# Solicitation 1906-327

# River Ranch County Park - Interpretive Center

# Bid Designation: Public

# Williamson County, Texas

# Bid 1906-327
# River Ranch County Park - Interpretive Center

| | |
|---|---|
| Bid Number | 1906-327 |
| Bid Title | River Ranch County Park - Interpretive Center |
| Expected Expenditure | **$1,000,000.00** (This price is expected - not guaranteed) |
| Bid Start Date | In Held |
| Bid End Date | Aug 5, 2019 3:00:00 PM CDT |
| Question & Answer End Date | Jul 26, 2019 3:00:00 PM CDT |
| Bid Contact | Blake Skiles<br>Senior Purchasing Specialist<br>512-**943**-1478<br>blake.skiles@wilco.org |
| Contract Duration | **One Time Purchase** |
| Contract Renewal | Not Applicable |
| Prices Good for | **365 days** |
| Pre-Bid Conference | **Jul 17, 2019 10:00:00 AM CDT**<br>**Attendance is mandatory**<br>**Location: Williamson County Purchasing Department**<br>**100 Wilco Way, Suite P101**<br>**Georgetown, TX 78626** |
| Bid Comments | **Williamson County seeks a qualified firm to construct the Interpretive Center at River Ranch County Park. This project is partially funded through a grant with the Texas Parks and Wildlife Department. The grant requires inclusion of specific sustainable features/materials. Scope of project includes, but is not limited to, Interpretive Center building, restrooms, signage, outdoor classroom space, low-flow plumbing, energy efficient doors and windows, energy efficient lighting, energy efficient mechanical system, thermal and moisture protection.** |

## Item Response Form

| | |
|---|---|
| Item | **1906-327-01-01** - Total Proposal Price |
| Quantity | **1 each** |
| Unit Price | |
| Delivery Location | **Williamson County, Texas**<br>No Location Specified<br><br>**Qty** 1 |

**Description**
Total Proposal Price
**PLEASE DO NOT ATTACH DOCUMENTS TO THIS LINE**

| | |
|---|---|
| Item | **1906-327-01-02** - Please Attach All Documents To This Line |

Quantity **1 each**

Prices are not requested for this item.

Delivery Location **Williamson County, Texas**

No Location Specified

**Qty** 1

**Description**

Please Attach All Documents To This Line

**PLEASE DO NOT ATTACH .ZIP FILES!**

# PUBLIC ANNOUNCEMENT AND GENERAL INFORMATION

## WILLIAMSON COUNTY PURCHASING DEPARTMENT
## SOLICITATION NUMBER 1906-327
River Ranch County Park - Interpretive Center

**PROPOSALS MUST BE RECEIVED ON OR BEFORE:**
**Aug 5, 2019 3:00:00 PM CDT**

**PROPOSALS WILL BE PUBLICLY OPENED:**
**Aug 5, 2019 3:00:00 PM CDT**

Notice is hereby given that Competitive Sealed Proposals for the above-mentioned construction services will be accepted by the Williamson County Purchasing Department. Williamson County uses BidSync to distribute and receive Proposals. Specifications for this RFCSP may be obtained by registering at www.bidsync.com.

**Williamson County prefers and requests electronic submittal of this Proposal.**

**All electronic proposals must be submitted via:** www.bidsync.com

Electronic Proposals are requested, however paper proposals will currently still be received, until further notice and may be mailed or delivered to the address listed below.

**Respondents are strongly encouraged to carefully read this entire RFCSP.**

All interested Respondents are invited to submit a Proposal in accordance with the Instructions and General Requirements, Proposal Format, Proposal Specifications, and Definitions, Terms and Conditions stated in this RFCSP.

**Please note that a complete package must be submitted choosing one of the above two methods. Split packages where a partial submittal is received in paper and a partial submittal is received via BidSync will be considered "unresponsive" and will not be accepted or evaluated.**

**Williamson County will not accept any Proposals received after the submittal deadline, and shall return such Proposals unopened to the Respondent.**

General Information:

- If mailed or delivered in person, Proposal and Proposal addenda are to be delivered in sealed envelope on or before the submittal deadline, as noted in the Public Announcement and General Information listed above for this RFCSP, to:

  Williamson County Purchasing Department
  Attn: **BID NAME AND NUMBER**
  100 Wilco Way
  Suite P101
  Georgetown, TX 78626

  - Respondents should list the Proposal Number, Proposal Name, Name and Address of Respondent, and the Date of the Proposal opening on the outside of the box or envelope and note "Competitive Sealed Proposal Enclosed."
  - Respondent should submit one (1) original.
  - Williamson County will NOT be responsible for unmarked or improperly marked envelopes.
  - Williamson County will not accept any responsibility for Proposals being delivered by third party carriers.
  - Facsimile transmittals will NOT be accepted.

- Proposals will be opened publicly and the names of the offerors and any monetary Proposals made by the offerors, will be read aloud.

- All submitted questions with their answers will be posted and updated on www.bidsync.com.

- It is the Respondent's responsibility to review all documents in BidSync, including any Addenda that may have been added after the document packet was originally released and posted.

  - Any Addenda and/or other information relevant to the RFCSP will be posted on www.bidsync.com.

  - The Williamson County Purchasing Department takes no responsibility to ensure any interested Respondent has obtained any outstanding addenda or additional information.

# Williamson County – Request for Competitive Sealed Proposal (RFCSP)

## SECTION 1 - DEFINITIONS

**Addendum/Addenda** – means any written or graphic instruments issued by the County prior to the consideration of Proposals which modify or interpret the Proposal Documents by additions, deletions, clarifications, or corrections.

**Agreement/Ensuing Agreement(s)** – means the Successful Respondent may be required by the County to sign an additional Agreement containing terms necessary to ensure compliance with the RFCSP and the Respondent's Proposal. Such Ensuing Agreement(s) shall contain the Proposal specifications, terms and conditions that are derived from the RFCSP.

**Contract** – means this RFCSP and the Proposal of the Successful Respondent shall become a Contract between the Successful Respondent and the County once the Successful Respondent's Proposal is properly accepted by the Williamson County Commissioners Court (sometimes referred to herein as the Commissioner's Court").

**Commissioner's Court** – means the Williamson County Commissioners Court.

**County –** means Williamson County, a political subdivision of the State of Texas.

**Executive Summary** – means the document submitted by Respondent that represents a concise summary of the contents of the Proposal. It does not include any information concerning costs.

**Proposal Documents** – means the Legal Notice, RFCSP including attachments, and any Addenda issued by the County prior to the consideration of any Proposals.

**Proposal** – means the complete, properly signed document, and ALL required forms and documentation listed in the proposal package which have been submitted in accordance with this RFCSP package. A Proposal submitted in accordance with this RFCSP is irrevocable during the specified time period for evaluation and acceptance of Proposals, unless a waiver is obtained from the Williamson County Purchasing Agent.

**Respondent** – means a person or entity who submits a Proposal in response to this RFCSP.

**Request for Competitive Sealed Proposals (RFCSP)** – means this document, together with the attachments thereto and any future Addenda issued by the County.

**Successful Respondent**– means the responsible Respondent who, in the County's sole opinion, submits the Proposal which is in the best interest of the County, taking into account factors identified

herein, and to whom the County intends to award the Contract.

# SECTION 2 - RESPONSE FORMAT AND SUBMISSION

## 2.1 INTRODUCTION

Each Proposal submitted in response to this RFCSP should clearly reference the numbered sections of this RFCSP that require a response. Failure to arrange the Proposal as requested may result in the disqualification of the Proposal.

Though there is not a page limit for Proposals, to save natural resources including paper, and to allow the County staff to efficiently evaluate all submitted Proposals, the County requests that Proposals be orderly, concise, but comprehensive in providing the requested information. Conciseness and clarity of content are emphasized and encouraged. If mailed or delivered in person, please limit additional, non-requested information.

