems.
4. Complete operating instructions for all systems.
5. Maintenance schedules and instructions with recommended spare parts that should be stocked by Owner.
6. Design capacities and performance data test results.

17010 RECORD DRAWINGS

A. The Architect shall furnish the Mechanical Contractor one (1) set of drawings covering the mechanical contract upon which the Mechanical Contractor shall mark all changes, modifications, or revisions effected during construction such

that the Architect may prepare record drawings from the information contained thereon upon completion of the work.

17011 VIBRATION ISOLATION

A. All systems shall operate under all conditions of load without any sound or vibration which is objectionable in the opinion of the Architect. In case of moving machinery, sound or vibration noticeable outside of room in which it is installed or annoyingly noticeable inside its own room will be considered objectionable. Sound or vibration conditions considered objectionable by the Architect shall be corrected in an approved manner by the Contractor at his expense.

B. Where connections are made to pieces of equipment containing rotating or reciprocating machinery, suitable approved means shall be provided as required to prevent transmission of noise and vibration.

C. Suspended equipment shall have steel spring vibration mounting with adjustable snubbers.

D. Floor mounted equipment shall be mounted on vibration eliminators.

17012 EQUIPMENT STANDS, FOUNDATIONS, HANGERS, SUPPORTS AND MISCELLANEOUS STEEL

A. Provide all stands and supports for equipment, piping, ductwork, etc., as shown or required. All stands and supports shall be fabricated from suitable steel structural members.

B. Provide suitable lintels as indicated or as directed by the Architect for wall openings larger than 12" x 12".

C. All concrete foundations and all concrete pads shown under pumps and equipment shall be provided by this Contractor, unless otherwise noted. Pads shall be placed under each piece of equipment so that no equipment base rests directly on the concrete floor or ground.

D. Construction of foundations, supports, pads, bases and piers where mounted on the floor shall be of the same material and same quality of finish as the adjacent and surrounding flooring material. All pads shall be extended beyond machine base 3 inches minimum in all directions with top edge chamfered. Inset 6-inch steel dowel rods into floors to anchor pads. Concrete shall develop strength of 3,000 psi at 28 days.

E. All miscellaneous steel for stands, hangers, supports, lintels, etc., shall be galvanized or shall receive one shop coat plus two finish coats of rust resistant paint.

F. All equipment, stands, supports and hangers shall be securely fastened to the building structure. Attachments shall be of a strong, durable nature.

G. No equipment shall be supported from ductwork or piping.

H. Any stands, supports, hangers or attachments which are, in the opinion of the Architect, inadequate shall be replaced as directed.

17013 CONCEALMENT OF PIPE, CHASES AND HOLE

A. Unless otherwise indicated, all piping and/or ductwork shall be run in concealed spaces above ceilings or in chases. Piping and/or ductwork in equipment rooms, crawl space and unfinished storage areas shall be installed exposed and as high as practical. This Contractor shall be responsible for the location and size of holes required for pipe and other equipment and shall advise the General Contractor of chase spaces and holes required as building progresses.

17014 CUTTING AND PATCHING

A. This Contractor shall have an experienced mechanic upon the job before concrete floors, concrete or masonry walls are set in place; whose duty it shall be to locate the exact position of any and all sleeves and holes for the future installation of his pipe or duct work. This Contractor shall locate and size all openings required for his equipment and give this information to the General Contractor in time to not delay the building construction.

B. If it becomes necessary to cut holes in concrete floors or concrete or other masonry walls, this Contractor shall call the General Contractor or his Superintendent of Construction and inform him of position and size of the hole or other opening to be provided and he shall determine the method to be used. Under no condition shall this Contractor make any cuts without permission from the General Contractor, nor shall he cut any green floors or walls.

C. This Contractor shall arrange proper openings in the building to admit his equipment. If it becomes necessary to cut any portion of the building to admit any equipment, the portion cut must be restored to their former condition by this Contractor through agreeable arrangement with the General Contractor.

17015 SLEEVES AND INSERTS

A. This Contractor shall provide and locate all sleeves and inserts required before the floors and walls are built or shall be responsible for the cost of cutting and patching required for pipes where sleeves and inserts were not installed, or where incorrectly located. This Contractor shall do all drilling required for the installation of his hangers.