Please provide your Proposal response using:

A. 8 ½" x 11" pages, inclusive of any cover letter or supporting materials.

B. The least amount of plastic/laminate or other non-recyclable binding materials.

C. Single-sided printing.

Vague and general Proposals will be considered non-responsive, and may, at the County's sole discretion, result in disqualification. Proposals must be legible and complete. Failure to provide the required information may result in the disqualification of the Proposal. All pages of the Proposal should be numbered and the Proposal should contain an organized, paginated table of contents corresponding to the sections and pages of the Proposal.

## 2.2 ORGANIZATION OF PROPOSAL CONTENTS AND TABLE OF CONTENTS

Each Proposal should be submitted with a table of contents that clearly identifies and denotes the location of all enclosures of the Proposal. The table of contents should follow the RFCSP's structure as much as is practical.

Each Proposal should be organized in the manner described below:

A. Transmittal Letter. Please see Section 2.3, Transmittal Letter, for more information.

B. Table of Contents.

C. Executive Summary. Please see Section 2.4, Executive Summary.

D. Proposal Response to Criteria. (Please see the sections in this RFCSP package that list the Specifications & Cost Proposal, Experience and Qualifications, References, and Implementation Strategy to respond to our criteria in a clear and concise manner)

E. Price Sheet.

F. References: Identification of three (3) references within the last four (4) years, for which the Respondent is providing, or has provided, the goods and/or services (public sector) of the type requested in this RFCSP. Include the name, position/title, and telephone number of a contact person at each entity.

G. Conflict of Interest Questionnaire.

H. Proposal Affidavit (Signature Page).

I. Attach your entities sample Contract, if applicable, for the County's review and consideration. This should include any additional terms or conditions. The County is not required to use the sample Contract submitted.

## 2.3 TRANSMITTAL LETTER

The Respondent should submit a Transmittal Letter that provides the following information:

A. Name and address of individual or business entity submitting the Proposal.

B. Respondent's type of business entity (i.e., Corporation, General Partnership, Limited Partnership, LLC, etc.). See Section 3.5, Signature of Respondent, for more information.

C. Place of incorporation or organization, if applicable.

D. Name and location of major offices and other facilities that relate to the Respondent's performance under the terms of this RFCSP.

E. Name, physical address, email address, business and fax number of the Respondent's principal contact person regarding all contractual matters relating to this RFCSP.

F. The Respondent's Federal Employer Identification Number.

G. A commitment by the Respondent to provide the services required by the County;

H. A statement that the Proposal is valid for the time specified on page three (3), under the section named *Prices Good for*, of this Proposal packet. Any Proposal containing a term of less than the required amount, may at the County's sole discretion, be rejected as non-responsive.

I. If the Proposal being submitted will have an effect on air quality for the County (as it relates to any state, federal, or voluntary air quality standard), then the Respondent is encouraged to provide information in narrative indicating the anticipated air quality impact. See Section 4.40, Air Quality for more information.

The Transmittal Letter should be signed by a person legally authorized to bind the Respondent to the representations in the Transmittal Letter and the Proposal. In the case of a joint Proposal, each party must sign the Transmittal Letter.

## 2.4 EXECUTIVE SUMMARY

The Respondent should provide an Executive Summary of its Proposal that asserts that the Respondent is providing in its response all of the requirements of this RFCSP. The Executive Summary should not include any information concerning the cost of the Proposal, but instead must represent a full and concise summary of the contents of the Proposal. It is recommended the Executive Summary include the following information:

A. Identify any goods and/or services that are provided beyond those specifically requested. If the Respondent is providing services and/or goods that do not meet the specific requirements of this RFCSP, but in the opinion of the Respondent are equivalent or superior to those specifically requested, any such differences should be noted in the Executive Summary. However, the Respondent must realize that failure to provide the goods and/or services specifically required, at the County's sole discretion, may result in disqualification of

the Proposal.

B. Indicate why the Respondent believes that it is the most qualified Respondent to provide the services described in this RFCSP. The Successful Respondent must demonstrate extensive experience and understanding of the intent of this project. The Respondent should describe in detail the current and historical experience the Respondent and its subcontractors have that would be relevant to completing the project. References must contain the name of key personnel and telephone numbers for each contact, as described in Section 3.14, References.

C. Briefly state why the Respondent believes its proposed goods and/or services best meet the County's needs and RFCSP requirements, and the Respondent also should concisely describe any additional features, aspects, or advantages of its goods and/or services in any relevant area not covered elsewhere in its Proposal.

## 2.5 CONFLICT OF INTEREST

No public official shall have interest in a contract, in accordance with Vernon's Texas Codes Annotated, Local Government Code, Title 5, Subtitle C, Chapter 171, as amended.

As of January 1, 2006, all Respondents are responsible for complying with Local Government Code, Title 5, Subtitle C, Chapter 176. Additional information may be obtained from the County's website at the following link:

http://www.wilco.org/Departments/Purchasing/Conflict-of-Interest

Each Respondent must disclose any existing or potential conflict of interest relative to the performance of the requirements of this RFCSP. **Examples of potential conflicts of interest may include an existing business or personal relationship between the Respondent, its principal, or any affiliate or subcontractor with the County or any other entity or person involved in any way with the project that is subject to this RFCSP**. Similarly, any personal or business relationship between the Respondent, the principals, or any affiliate or subcontractor with any employee, or official of the County or its suppliers must be disclosed. Any such relationship that might be perceived or represented as a conflict must be disclosed. Failure to disclose any such relationship or reveal personal relationships with the County employees or officials may be cause for termination.

The County will decide if an actual or perceived conflict should result in Proposal disqualification.

By submitting a Proposal in response to this RFCSP, all Respondents affirm they have not given, nor intend to give, at any time hereafter, any economic opportunity, future employment, gift, loan, gratuity, special discount, trip, favor, or service to a County public servant or any employee, official or representative of same, in connection with this procurement.

**Each Respondent must provide a Conflict of Interest Statement.**

## 2.6 CERTIFICATE OF INTERESTED PARTIES – FORM 1295

As of January 1, 2016, all Respondents are responsible for complying with the Texas Government Code, Section 2252.908. The law states that the County may not enter into certain contracts with a Respondent unless the Respondent submits a disclosure of interested parties to the County at the time the Respondent submits the signed contract. The law applies only to a contract of the County on or after January 1, 2016 that either:

A. Requires an action or vote by the Commissioners Court before the contract may be signed (all contracts that fall under the jurisdiction of the Commissioners Court approval, such as

contracts resulting from an Initiation for Bid (IFB), RFP, RFCSP, Request for Qualifications (RFQ), etc., excluding, but not limited to, certain Juvenile Service contracts, contracts funded with Sheriff's seized fun monies, etc.); or

B. Has a value of at least $1,000,000.

By January 1, 2016, the Texas Ethics Commission will make available on its website, a new filing application that must be used to file Form 1295. Information regarding how to use the filing application is available on the Texas Ethics Commission website at the following link:

https://www.ethics.state.tx.us/whatsnew/elf_info_form1295.htm

A Respondent must:

A. Use the online application to process the required information on Form 1295.

B. Print a copy of the form which will contain a unique certification number.

C. An authorized agent of the Respondent must sign the printed copy of the form.

D. Have the form notarized.

E. File the completed Form 1295 and certification of filing (scanning and emailing form is sufficient) with Williamson County Purchasing Agent at the time the signed Contract is submitted for approval.

After the Commissioners Court award of the contract, the County shall notify the Texas Ethics Commission, using the Texas Ethics Commission's filing application, of the receipt of the filed Form 1295 and certification of filing not later than the 30th day after the date the contract binds all parties to the contract. The Texas Ethics Commission will post the completed Form 1295 to its website within seven business days after receiving notice from the County.