B. Sleeves shall be provided for all piping passing through concrete floor slabs and

concrete, masonry, tile and gypsum wall construction. Sleeves shall not be provided for piping installed under concrete slabs on grade or paving unless specifically noted.

C. Where sleeves are placed in exterior walls below grade, the space between the pipe or conduit and the sleeves shall be packed with oakum and lead and made completely watertight.

D. Where pipe motion due to expansion and contraction will occur, make sleeves of sufficient diameter to permit free movement of pipe. Where sleeves pass insulated pipes, the sleeves shall be large enough to pass the pipe and insulation. Check floor and wall construction finishes to determine proper length of sleeves for various locations; make actual lengths to suit the following:

1. Terminate sleeves flush with walls, partitions and ceiling.

2. In areas where pipes are concealed, as in chases, terminate sleeves one inch above finished floor.

3. In all areas where pipes are exposed, extend sleeves 1/4-inch above finished floor, except in rooms having floor drains where sleeves shall be extended 4 inches above floor.

E. Duct sleeves shall be constructed of 22 gauge galvanized sheet steel with lock seam joints for all sleeves set in concrete floor slabs terminating flush with the floor. Pipe sleeves shall be Schedule 40 galvanized steel pipe unless otherwise indicated on the drawings.

F. Fasten sleeves securely in floors, walls, etc., so they will not become displaced when concrete is poured or when other construction is built around them. Take precautions to prevent concrete, plaster or other materials being forced into the space between pipe and sleeves during construction.

G. All piping and/or ductwork passing thru sleeves in fire walls, fire partitions or floor acting as fire separation shall have opening around pipe or duct caulked smoke tight with approved fireproof material to form a fire and smoke stop. Each sleeve shall contain a minimum of one-inch of packing. At the Contractor's option, "Pyro-Pac" seals as manufactured by Thunderline Corporation may be used to seal around piping through fire and smoke walls. Any sleeves provided and not used shall be sealed with concrete or other approved fireproof material.

H. Escutcheon plates shall be provided for all exposed pipes, insulated pipes and all exposed conduit passing thru walls, floors and ceilings in finished areas. Plates shall be nickelplated, of the solid ring type, of size to match the pipe or conduit. Where plates are provided for pipes passing thru sleeves which extend above floor surface in finished areas, provide deep recessed plates to conceal the pipe sleeves.

I. Escutcheon plates will not be required in equipment rooms unless specifically noted on drawings.

17016 EXCAVATION, TRENCHING AND BACKFILL

A. Perform all excavating, trenching and backfilling necessary to install work. Trenches are to be excavated so that pipe will have a solid bearing. Trenches are to be at least 12 inches wider than the diameter of the pipe. Furnish pumps as required to keep trenches dry during laying and jointing of mains. Provide shoring where required to maintain trench against settlement until final acceptance. After work is installed, inspected, tested and approved, trenches shall be refilled in 6-inch layers with clean damp earth, and thoroughly tamped and brought to proper grade.

B. Excavation:

1. Excavation work under this contract shall be bid unclassified.

2. Where it is necessary to cut existing paving, sidewalks, etc., for the installation, the Contractor shall patch such paving to smooth finish with equal type paving construction as that cut.

3. Wherever shrubs, flowers, hedges and/or sod are removed, they shall be preserved and reset according to good nursery practice. In areas where sod is not suitable to preserve and replace, this Contractor shall provide top soil as required. Areas shall be backfilled and well tamped and brought up to finish grade. Re-seed all disturbed areas as required to equal surrounding grass types already established.

17017 ELECTRICAL WORK:

A. All electrical work and equipment (including motors) provided by this Contractor shall comply with the detailed Electrical Specifications of this project.

B. In general, the Electrical Contractor shall provide disconnect switches and all load side power wiring to termination points in mechanical equipment. Mechanical Contractor shall be responsible for notifying the Electrical Contractor of wiring and disconnect requirements for mechanical equipment. Disconnect switches shall be sized to handle the maximum allowable fuse size for the equipment served. Mechanical Contractor shall be responsible for additional costs of electrical work required to serve mechanical equipment with electrical characteristics differing from those indicated on the mechanical schedules.

C. This Contractor shall provide properly sized fuses to protect his equipment.

D. This Contractor shall provide all control wiring interlocks and specialties as

shown or as required if not shown to properly operate mechanical equipment. All control wiring shall be suitable for healthcare application and shall be installed in conduits conforming to the detailed electrical specification .

E. Mechanical Contractor shall review the electrical drawings. All electrical work not specifically shown on the electrical drawings, but required for the proper operation of each item of mechanical equipment shall be furnished by the Mechanical Contractor. Mechanical Contractor shall be responsible for all changes and coordination of electrical work required for substituted mechanical equipment.

F. Motors shall be of sufficient size for the duty to be performed and shall not exceed their full rated load when driven equipment is being operated at specified capacity under the most severe conditions likely to be encountered. Motors shall have continuous duty classification based on a 40 degree C. ambient temperature. Except as specified otherwise, all motors 1/2 hp and above shall be wired for three phase service and shall have ball, roller or taper bearings. Provide standard grease fittings that are accessible for service without disconnecting other equipment.

17018 KITCHEN AND LAUNDRY EQUIPMENT

A. Mechanical services for kitchen and laundry equipment shall be provided and installed by the Mechanical Contractor.

B. Kitchen and laundry equipment shown on the drawings are based on assumed manufacturers. Mechanical Contractor shall coordinate with the actual suppliers and provide appropriate mechanical connections for equipment installed. Complete, properly operating systems installed in accordance with manufacturer requirements are required.

17019 MAJOR ITEMS OF EQUIPMENT

A. Mechanical equipment shall be as scheduled on drawings complete with all options and accessories indicated. Design basis manufacturers and models are scheduled on drawings. Alternate manufacturers of equivalent performance and quality may be considered if acceptable to the Architect/Engineer. Contractor is responsible for coordination and revisions necessitated by the use of alternate equipment. No extras will be allowed.

B. Split System Heat Pumps:

1. Split system heat pumps shall be air to air, electric driven units with direct expansion coil. The units shall be listed by Underwriter's Laboratories and rated in accordance with AHRI. Units shall be matched sections to provide capacities as shown on the drawings and shall be suitable and approved for use together. Manufacturers and accessories shall be as

scheduled on drawings. Trane design basis.

2. Indoor section shall be a factory assembled unit, complete with insulated steel cabinet (housing); refrigerant coil and fittings; filter section with filter rack and throw-away filters; centrifugal fan, belt driven, electrical furnace section with heater coils; refrigerant metering devices; contactors; relays; and all other accessories necessary for a complete assembly ready for operation.

3. Outdoor section shall be a factory assembled unit housed and suitably protected for outdoor installation. Units shall contain a hermetically sealed compressor, coil, reversing valve, crankcase heater, high and low pressure stats, suction line accumulator, filter-drier, pressure relief devices, compressor power delay starting device to prevent short cycling of compressor, automatic defrost control, service valves and connections, and other factory recommended devices for adequate and proper control. Compressor shall have thermal and current overload protection. Compressors shall carry a five (5) year factory warranty.

4. Provide suitable fused disconnect switches for each component as required by Code.

C.

D. Variable Refrigerant Flow Zoning (VRFZ) Split System Heat Pumps:

1. Variable capacity, heat pump heat recovery air conditioning system shall be a Variable Refrigerant Flow System multizone simultaneous cooling and heating split system heat pumps. Trane design basis. Equivalent Mitsubishi or Daikin products may be considered

2. The system shall consist of a variable speed heat pump outdoor unit, branch selector box(es) multiple indoor units. and DDC (Direct Digital Controls). Each indoor unit or group of indoor units shall be capable of operating in any mode independently of other indoor units or groups. System shall be capable of changing mode (cooling to heating, heating to cooling) with no interruption to system operation. Each indoor unit or group of indoor units shall be independently controlled. Include isolation valves on each indoor unit refrigerant circuit to allow individual servicing.