## 2.7 PROPOSAL AFFIDAVIT

The Respondent attests to abiding by Texas Government Code Chapter 2270, Subtitle F, Title 10 stating that they neither currently boycott Israel, nor will the boycott Israel during the term of the contract. Furthermore, the Respondent certifies and agrees to furnish any and/or all goods and/or services upon which prices are extended at the price Proposal, and upon the conditions contained in the RFCSP. Additionally, the Respondent certifies that the Proposal has not been prepared in collusion with any other Proposer or other person or persons engaged in the same line of business prior to the official opening of this Proposal. Further, Proposer certifies that the he or she is not now, nor has been for the past six (6) months, directly or indirectly concerned in any pool or agreement or combination, to control the price of services/commodities Proposal on, or to influence any person or persons to submit a Proposal or not to submit a Proposal thereon. **Each Respondent must provide a Proposal Affidavit with their Proposal Package. Package may be deemed incomplete without this form.**

## 2.8 PROPOSAL SUBMITTAL DEADLINE

The Proposal is due no later than the submittal date and time set forth in the Public Announcement and General Information listed in this RFCSP package. Contents of each Proposal shall be submitted in accordance with this RFCSP.

## 2.9 ETHICS

The Respondent shall not accept or offer gifts or anything of value, nor enter into any business arrangement with any employee, official or agent of the County.

## 2.10 DELIVERY OF PROPOSALS

The County uses BidSync to distribute and receive bids and Proposals. It is preferred that Proposals be submitted electronically through BidSync; however, Respondents can submit a hard copy. Please be aware that submitting proposals electronically is a convenience to the respondent. **Williamson County takes no responsibility for any third-party system interruption potentially causing late delivery of respondent's submittal.**

Refer to www.bidsync.com for further information on how to submit electronically.

If mailed or delivered in person, Proposal and Proposal Addenda are to be delivered in sealed envelope on or before the submittal deadline, as noted in the Public Announcement and General Information listed in this RFCSP package, to:

Williamson County Purchasing Department
Attn: **Proposal Name and Number**
100 Wilco Way, Suite P101
Georgetown, Texas 78626

Also, all Respondents should list their Name and Address, and the Date of the Proposal opening on the outside of the box or envelope and note "Competitive Sealed Proposal Enclosed." Williamson County will not accept any Proposals after the submittal deadline, and shall return such Proposals unopened to the Respondent. The County will not accept any responsibility for Proposals being delivered by third party carriers.

Proposals will be opened publicly and the names of the offerors and any monetary proposals made by the offerors, will be read aloud.

# SECTION 3 - INSTRUCTIONS AND GENERAL REQUIREMENTS

## 3.1 INSTRUCTIONS

Read this document carefully, and follow all instructions and requirements. All Respondents are responsible for fulfilling all requirements and specifications. Be sure to have a clear understanding of this RFCSP.

General requirements apply to all advertised RFCSPs; however, these may be superseded, in whole or in part, by the proposal specifications, Addenda and modifications issued as a part of this RFCSP. Be sure your Proposal package is complete.

## 3.2 AMBIGUITY, CONFLICT, OR OTHER ERRORS IN THIS RFCSP

If a Respondent discovers any ambiguity, conflict, discrepancy, omission or other error in this RFCSP, the Respondent shall immediately notify the County Purchasing Department of such error in writing and request modification or clarification of the document.

Modifications will be made by issuing Addenda. If the Respondent fails to notify the County prior to the date and time fixed for submission of Proposals of an error or ambiguity in the RFCSP known to the Respondent, or an error or ambiguity that reasonably should have been known to the Respondent, then the Respondent shall be deemed to have waived the error or ambiguity or its later resolution.

The County may also modify the RFCSP, no later than forty-eight (48) hours prior to the date and time fixed for submission of Proposals, by issuance of an Addendum. All Addenda will be numbered consecutively, beginning with one (1).

## 3.3 NOTIFICATION OF MOST CURRENT ADDRESS

All Respondents in receipt of this RFCSP shall notify the Williamson County Purchasing Department of any address changes, contact person changes, and/or telephone number changes no later than forty-eight (48) hours prior to the date and time fixed for submission of Proposals.

## 3.4 SIGNATURE OF RESPONDENT

A Transmittal Letter, which shall be considered an integral part of the Proposal as stated in Section 2.3, Transmittal Letter, shall be signed by an individual who is authorized to bind the Respondent contractually.

A. If the Respondent is a Corporation or Limited Liability Company, the legal name of the Corporation or Limited Liability Company shall be provided together with the signature of the officer or officers authorized to sign on behalf of such entity.

B. If the Respondent is a General Partnership, the true name of the firm shall be provided with the signature of each partner authorized to sign.

C. If the Respondent is a Limited Partnership, the name of the Limited Partner's General Partner shall be provided with the signature of the officer authorized to sign on behalf of the General Partner.

D. If the Respondent is a Sole Proprietor(s) (individual), each Sole Proprietor(s) shall sign.

E. If signature is by an agent, other than the Sole Proprietor(s) or an officer of a Corporation, Limited Liability Company, General Partner or a member of a General Partnership, a power of attorney or equivalent document must be submitted to the Williamson County Purchasing Department.

## 3.5 ASSUMED BUSINESS NAME

If the Respondent operates business under an Assumed Business Name, the Respondent must have on file with the Williamson County Clerk a current Assumed Name Certificate and provide a file marked copy of same prior to contract award.

## 3.6 ECONOMY OF PRESENTATION

Proposals should not contain promotional or display materials, except as they may directly answer in whole or in part questions contained in the RFCSP. Such exhibits shall be clearly marked with the applicable reference number of the question in the RFCSP. Proposals must address the technical requirements as specified in the RFCSP. All questions posed by the RFCSP must be answered concisely and clearly. Proposals that do not address each criterion may be, at the sole discretion of the County, rejected and not considered.

## 3.7. REJECTION OR ACCEPTANCE

It is understood that the Commissioners Court of Williamson county, Texas, reserves the right to accept or reject any and/or all proposals for any or all materials and/or services covered in the RFP, and to waive informalities or defects in the proposal or to accept such proposal it shall deem to be in the best interest of Williamson County.

## 3.8 PROPOSAL OBLIGATION

The contents of the RFCSP, Proposal, and any clarification thereof submitted by the Successful Respondent shall become part of the contractual obligation and incorporated by reference into the Contract and any Ensuing Agreement(s).

## 3.9 COMPLIANCE WITH RFCSP SPECIFICATIONS

It is intended that this RFCSP describe the requirements and the Proposal format in sufficient detail to secure comparable Proposal. Failure to comply with all provisions of the RFCSP may, at the sole discretion of the County, result in disqualification.

## 3.10 EVALUATION

The County reserves the right to use all pertinent information (also learned from sources other than disclosed in the RFCSP process) that might affect the County's judgment as to the appropriateness of an award to the best evaluated Respondent. This information may be appended to the Proposal evaluation process results. Information on a Respondent from reliable sources, and not within the Respondent's Proposal, may also be noted and made part of the evaluation file. The County shall have sole discretion for determining the reliability of the source. The County reserves the right to conduct written and/or oral discussions/interviews after the Proposal opening. The purpose of such discussions/interviews is to provide clarification and/or additional information to make an award that is in the best interest of the County.

## 3.11 WITHDRAWAL OF PROPOSAL

The Respondent may withdraw its Proposal by submitting a written request with the company letterhead and the signature of an authorized individual, as described in Section 3.4, Signature of Respondent, to the Williamson County Purchasing Department any time prior to the submission

deadline.