3. See drawing schedules and details for equipment arrangement and performance.

4. Systems shall be designed and installed by a manufacturer certified dealer and installer and verified with a completed commissioning report submitted to manufacture to obtain 10 year extended manufacturer's warranty. Installation shall be in strict accordance with manufacturer instructions.

E. Thu-wall Heat Pumps:

1. Thru-wall heat pump shall be a complete single package unit with electric auxiliary heat to include compressor(s), DX coils, electric heat coil, direct drive centrifugal indoor fan, propeller outdoor fan, motors, controls, internal piping and wiring. Unit shall have condensate removal system and shall be furnished with all accessories required for a complete operational installation. Provide matching galvanized steel wall sleeve, architectural louvered outdoor grille, standard front cabinet, unit mounted thermostat and fan controls for continuous fan operation. Manufacturers and accessories shall be as scheduled on drawings.

F. Exhaust Fans: Exhaust fans shall be size, type, and capacities as shown on the drawings. All units shall be provided with birdscreen (where applicable), backdraft damper and disconnect switch mounted in fan junction box. Wiring from motor to junction box shall be installed with green grounding conductor. All single-phase motors shall be provided with internal overload protection device. Manufacturers and accessories shall be as scheduled on drawings.

G. Energy Recovery Units:

1. Single package fixed enthalpy core energy recovery unit with integral supply and exhaust fans, Aldes design basis.

2. Energy recovery core shall be enthalpy type with minimum efficiency of 65% at design conditions.

3. Provide disposable air filters on inlet air connection to unit (supply and exhaust).

4. See drawing schedules and details for equipment arrangement, performance, options and accessories.

H. Kitchen Exhaust Hoods:

1. Type I wall canopy commercial kitchen hood, NFPA 96 rated for all types of cooking equipment, CaptiveAire design basis. Provide for 0 inch clearance to combustible materials on top and sides as required.

2. Provide matched dedicated outdoor air makeup system with integral temperature and humidity controls.

3. Construction shall be type 430 stainless steel with a #3 or #4 polish where exposed. Individual component construction shall be determined by manufacturer and ETL. Construction shall be dependent on the structural

application to minimize distortion and other defects. All seams, joints and penetrations of the hood enclosure to its lower outermost perimeter that directs and captures grease-laden vapor and exhaust gases shall have a liquid-tight continuous external weld in accordance with NFPA 96.

4. Hood shall be furnished with U.L. classified aluminum baffle filters, supplied in size and quantity as required by ventilator. The filters shall extend the full length of the hood and the filler panels shall not be more than 6".

5. U.L. LED light fixtures shall be installed and pre-wired to a junction box.

6. The hood shall include:

   a) A double wall insulated front to eliminate condensation and increase rigidity. The insulation shall have a flexural modulus of 475 EI, meet UL 181 requirements and be in accordance with NFPA 90A and 90B.
   b) An integral front baffle to direct grease laden vapors toward the exhaust filter bank.
   c) The grease drain system shall be an integral part of the hood back and have a minimum 1/8" per foot slope with an exposed, removable ½ pint grease cup to facilitate cleaning.
   d) Factory furnished listed fire suppression system with pre-wired control panel.
   e) Complete fan switching package and controls per Code.
   f) Matching exhaust fan(s) with curb(s).
   g) Matching dedicated outdoor air conditioning and makeup unit.
   h) Factory startup and commissioning.

7. See drawing schedules and details for equipment arrangement, performance, options and accessories.

I. Dishwasher Exhaust Hood:

1. Type II wall canopy condensate hood, CaptiveAire design basis.

2. Construction shall be type 430 stainless steel with a #3 or #4 polish where exposed. Individual component construction shall be determined by manufacturer and ETL. Construction shall be dependent on the structural application to minimize distortion and other defects. All seams, joints and penetrations of the hood enclosure to its lower outermost perimeter that directs and captures water vapor shall have a liquid-tight continuous external weld.

3. Hood shall include:

a) Matching exhaust fan with curb.
b) Fan Switch with interlock to dishwasher.

4. See drawing schedules and details for equipment arrangement, performance, options and accessories.

17020 ROOF MOUNTING CURBS:

A. Mechanical Contractor shall provide General Contractor curbs of the correct size and quantity and exact locations of same.

B. Curbs shall be at least 12 inches high and shall match the equipment for which they are intended to support.

C. Curbs for fans shall be prefabricated of minimum 18 gauge galvanized steel, with recess to adjust for insulation thickness.

D. Curbs shall be lined with rigid fiberglass insulation.

E. Provide wind and/or seismic engineered design as required.

17021 AIR DISTRIBUTION EQUIPMENT

A. Registers, diffusers and grilles shall be of sizes and styles as scheduled on the drawings, Price design basis. Construction shall be aluminum or steel as indicated with suitable mounting frame. Finish shall be as directed by the Architect. Equipment shall be models scheduled or equal.

17022 DUCTWORK

A. Provide all ductwork as indicated on the drawings. All duct dimensions shown on the drawings are clear and free inside dimensions. The heating and air conditioning contractor may change the cross section dimensions of ductwork when required to meet job conditions; however, at least same ASHRAE equivalent cross sectional area shall be maintained.

B. All ductwork shall be galvanized steel in accordance with SMACNA "HVAC Duct Construction Standards," one-inch pressure class, Seal Class C. All sheet metal work shall be performed by trained mechanics, experienced in this type of work and shall be installed in a neat, workmanlike and substantial manner.

C. Provide manual dampers in branch duct runouts for balancing the air flow for supply, return and exhaust. Dampers shall be fitted with exposed locking quadrants. Each damper quadrant to be marked to indicate open and closed position and be securely anchored to ducts. Dampers in diffusers or registers are

not acceptable in lieu of duct mounted dampers.

D. Duct hangers and supports shall be in accordance with standards and details as described and set forth in SMACNA "HVAC Duct Construction Standards" for pressure class specified. All hangers and supports shall be securely attached to the building structure.

E. All duct joint sealing compounds, glues, mastics, and adhesives used on duct construction shall be "Fire Safe" and be "U.L." approved and labeled.

F. All square bends or elbows with a centerline radius of turn less than 1-1/2 times the width of the duct shall be fitted with double thickness air foil turning vanes of an approved type, unless otherwise shown.

G. All ductwork shall be installed in accordance with the applicable requirements of NFPA 90A.

H. Runouts to diffusers shall be round sheetmetal ducts same size as diffuser neck size unless otherwise shown. If transition is necessary, it shall be made at the diffuser neck with a tapered fitting.

I. Flexible ducts may be used as connectors between runouts and diffusers to adjust for final diffuser location. Connectors shall not exceed 6 feet in length unless otherwise noted and shall be supported so as to prevent sagging. Centerline bend radius shall not be less than one duct diameter. Connectors shall be U.L. labeled and shall meet Class I requirement of NFPA 90A. Connectors shall be insulated with one pcf one-inch thick fiberglass insulation and be constructed with one zinc coated spring steel Helix bonded to a non-perforated liner. All connections shall be secured with 1/2-inch wide positive locking steel straps. Connectors shall be Genflex SL-181 or approved equal.

J. Flexible connections shall be installed at all connections between ductwork and fans. Each unit shall be of double thickness, heavy glass fabric, forming a flexible, air tight bellow joint. Joints, in all cases where space permits, shall be a minimum of 6 inches in width. All flexible duct connections at fans to be Ventglass as made by Vent Fabric, Inc. of Chicago, Illinois; Duro Dyne "Durolon"; or other type as approved that has U.L. approval for operation at 265 degrees.

K. In all cases where duct sleeves are roughed through walls, floors, or ceilings, they shall be blocked and braced to prevent sagging or crushing occurring during construction.

L. Exhaust duct shall be minimum of 26 gauge and shall be run uninsulated, except where connected to energy recovery exhaust or where otherwise shown on the drawings.

M. Kitchen hood exhaust duct shall be factory manufactured ETL listed grease duct

for 0" clearance to combustibles. All work shall be in accordance with NFPA 96.