The Respondent may submit a new Proposal prior to the deadline. Alterations of the Proposal in any manner will not be considered if submitted after the deadline. Withdrawal of a Proposal after the deadline will be subject to written approval of the Williamson County Purchasing Agent.

## 3.12 RESPONSIBILITY

It is expected that a Respondent will be able to affirmatively demonstrate responsibility. A prospective Respondent should be able to meet the following requirements:

A. Have adequate financial resources, or the ability to obtain such resources as required;
B. Be able to comply with the required or proposed delivery schedule;
C. Have a satisfactory record of performance that can be determined thru references provided; and
D. Be otherwise qualified and eligible to receive an award.

The County may request representation and other information sufficient to determine the Respondent's ability to meet these minimum standards listed above.

## 3.13 PURCHASE ORDERS

If required by the Williamson County Purchasing Department, a purchase order(s) may be generated to the Successful Respondent for goods and/or services. If a purchase order is issued, the purchase order number must appear on all itemized invoices and/or requests for payment.

## 3.14 SILENCE OF SPECIFICATIONS

The apparent silence of any RFCSP specifications as to any detail or to the apparent omission from it of a detailed description concerning any point, shall be regarded as meaning that only the best practices are to prevail. All interpretations of these specifications shall be made on the basis of this statement.

## 3.15 REFERENCES

Respondents shall furnish a list of contracts where similar responsibilities and goods and/or services have been required and/or performed for the past five (5) years, to include names, titles, phone numbers and email addresses of reference contacts, contract numbers and dates of performance.

Also, Respondents shall include a list of any contracts that have been cancelled or terminated within the last five (5) years, along with an explanation of the cancellation and the names, email address and phone number of a reference person with that institution.

The County may contact some or all of the references in order to determine the Respondent's performance record on work similar to that described in this RFCSP. The County reserves the right to contact references other than those provided in the response and to use the information gained from them in the evaluation process.

References should be provided in accordance with this RFCSP. Proposal may not be deemed complete without the inclusion of requested references.

# SECTION 4 - TERMS AND CONDITIONS

## 4.1 VENUE AND GOVERNING LAW

The Respondent hereby agrees and acknowledges that venue and jurisdiction of any suit, right, or cause of action arising out of or in connection with this RFCSP, the Contract and any Ensuing Agreement(s), shall lie exclusively in either Williamson County, Texas or in the Austin Division of the Western Federal District of Texas, and the parties hereto expressly consent and submit to such jurisdiction. Furthermore, except to the extent that this RFCSP, the Contract and any Ensuing Agreement(s) is governed by the laws of the United States, this RFCSP, the Contract and any Ensuing Agreement(s) shall be governed by and construed in accordance with the laws of the State of Texas, excluding, however, its choice of law rules.

## 4.2 INCORPORATION BY REFERENCE AND PRECEDENCE

A. The Contract shall be derived from the RFCSP and its Addenda (if applicable), and the Respondent's Proposal. In the event of a dispute under the Contract, applicable documents will be referred to for the purpose of clarification or for additional detail in the following order of precedence:

   1. The RFCSP and its Addenda (if applicable); and

   2. The Respondent's Proposal.

B. In the event the County requires that an Ensuing Agreement be executed following award and a dispute arises between the terms and conditions of the Ensuing Agreement, the RFCSP and its Addenda (if applicable), and the Respondent's Proposal, applicable documents will be referred to for the purpose of clarification or for additional detail in the following order of precedence:

   1. The terms and conditions of the Ensuing Agreement;

   2. The RFCSP and its Addenda; and

   3. The Respondent's Proposal.

## 4.3 OWNERSHIP OF PROPOSAL

Each Proposal shall become the property of the County upon submittal and will not be returned to Respondents unless received after the submittal deadline.

## 4.4 DISQUALIFICATION OF RESPONDENT

Upon signing and submittal of the Proposal, a Respondent offering to sell supplies, materials, services, or equipment to the County, certifies that the Respondent has not violated the antitrust laws of the State of Texas codified in Business & Commerce Code, Section 15.01, or the Federal Antitrust Laws, and has not communicated directly or indirectly the offer made to any competitor or any other person engaged in such line of business. Any or all Proposals may be rejected if the County believes that collusion exists among the Respondents.

## 4.5 FUNDING

The County intends to budget and make sufficient funds available and authorize funds for expenditure to finance the costs of the Contract. All Respondents understand and agree that the County's payment of amounts under the Contract shall be contingent on the County receiving appropriations or other expenditure authority sufficient to allow the County, in the exercise of reasonable administrative discretion, to make payments under this Contract.

### A. ASSIGNMENT, SUCCESSORS AND ASSIGNS

The Successful Respondent may not assign, sell, or otherwise transfer the Contract or any other rights or interests obtained under the Contract without written permission of the Williamson County the Commissioners Court. The Contract and any Ensuing Agreement(s) shall be binding upon and inure to the benefit of the contracting parties hereto and their respective successors and permitted assigns.

## 4.6 IMPLIED REQUIREMENTS

Products or services not specifically described or required in the RFCSP, but are necessary to provide the functional capabilities described by the Respondent, shall be implied and deemed to be included in the Proposal.

## 4.7 TERMINATION

**A. Termination for Cause:** The County reserves the right to terminate the Contract and/or any Ensuing Agreement(s) for default if the Successful Respondent breaches any of the Proposal specifications, terms and conditions, including warranties of the Respondent, if any, or if the Successful Respondent becomes insolvent or commits acts of bankruptcy. Such right of termination is in addition to and not in lieu of any other remedies the County may have at law or in equity or as may otherwise be provided hereunder. Default may be construed as, but not limited to, failure to deliver the proper goods and/or services within the proper amount of time, and/or to properly perform any and all other requirements to the County's satisfaction, and/or to meet all other obligations and requirements.

**B. Termination for Convenience:** The County may terminate the Contract and/or any Ensuing Agreement(s) for convenience and without cause or further liability, upon no less than thirty (30) calendar days written notice to the Successful Respondent. The County reserves the right to extend this period if it is in the best interest of the County. In the event the County exercises its right to terminate without cause, it is understood and agreed that only the amounts due to the Successful Respondent for goods, commodities and/or services provided and expenses incurred to and including the date of termination, will be due and payable. No penalty will be assessed for the County's termination for convenience.

## 4.8 NON-PERFORMANCE

It is the objective of the County to obtain complete and satisfactory performance of the requirements set forth herein. In addition to any other remedies available at law, in equity or that may be set out herein, failure to perform may result in a deduction of payment equal to the amount of the goods and/or services that were not provided and/or performed to the County's satisfaction.

In the event of such non-performance, the County shall have the right, but shall not be obligated, to complete the services itself or by others and/or purchase the goods from other sources. If the County elects to acquire the goods or perform the services itself or by others, pursuant to the foregoing, the Successful Respondent shall reimburse the County, within ten (10) calendar days of demand, for all costs incurred by the County (including, without limitation, applicable, general, and administrative expenses, and field overhead, and the cost of necessary equipment, materials, and field labor) in correcting the nonperformance which the Successful Respondent fails to meet

pursuant to the requirements set out herein. In the event the Successful Respondent refuses to reimburse the County as set out in this provision, the County shall have the right to deduct such reimbursement amounts from any amounts that may be then owing or that may become owing in the future to the Successful Respondent.

## 4.9 PROPRIETARY INFORMATION AND THE TEXAS PUBLIC INFORMATION ACT

All material submitted to the County shall become public property and subject to the Texas Public Information Act upon receipt. If a Respondent does not desire proprietary information in the Proposal to be disclosed, each page must be clearly identified and marked proprietary at time of submittal or, more preferably, all proprietary information may be placed in a folder or appendix and be clearly identified and marked as being proprietary. Failure to clearly identify and mark information as being proprietary as set forth under this provision will result in all unmarked information being deemed non-proprietary and available to the public. For all information that has not been clearly identified and marked as proprietary by the Respondent, the County may choose to place such information on the County's website and/or a similar public database without obtaining any type of prior consent from the Respondent.

The County will, to the extent allowed by law, endeavor to protect from public disclosure the information that has been identified and marked as proprietary. The final decision as to what information must be disclosed, however, lies with the Texas Attorney General.

To the extent, if any, that any provision in this RFCSP or in the Respondent's Proposal is in conflict with Texas Government Code, Chapter 552, as amended (the "Public Information Act"), the same shall be of no force or effect. Furthermore, it is expressly understood, and agreed, that the County, and its officers and employees, may request advice, decisions and opinions of the Attorney General of the State of Texas in regard to the application of the Public Information Act to any items or data furnished to the County as to whether or not the same are available to the public. It is further understood that that the County, and its officers and employees, shall have the right to rely on the advice, decisions and opinions of the Attorney General, and that the County, its officers and employees shall have no liability or obligation to any party hereto for the disclosure to the public, or to any person or persons, of any items or data furnished to the County by a party hereto, in reliance of any advice, decision or opinion of the Attorney General of the State of Texas.

## 4.10 RIGHT TO AUDIT

The Successful Respondent agrees that the County or its duly authorized representatives shall, until the expiration of three (3) years after termination or expiration of the services to be performed, have access to and the right to examine and photocopy any and all books, documents, papers and records of the Successful Respondent, which are directly pertinent to the services to be performed or goods to be delivered for the purposes of making audits, examinations, excerpts and transcriptions. The Successful Respondent agrees that the County shall have access during normal working hours to all necessary facilities and shall be provided adequate and appropriate work space in order to conduct audits in compliance with the provisions of this section. The County shall give the Successful Respondent reasonable advance notice of intended audits.

## 4.11 TESTING AND INSPECTIONS

The County reserves the right to inspect and test equipment, supplies, materials and goods for quality and compliance with this RFCSP, and ability to meet the needs of the user. Demonstration units must be available for review. Should the goods or services fail to meet requirements and/or be unavailable for evaluation, the County can deem the Respondent to be in breach and terminate the Contract and/or any Ensuing Agreement(s).

## 4.12 PROPOSAL PREPARATION COSTS

The cost of developing Proposals is the sole responsibility of the Respondents and shall not be charged to the County. There is no expressed or implied obligation for the County to reimburse the Respondents for any expense incurred in preparing a Proposal in response to this RFCSP and the County will not reimburse the Respondents for such expenses.

## 4.13 INDEMNIFICATION

The Successful Respondent shall indemnify, defend and save harmless, the County, its officials, employees, agents and agent's employees from, and against, all claims, liability, and expenses including reasonable attorneys' fees, arising from activities of the Respondent, its agents, servants or employees, performed hereunder that result from the negligent act, error, or omission of the Respondent or any of the Respondent's agents, servants or employees, as well as all claims of loss or damage to the Respondent's and the County's property, equipment, and/or supplies.

Furthermore, the County, its officials, employees, agents and agents' employees shall not be liable for damages to the Successful Respondent arising from any act of any third party, including, but not limited to, theft. The Successful Respondent further agrees to indemnify, defend and save harmless, the County from its officials, employee, agents and agents' employees against all claims of whatever nature arising from any accident, injury, or damage whatsoever, caused to any person, or the property of any person, occurring in relation to the Successful Respondent's performance of any services requested hereunder during the term of the Contract and/or any Ensuing Agreement (s).

The Successful Respondent shall timely report all claims, demands, suits, actions, proceedings, liens or judgements to the County and shall, upon the receipt of any claim, demand, suit, action, proceeding, lien or judgement, not later than the fifteenth ($15^{th}$) day of each month; provide the County with a written report on each such matter, setting forth the status of each matter, the schedule or planned proceedings with respect to each matter and the cooperation or assistance, if any, of the County required by the Successful Respondent in the defense of each matter. The Successful Respondent's duty to defend, indemnify and hold the County harmless shall be absolute. It shall not abate or end by reason of the expiration or termination of the Contract and/or any Ensuing Agreement(s), unless otherwise agreed by the County in writing. The provisions of this section shall survive the termination of the Contract and shall remain in full force and effect with respect to all such matters no matter when they arise.

In the event of any dispute between the parties, as to whether a claim, demand, suit, action, proceeding, lien or judgement, that appears to have been caused by or appears to have arisen out of or in connection with acts or omissions of the County, the Respondent shall nevertheless fully defend such claim, demand, suit or action, proceeding, lien or judgement, until and unless there is a determination by a court of competent jurisdiction that the acts and omissions of the Respondent are not an issue in the matter.

The Successful Respondent's indemnification shall cover, and the Successful Respondent agrees to, indemnify the County, in the event the County is found to have been negligent for having selected the Successful Respondent to perform the work described in this request. The provision by the Successful Respondent of insurance shall not limit the liability of the Successful Respondent under the Contract and/or any Ensuing Agreement(s).

## 4.14 WAIVER OF SUBROGATION

The Successful Respondent and the Successful Respondent's insurance carrier waive any and all rights whatsoever with regard to subrogation against the County as an indirect party to any suit arising out of personal or property damages resulting from the Respondent's performance under this Contract and any Ensuing Agreement(s).

## 4.15 RELATIONSHIP OF THE PARTIES

The Successful Respondent shall be an independent contractor and shall assume all of the rights, obligations, liabilities, applicable to it as such independent contractor hereunder and any provisions herein which may appear to give the County the right to direct the Successful Respondent as to details of doing work herein covered, or to exercise a measure of control over the work, shall be deemed to mean that the Successful Respondent shall follow the desires of the County in the results of the work only. The County shall not retain or have the right to control the Successful Respondent's means, methods or details pertaining to the Successful Respondent's performance of the work. The County and the Successful Respondent hereby agree and declare that the Successful Respondent is an independent contractor and as such meets the qualifications of an "Independent Contractor" under Texas Workers Compensation Act, Texas Labor Code, Section 406.141, that the Successful Respondent is not an employee of the County, and that the Successful Respondent and its employees, agents and subcontractors shall not be entitled to workers compensation coverage or any other type of insurance coverage held by the County.

## 4.16 SOLE PROVIDER

The Successful Respondent agrees and acknowledges that it shall not be considered a sole provider of the goods and/or services described herein and that the County may contract with other providers of such goods and/or services if the County deems, at its sole discretion, that multiple providers of the same goods and/or services will serve the best interest of the County.

## 4.17 FORCE MAJEURE

If the party obligated to perform is prevented from performance by an act of war, order of legal authority, act of God, or other unavoidable cause not attributable to the fault or negligence of said party, the other party shall grant such party relief from the performance. The burden of proof for the need of such relief shall rest upon the party obligated to perform. To obtain release based on force majeure, the party obligated to perform shall file a written request with the other party.

## 4.18 SEVERABILITY

If any provision of this RFCSP, the Contract or any Ensuing Agreement(s) shall be held invalid or unenforceable by any court of competent jurisdiction, such holding shall not invalidate or render unenforceable any other provision thereof, but rather the entire RFCSP, Contract or any Ensuing Agreement(s) will be construed as if not containing the particular invalid or unenforceable provision or provisions, and the rights and obligation of the parties shall be construed and enforced in accordance therewith. The parties acknowledge that if any provision of this RFCSP, the Contract or any Ensuing Agreement(s) is determined to be invalid or unenforceable, it is the desire and intention of each that such provision be reformed and construed in such a manner that it will, to the maximum extent practicable, give effect to the intent of this RFCSP, the Contract or any Ensuing Agreement(s) and be deemed to be validated and enforceable.