N. Dryer vent ductwork shall be 26 gauge minimum galvanized steel with joints sealed with non-combustible sealant. No screws or fasteners may extend into duct. Minimum clearance to combustible materials shall be 6" unless approved equivalent protection is provided. Dryer vent terminations shall be as recommended by dryer manufacturer. Installation and arrangement shall be in strict accordance with dryer manufacturer's instructions. Verify requirements with equipment provided.

O. All duct joints and connections shall be sealed with approved mastic or sealant to effectively seal joints to air-tight condition.

P. Round runouts shall be connected to rectangular trunk duct with spin-in type fittings with volume dampers, and insulation guards. Fittings shall be sealed to trunk duct with high pressure duct joint sealing compound. Fittings shall be Genflex SM-IDELG or approved equal.

Q. Round runouts shall be connected to round trunk duct with round tap fittings with volume dampers. Fittings shall be sealed to trunk duct with high pressure duct joint sealing compound.

R. Ceiling radiation dampers shall be UL listed fusible link, approved for use with planned construction. Installation shall be in strict accordance with manufacturer's installation instructions to maintain listing.

S. Fire dampers shall be UL listed multi-leaf type, constructed in accordance with NFPA 90A. Damper rating shall be appropriate for the assembly rating. Installation shall be in strict accordance with manufacturer's instructions to maintain listing.

17023 PIPING

A. General:

1. Piping shall be installed in a neat and workmanlike manner.

2. Routing shall be, in general, parallel to or at right angles to building walls.

3. Piping systems shall be fitted in proper alignment. Extra fittings shall not be used to make up for poor alignment.

4. Pipes (including conduits) shall not be strapped together with cable ties, etc. Each pipe shall be attached to supports independently.

B. Refrigerant Piping:

1. Refrigerant piping shall be Type "ACR" copper pipe in accordance with ASTM B-88. Fittings shall be wrought copper in accordance with ASA B16.22. All joints shall be brazed with silver brazing allowed in accordance with the manufacturer's recommendations. Soft copper with minimal use of fittings is preferred for piping between branch controllers and indoor units.

2. The Contractor shall evacuate, dehydrate and charge refrigerant piping to charge as recommended by equipment manufacturer. Furnish and install filter-drier unit, thermal expansion valves, solenoid valves and sight glass and other accessories as recommended by the equipment manufacturer. Refrigerant piping shall be sized and installed strictly according to manufacturer's instructions.

3. The Contractor may, at his option, furnish and install pre-charged refrigerant piping and quick connect couplings, as recommended by equipment manufacturer.

4. Refrigerant gas and liquid lines shall not be strapped together on supports with plastic cable ties. Secure each line and control conduit separately.

5. Cable tray may be used to support multiple runs of soft copper line sets.

6. Refrigerant piping shall be run as direct and short as reasonably possible consistent with building construction.

7. Provide service isolation valves on

8. Provide a full charge of refrigerant for each system and maintain the charge for a period of one year from date of acceptance, replacing at Contractor's expense any refrigerant that may be lost, unless loss is due to damage by the Owner.

C. Coil and Auxiliary Drain Piping:

1. Drain piping shall be Schedule 40 PVC pipe and fittings (ASTM D-2665) with solvent weld joints (ASTM 2564) unless otherwise specified or indicated.

2. Drain piping routed along floors subject to traffic or as indicated shall be Schedule 40 galvanized steel (ASTM A53 or ASTM A120) with recessed threaded galvanized iron drainage pattern fittings and teflon tape.

3. Provide cleanout at equipment trap and at each change in direction.

4. Slope pipe as required to obtain proper drainage.

17024 PIPING SPECIALTIES:

A. Refrigerant Piping: Each refrigerant circuit shall be equipped with isolation shutoff valve, thermal expansion valve, and sight glass as recommended by the refrigeration equipment manufacturer.

17025 HANGERS AND SUPPORTS:

A. Support all piping from building structure by means of hangers or inserts to prevent vibration, secure piping in place and to provide for expansion and contraction.

B. Horizontal piping shall be supported by all metal hangers or brackets with individual means of vertical adjustment for the leveling of lines after piping is in place. All hangers shall be locked in place with a separate locknut on hanger rod after line is properly leveled. Hangers shall be adjustable clevis type Grinell Fig. 260 or equal.