## 4.19 EQUAL OPPORTUNITY

Neither party shall discriminate against any employee or applicant for employment because of race, color, sex, religion or national origin.

## 4.20 NOTICE

Any notice to be given shall be in writing and may be distributed by personal delivery, or by registered or certified mail, return receipt requested, addressed to the proper party, at the following address:

The County: Williamson County Purchasing Department
Attn: Purchasing Agent
100 Wilco Way, Suite P101

Georgetown, Texas 78626

The Respondent: Address set out in Respondent's Transmittal Letter

Notices given in accordance with this provision shall be effective upon (1) receipt by the party to which notice is given, or (2) on the third (3rd) calendar day following mailing, whichever occurs first.

## 4.21 SALES AND USE TAX EXEMPTION

The County is a body, corporate and politic, under the laws of the State of Texas and claims exemption from sales and use taxes under Texas Tax Code, Section 151.309, as amended, and the services and/or goods subject hereof are being secured for use by the County.

## 4.22 COMPLIANCE WITH LAWS

The County and the Successful Respondent shall comply with all federal, state, and local laws, statutes, ordinances, rules and regulations, and the orders and decrees of any courts or administrative bodies or tribunals in any matter affecting the performance of the Contract and any Ensuing Agreement(s), including, without limitation, Workers' Compensation laws, salary and wage statutes and regulations, licensing laws and regulations. When required, the Successful Respondent shall furnish the County with certification of compliance with said laws, statues, ordinances, rules, regulations, orders, and decrees above specified.

## 4.23 INCORPORATION OF EXHIBITS, APPENDICES AND ATTACHMENTS

All of the Exhibits, Appendices and Attachments referred to herein are incorporated by reference as if set forth verbatim herein. Any conflicting terms in the Contract documents will be resolved at the sole discretion of the Commissioners Court.

## 4.24 NO WAIVER OF IMMUNITIES

Nothing herein shall be deemed to waive, modify or amend any legal defense available at law or in equity to the County, its past or present officers, employees, or agents, nor to create any legal rights or claim on behalf of any third party. The County does not waive, modify, or alter to any extent whatsoever the availability of the defense of governmental immunity under the laws of the State of Texas and of the United States.

## 4.25 NO WAIVER

The failure or delay of any party to enforce at any time or any period of time any of the provisions of this RFCSP, the Contract or any Ensuing Agreement(s) shall not constitute a present or future waiver of such provisions nor the right of either party to enforce each and every provision. Furthermore, no term or provision hereof shall be deemed waived and no breach excused unless such waiver or consent shall be in writing and signed by the party claimed to have waived or consented. Any consent by any party to, or waiver of, a breach by the other, whether expressed or implied, shall not constitute a consent to, waiver of or excuse for any other, different or subsequent breach.

## 4.26 CURRENT REVENUES

The obligations of the parties under the Contract and any Ensuing Agreement(s) do not constitute a general obligation or indebtedness of the County for which the County is obligated to levy, pledge, or collect any of taxation. It is understood and agreed that the County shall have the right to terminate the Contract and any Ensuing Agreement(s) at the end of any the County fiscal year if the governing body of the County does not appropriate sufficient funds as determined by the County's budget for the fiscal year in question. The County may effect such termination by giving written notice of

termination to the Successful Respondent at the end of its then-current fiscal year.

## 4.27 BINDING EFFECT

This Contract and any Ensuing Agreement(s) shall be binding upon and inure to the benefit of the parties and their respective permitted assigns and successors.

## 4.28 SAFETY

The Successful Respondent is responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with any services to be provided hereunder. The safety program shall comply with all applicable requirements of the current federal Occupational Safety and Health Act and all other applicable federal, state and local laws and regulations.

## 4.29 GENERAL OBLIGATIONS AND RELIANCE

The Successful Respondent shall perform all services and/or provide all goods, as well as those reasonably inferable and necessary for completion and provision of services and/or goods required hereunder. The Successful Respondent shall keep the County informed of the progress and quality of the services. The Successful Respondent agrees and acknowledges that the County is relying on the Successful Respondent's represented expertise and ability to provide the goods and/or services described herein. The Successful Respondent agrees to use its best efforts, skill, judgment, and abilities to perform its obligations in accordance with the highest standards used in the profession and to further the interests of the County in accordance with the County's requirements and procedures. The Successful Respondent's duties, as set forth herein, shall at no time be in any way diminished by reason of any approval by the County, nor shall the Successful Respondent be released from any liability by reason of such approval by the County, it being understood that the County at all times is ultimately relying upon the Successful Respondent's skill and knowledge in performing the services and providing any goods required hereunder.

## 4.30 CONTRACTUAL DEVELOPMENT

The Commissioners Court may award the Contract on the basis of the initial Proposals received, without any further or additional discussions. Therefore, each initial Proposal should contain the Respondent's best terms and offer. The contents of the RFCSP and the selected Proposal will become an integral part of the Contract, but may be modified, at Williamson County's sole discretion, by provisions of an Ensuing Agreement. Therefore, the Respondent must agree to inclusion in an Ensuing Agreement of the Proposal specifications, terms and conditions of this RFCSP. Williamson County and its architect or engineer may discuss with the Successful Respondent options for a scope or time modification and any price change associated with the modification. In the event such discussions are conducted and Williamson County and the Successful Respondent cannot agree to scope or time modifications and any price change associated with such modifications, County may still opt to contract with the Successful Respondent based on selected Respondent's original Proposal to the RFCSP.

The Successful Respondent shall be required to execute a formal contract at Williamson County's offices in Georgetown, Texas within ten (10) days after the award. Said contract shall be in the same form as the Agreement Between Owner and Contractor which begins on the following page. The only anticipated changes in the contract will be to include additional exhibits, to fill in blanks to identify the contractor, and terms relating to the compensation, or to revise the contract to accommodate corrections, changes in the scope of services, or changes pursuant to addenda issued. Respondents should raise any questions regarding the terms of the contract, or submit requested changes in said terms, in the form of written questions or submittals. Because the signed contract will be substantively and substantially derived from the attached contract, each Respondent is urged to seek independent legal counsel as to any questions about the terms, conditions or

provisions contained in the attached contract before submitting a Proposal. Again, the attached contract contains important legal provisions and is considered part and parcel of this RFCSP. Failure or refusal to sign aforesaid contract shall be grounds for Williamson County to revoke any award which has been issued, forfeit security, if applicable, and select another Respondent.

## 4.31 ENTIRE AGREEMENT

The Contract and any Ensuing Agreement(s) shall supersede all prior Agreements, written or oral between the Successful Respondent and the County and shall constitute the entire Agreement and understanding between the parties with respect to the services and/or goods to be provided. Each of the provisions herein shall be binding upon the parties and may not be waived, modified, amended or altered, except by writing signed by the Successful Respondent and the County.

## 4.32 SURVIVABILITY

All applicable agreements that were entered into between the Successful Respondent and the County, under the terms and conditions of the Contract and/or any Ensuing Agreement(s), shall survive the expiration or termination thereof for ninety (90) days unless a new contract has been awarded.

The County may exercise, by written notice to the Successful Respondent no later than ten (10) calendar days of the Contract expiration, this clause for emergency cases only.

## 4.33 PAYMENT

The County's payment for goods and services shall be governed by the Texas Government Code, Chapter 2251. An invoice shall be deemed overdue the thirty-first (31st) day after the later of the following:

A. The date the County receives the goods under the Contract;
B. The date the performance of the service under the Contract is completed; or
C. The date the Williamson County Auditor receives an invoice for the goods or services.