C. Hangers on insulated lines shall encompass pipe and insulation and shall have a 16 gauge steel saddle 12 inches long attached to hanger to protect insulation. A wood or foamglass spacer block equal to the length of the shield shall be provided to prevent crushing of the insulation. Jacket shall be contiguous around spacer.

D. All hangers shall be supported by solid steel rods with machine threads in the following sizes:

| | Size of Pipe | Size of Rod |
|---|---|---|
| 1. | | |
| 2. | 2" and smaller | 3/8" |
| 3. | 2-1/2" and 3" | 1/2" |
| 4. | 4" | 5/8" |

E. Horizontal distance between hangers shall not exceed values indicated in the following table:

Maximum Hanger Spacing (Feet)

| | Pipe Size (Inches) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | <1 | 1-1/4 | 1-1/2 | 2 | 2-1/2 | 3 | 3-1/2 | 4 | 5 | 6 |
| Plastic Pipe | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| Copper Pipe | 6 | 6 | 6 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |

F. Channel type brackets and clamps as manufactured by Unistrut Hydra-Zorb or B-Line shall be used to support piping runs along walls. Clamps shall allow for insulation thickness.

G. Route piping neatly and parallel or perpendicular to building structure.

17026 MECHANICAL THERMAL INSULATION

A. Duct Insulation:

1. All air conditioning supply, return, energy recovery supply and energy recovery exhaust ductwork (except pre-insulated flexible duct) shall be externally insulated with fiberglass duct wrap with factory-laminated reinforced foil kraft vapor barrier facing in thickness prescribed by Code or 2 inch, minimum. Insulation shall be applied over clean, dry, air tight ducts. Joints shall be butted tightly together and vapor barrier facing shall be overlapped 2 inches, minimum. Seams shall be stapled with outward clinching staples, 6 inches on center, maximum. All joints and seams shall be taped with two wraps of adhesive duct tape. On ducts larger than 24 inches in width, metal clip fasteners 18 inches on center, minimum, to prevent insulation from shifting or sagging. Any penetrations or rips in the facing shall be sealed to provide a vapor tight barrier.

2. Dishwasher hood exhaust ductwork shall be insulated with UL E226 listed fire-rated duct wrap for zero clearance to combustible construction. Install strictly according to manufacturer's instructions to maintain listing.

B. Refrigerant Piping Insulation: Code thickness "slip-on" type Armstrong "Armaflex" or approved equal pre-formed tubing insulation. Insulation sections shall be tightly butted together and sealed with Armstrong 520 adhesive to obtain vaportight installation. Fittings shall be insulated with miter cut pieces. Insulation exposed to weather at outdoor units shall be finished with two (2) coats of white "Armaflex Finish" material. Do not apply finish within 7 days of 520 adhesive application. Clean thoroughly and apply in strict accordance with manufacturer's recommendations.

C. Coil Condensate Piping Insulation: Condensate piping insulation shall be 1/2-inch thick "slip on" type Armstrong "Armaflex" or equal pre-formed tubing insulation. Insulation sections shall be tightly butted together and sealed with Armstrong 520 adhesive to obtain vaportight installation. Fittings shall be insulated with miter cut pieces.

D. Before closing out any ceiling areas or chases that contain insulation on cold ducts or piping, the vapor barrier seal shall be checked by the Architect. It shall be the duty of the Contractor to notify the Architect ahead of time in order that the work will not be delayed by this inspection.

17027 MECHANICAL PAINTING

A. All equipment, equipment supports, hoods, etc., except galvanized, furnished by

this Contractor shall be cleaned after fabrication, primed and painted with two coats of rust resistant paint, color selected by the Architect.

B. All hangers, hanger rods inserts, and beam clamps in mechanical room shall be painted flat black.

C. All sheet metal ductwork or duct liner visible through return and exhaust air grilles shall be painted with flat black enamel.

17028 TEMPERATURE CONTROL SYSTEM

A. General: Furnish and install temperature control system as shown on the drawings and/or specified herein. Systems shall be complete in every respect, tested, adjusted and calibrated for accurate and reliable temperature and system control. Control system installation, testing, calibration and adjustment shall be performed by competent mechanics experienced in work of this nature.

B. Electric/Electronic Temperature Control Systems: Controls shall be electric/electronic type, complete with all items required for a properly operating control system. Equipment shall include but not be limited to: thermostats, thermostat guards, damper operators, sensors, electric switches, relays, interlocks, time controls, transformers, wiring and panels. All electrical work for controls shall be by this Contractor and shall be in strict accordance with the electrical specifications for the project.

C. Sequence of Operation: Sequence of operation shall be as indicated on the drawings and as specified herein.

D. Fire Alarm Interlock: Interlock all air handlers, exhaust fans and energy recovery units with building fire alarm system to shutdown in the event of fire. Coordinate requirements with Electrical Contractor.

E. Emergency fan shutdown switch: Provide global manual shutdown switch for air handling systems to stop fans in an emergency. Locate switch at nurse station or other location as indicated or prescribed by Code.

F. Energy recovery units shall be scheduled to start-stop through associated air handler auxiliary relay contacts and shall be interlocked to shut-down on fire alarm activation.

17029 PLACING IN SERVICE, TESTING, ADJUSTING AND BALANCING

A. The Contractor shall provide start-up services, testing and trial operations as required and as directed by the Architect to prove that all work performed under these drawings and specifications is in complete operational condition and shall function as intended. All costs associated with tests shall be paid by the Contractor. Contractor shall advise the Architect at least three days prior to

testing so that the Architect may witness the tests.

B. The interior of all equipment, coils and piping shall be cleaned and flushed of all grease and foreign matter with approved type chemicals.

C. After installation and start-up of equipment, the Contractor shall test, adjust and balance systems to quantities indicated on the drawings.

D. Testing and balancing shall be performed according to procedures outlined in the latest edition of the Associated Air Balance Council (AABC) "National Standards." The Contractor shall furnish all labor, devices and test equipment required to accomplish testing and balancing.

E. Three (3) copies of all test data, tabulated on AABC Test Report Forms shall be submitted to the Architect.

F. Air System Tests: Provide testing and balancing results for each air handling system installed (air handlers, fans, ventilators, fan-coils, etc.). Information supplied shall include but not be limited to the following:

1. Equipment manufacturer, model, serial number, nameplate data, designation from drawings and location.

2. Motor nameplate and operating horsepower, volts, phase, amperes, and RPM.

3. Fan driver and driven pulley sizes and RPM.

4. Drive belt size and type.

5. Fan discharge pressure, design and actual.

6. Fan inlet pressure, design and actual.

7. Space inlet/outlet air flow quantities (supply, return, exhaust, outside air), design and actual.

8. Air temperature and humidity (supply, return, exhaust, outside air).

9. Space temperature at room thermostat.

10. Date and time tests are performed.

G. Refrigerant Piping Test: Test refrigerant piping per Code, ASHRAE 15 and manufacturer's instructions.

INSTRUCTIONS:

A. It is the Contractor's responsibility to turn over to the Owner all equipment and work in a clean and first-class condition. All torn or gouged insulation shall be patched and all equipment panels shall be straight with no dents or construction debris on them. All equipment which is scratched up shall be properly primed and touched up with paint matching the adjacent surfaces. This Contractor shall protect his equipment from damage during construction with suitable covers.

B. All items of mechanical equipment shall be identified with engraved bakelite plates permanently attached to the equipment. All switches, disconnects, time clocks and other items controlling or associated with items of mechanical equipment shall be labeled likewise, whether or not they are furnished by this Contractor. Contractor shall submit a list of equipment identification for approval prior to labeling.

C. When all of the requirements of the drawings and specifications have been met and prior to final inspection, the Contractor shall arrange to instruct the Owner or his representative in the correct and proper procedures for the operation and maintenance of the systems.

17031 GUARANTEE

A. The Contractor shall guarantee all heating, ventilating and air conditioning systems subject to the General Conditions of these specifications. The Contractor shall further guarantee that each piece of apparatus furnished and installed under this contract shall have a capacity for performance of not less than that called for when the apparatus is operating under design conditions. Provide extended warranty for VRF systems as indicated.

END OF SECTION 17000