Interest charges for any overdue payments shall be paid by the County in accordance with Texas Government Code, Section 2251.025. More specifically, the rate of interest that shall accrue on a late payment is the rate in effect on September 1 of the County's fiscal year in which the payment becomes due. The said rate in effect on September 1 shall be equal to the sum of one (1) percent and the prime rate published in the Wall Street Journal on the first (1st) day of July of the preceding fiscal year that does not fall on a Saturday or Sunday.

In the event that an error appears in an invoice submitted by the Successful Respondent, the County shall notify the Successful Respondent of the error not later than the twenty-first (21st) day after the date the County receives the invoice. If the error is resolved in favor of the Successful Respondent, the Successful Respondent shall be entitled to receive interest on the unpaid balance of the invoice submitted by the Successful Respondent beginning on the date that the payment for the invoice became overdue. If the error is resolved in favor of the County, the Successful Respondent shall submit a corrected invoice that must be paid in accordance within the time set forth above. The unpaid balance accrues interest as provided by the Texas Government Code, Chapter 2251, if the corrected invoice is not paid by the appropriate date.

As a minimum, invoices shall include:

A. Name, address, and telephone number of the Successful Respondent and similar information in the event the payment is to be made to a different address.

B. The County Contract, Purchase Order.

C. Identification of items or service as outlined in the Contract.

D. Quantity or quantities, applicable unit prices, total prices and total amount.

E. Any additional payment information which may be called for by the Contract.

Payment inquiries should be directed to the following address:

Williamson County Auditor's Office, Accounts Payable Department
Email: accountspayable@wilco.org
Phone: 512-943-1500

## 4.34 CONTRACTUAL FORMATION AND ENSUING AGREEMENT

The RFCSP and the Respondent's Proposal, when properly accepted by the Commissioners Court, shall constitute a Contract equally binding between the Successful Respondent and the County. The Successful Respondent may be required by Williamson County to sign an additional Agreement containing terms necessary to ensure compliance with the RFCSP and Respondent's Proposal.

## 4.35 LEGAL LIABILITY INFORMATION

The Successful Respondent shall disclose all legal liability information by listing any pending litigation, civil or criminal, or anticipated litigation that your firm is involved in including, but not limited to, potential or actual legal matters with private parties and any local, state, federal or international governmental entities. Furthermore, the respondent certifies to the best of its knowledge and belief that within the last five (5) years Respondent or Respondent Related Entities have not: a. been indicted or convicted of a crime involving moral turpitude or business honesty or integrity in any jurisdiction; b. been suspended, debarred or otherwise disqualified from entering into any contract with any governmental agency; c. had any business license or professional license suspended or revoked; d. had any sanction or finding of fact imposed as a result of a judicial or administrative proceeding related to fraud, extortion, bribery, bid rigging, embezzlement, misrepresentation or anti-trust; and e. been, and is not currently, the subject of a criminal investigation by any federal, state or local prosecuting or investigative agency and/or civil anti-trust investigation by any federal, state or local prosecuting or investigative agency. If Respondent cannot so certify to the above, then it must submit along with its proposal, proposal or contract a written explanation of why such certification cannot be made. The Commissioner's Court will determine whether a contract may be entered into with the Respondent. The Respondent's obligation pursuant to this certification is ongoing from and after the effective date of the contract through the termination date thereof. Accordingly, the Respondent shall have an obligation to immediately notify the Purchasing Department in writing if at any time during the term of the contract if becomes aware of any event which would cause the Respondent's certification or explanation to change. Respondent acknowledges that the Commissioner's Court may, in its sole discretion, terminate the contract for cause if it learns that any of the certifications made herein are currently false due to intervening factual circumstances or were false or should have been known to be false when entering into the contract. The County reserves the right to consider legal liability information in the recommendation of any proposed contract to the Commissioners Court.

## 4.36 CONFIDENTIALITY

Respondent expressly agrees that it will not use any direct or incidental confidential information that may be obtained while working in a governmental setting for its own benefit, and agrees that it will not access unauthorized areas or confidential information and it will not disclose any information to

unauthorized third parties, and will take care to guard the security of the information at all times.

## 4.37 INCLEMENT WEATHER

In case of inclement weather or any other unforeseen event causing the County to close for business on the date of a Proposal submission deadline, the Proposal closing will automatically be postponed until the next business day the County is open. If inclement weather conditions or any other unforeseen event causes delays in carrier service operations, the County may issue an Addendum to all known Respondents interested in the project to extend the deadline. It will be the responsibility of the Respondent to notify the County of their interest in the project if these conditions are impacting their ability to turn in a submission within the stated deadline. The County reserves the right to make the final judgement call to extend any deadline.

## 4.38 AIR QUALITY

In determining the overall best Proposal, the County may, to the extent applicable, exercise the option granted to local governments under the Texas Local Government Code, Section 271.907.

This option allows the County to evaluate Proposals and give preference to goods and/or services of a Respondent that demonstrates that the Respondent meets or exceeds any and all state or federal environmental standards, including voluntary standards, relating to air quality. If the Proposal being submitted will have an effect on air quality for the County (as it relates to any state, federal, or voluntary air quality standard), then the Respondent is encouraged to provide information in narrative indicating the anticipated air quality impact. All Respondents are expected to meet all mandated state and federal air quality standards.

## 4.39 COOPERATIVE PURCHASING PROGRAM

During the term of the Contract resulting from this RFCSP, the County would like to afford the same prices, terms and conditions to other political subdivisions or public entities. Another entity's participation in the Contract resulting from this RFCSP is subject to a properly authorized Purchasing Cooperative Inter-local Agreement (ILA) with the County. Any liability created by purchase orders issued against the Contract shall be the sole responsibility of the governmental agency placing the order.

## 4.40 PREVAILING WAGE RATES

To the extent this procurement is for the construction of a public work, including a building, highway, road, excavation, and repair work or other project development or improvement, paid for in whole or in part from public funds, without regard to whether the work is done under public supervision or direction, Texas Government Code, Chapter 2258, shall apply and the contractor shall pay not less than the wage scale of the various classes of labor as shown on the "Prevailing Wage Schedule" provided by the County. Pursuant to Texas Government Code, Section 2258.022(a)(2), the County has determined the general prevailing rate of the "Prevailing Wage Schedule" in the locality in which the public work is to be performed for each craft or type of worker needed to execute the contract and the prevailing rate for legal holiday and overtime work by using the prevailing wage rate as determined by the United States Department of Labor in accordance with the United States Code, Section 276a (Davis-Bacon Act).

The specified wage rates are minimum rates only, and are not representations that qualified labor adequate to perform the work is available locally at the prevailing wage rates. The County is not bound to pay—and will not consider—any claims for additional compensation made by any contractor because the contractor pays wages in excess of the applicable minimum rate contained in the Contract Documents. The "Prevailing Wage Schedule" is not a representation that quantities of qualified labor adequate to perform the work may be found locally at the specified wage rates.

For classifications not shown, workers shall not be paid less than the wage indicated for laborers. The contractor shall notify each worker commencing work on the project the worker's job classification and the established minimum wage rate required to be paid, as well as the actual amount being paid. The notice must be delivered to and signed in acknowledgement of receipt by the employee and must list both the monetary wages and fringe benefits to be paid or furnished for each classification in which the worker is assigned duties. When requested by the County, competent evidence of compliance with the Texas Prevailing Wage Law shall be furnished by contractor. A copy of each worker wage rate notification shall be submitted to the County with the Application for Payment for the period during which the worker began on-site activities.

Should the contractor at any time become aware that a particular skill or trade not reflected on the County's "Prevailing Wage Schedule" will be or is being employed in the work, whether by the contractor or by a subcontractor, the contractor shall promptly inform the County and shall specify a wage rate for that skill or trade, which shall bind the contractor.

The contractor and any subcontractor shall pay to the County a penalty of sixty dollars ($60.00) for each worker employed for each calendar day, or portion thereof, that the worker is paid less than the wage rates stipulated in the "Prevailing Wage Schedule" or any supplement thereto. The contractor and each subcontractor shall keep, or cause to be kept, an accurate record showing the names and occupations of all workers employed in connection with the work, and showing the actual per diem wages paid to each worker, which records shall be open at all reasonable hours for the inspection by the County.

Within thirty-one (31) days of receipt of information concerning a violation of the Texas Government Code Chapter 2258, the County shall make an initial determination as to whether good cause exists to believe a violation occurred. The County's decision on the initial determination shall be reduced to writing and sent to the contractor or subcontractor against whom the violation was alleged, and to the affected worker. When a good cause finding is made, the County shall retain the full amounts claimed by the claimant or claimants as the difference between wages paid and wages due under the "Prevailing Wage Schedule" and any supplements thereto, together with the applicable penalties, such amounts being subtracted from successive progress payments pending a final decision on the violation.

After the County makes its initial determination, the affected contractor or subcontractor and worker have fourteen (14) calendar days in which to resolve the issue of whether a violation occurred, including the amount that should be retained by the County or paid to the affected worker. If the contractor or subcontractor and affected worker reach an agreement concerning the worker's claim, the contractor shall promptly notify the County in a written document signed by the worker. It the contractor or Subcontractor and affected worker do not agree before the fifteenth ($15^{th}$) calendar day after the County's determination, the contractor or subcontractor and affected worker must participate in binding arbitration in accordance with the Texas General Arbitration Act, Chapter 171, (Texas Civil Practice and Remedies Code). The parties to the arbitration have ten (10) calendar days after the expiration of the fifteen (15) calendar days referred to above, to agree on an arbitrator; if by the eleventh ($11^{th}$) calendar day there is no agreement to an arbitrator, a district court shall appoint an arbitrator on the petition of any of the parties to the arbitration.

If an arbitrator determines that a violation has occurred, the arbitrator shall assess and award against the contractor or subcontractor the amount of penalty as provided above and the amount owed the worker. The County may use any amounts retained hereunder to pay the worker the amount as designated in the arbitration award. If the County has not retained enough from the contractor or subcontractor to pay the worker in accordance with the arbitration award, the worker has a right of action against the contractor and subcontractor as appropriate, and the surety of either to receive the amount owed, attorneys' fees and court costs. The contractor shall promptly furnish a copy of the arbitration award to the County.

Money retained pursuant to the provisions above shall be used to pay the claimant or claimants the

difference between the amount the worker received in wages for labor on the project at the rate paid by the contractor or subcontractor and the amount the worker would have received at the general prevailing wage rate as provided by the agreement of the claimant and the contractor or subcontractor affected, or in the arbitrator's award. The full statutory penalty of sixty dollars ($60.00) per calendar day of violation per worker shall be retained by Williamson County to offset its administrative costs, pursuant to Texas Government Code, Section, 2258.023. Any retained funds in excess of these amounts shall be paid to the contractor on the earlier of the next progress payment or final payment. Provided, however, that the County shall have no duty to release any funds to either the claimant or the contractor until it has received the notices of agreement or the arbitration award as provided under the provision herein-above.

## 4.41 CONFIDENTIALITY

The Respondent expressly agrees that it will not use any direct or incidental confidential information that may be obtained while working in a governmental setting for its own benefit, and agrees that it will not access unauthorized areas or confidential information and it will not disclose any information to unauthorized third parties, and will take care to guard the security of the information at all times.

# Additional Stipulations

## 1 Additional Stipulations

### 1.1 Introduction

The Proposal evaluation and selection process is detailed in this section, as are other factors, and the format in which the Price Proposal of each Proposal should be submitted.

### 1.2 Price Proposal

The Respondent must utilize the price sheet form as provided in RFCSP. The Price Proposal should be included in each copy of the Proposal if submitted in paper form.

**Note: Any reworked version of the price sheet that is intended to be a substitute and that is provided by a Respondent may be determined as non-responsive, and may, at the County's sole discretion, result in the Respondent's disqualification.**

### 1.3 Proposal Evaluation and Selection

#### 1.3.1 Evaluation/Selection Criteria

All Proposals received by the designated date and time will be evaluated based on the Respondent's Proposal. Other information may be taken into consideration when that information potentially provides an additional benefit to the County, and further helps the County in receiving the services listed in the RFCSP.

**Respondents' Proposals must meet all mandatory (minimum) requirements in order to be scored. Scoring may also be based on total information gathered by the County at its discretion, including but not limited to respondent's ability to perform "without delay or interference, character, responsibility, integrity, and experience or demonstrated capability; quality of prior work; compliance with laws; and noncompliance with requirements as to submission of relevant information."**

### 1.3.2 Evaluation Committee and Selection Process

All Proposals will be evaluated by a County appointed Evaluation Committee. The Evaluation Committee may be composed of County Staff that may have expertise, knowledge or experience with the services and/or goods being procured hereunder. Those Respondents meeting all requirements and deemed most qualified may receive further evaluation via telephone or in-person interviews with members of the Evaluation Committee. The County will select a Respondent determined best and most responsible Respondent meeting minimum specifications and qualifications.

Respondents are advised that the Evaluation Committee, at its option, may recommend an award strictly on the basis of the initial RFCSP responses, or in addition, may have interviews with firms to determine its final recommendation. The Evaluation Committee will present its recommendation to the Williamson County Commissioners' Court for approval and award of contract.

Finalist shall be determined by the Respondent receiving the most points in relation to the following Evaluation Criteria. Additional scoring may be conducted based upon Respondent's presentation during the interview process and may or may not include previous scores from Respondent's Proposal.

### 1.3.3 Mandatory Criteria

Minimum requirements must be passed in order to be considered for scoring as described in section 1.3.4

### 1.3.4 Graded Evaluation Factors

The following graded evaluation factors will be used to determine how well a Respondent(s) meet(s) the desired performance

1. **Price – 40%**
    a. **Submit pricing per price sheet**
2. **Respondent's experience and reputation – 30%**
    a. **Respondent to provide a list of 3 similar (or larger) projects performed in Texas. Please include project name, owner contact name & contact information, brief project description with size/square footage and contracted dollar amount.**
3. **Respondent's proposed personnel for the project – 20%**
    a. **Respondent to provide list of proposed staff to be used on the project. Provide names of Company Owner, Project Manager, Superintendent, Etc. and/or equivalents.**
4. **Respondent's office location as it relates to distance from the project site. – 10%**
    a. **Provide verifiable physical address of Respondent's closest permanent location to project and length of time at that location.**

### 1.3.5 Interviews

Interview scoring (if applicable) will be provided along with invitation to interview candidates. Best and Final Offer will be required from all Respondents scheduled for interviews, twenty-four (24) hours prior to scheduled interview.

### 1.3.6 Additional Evaluation Information

The County reserves the right to award a contract for any or all areas of this RFCSP.

It is the responsibility of the Respondent to provide sufficient information/data in a convincing manner to the County to assure all of the terms, conditions and expectations for satisfactory performance of the services requested herein will be met.

**All contact during the evaluation phase shall be through the Williamson County Purchasing Department only**. The Respondent shall neither contact nor lobby evaluators during the evaluation process. Attempts by the Respondent to contact and/or influence members of the Evaluation Committee may result in disqualification of Proposal.

## 1.4 Technical Contact

Bob Lubecker, Facilities Project Manager (or successor), Williamson County, TX shall serve as the County's Technical Contact with designated responsibility to ensure compliance with the requirements of the Contract and any ensuing agreement, such as but not limited to, acceptance, inspection and delivery, together with the Purchasing Department. The Technical Contact, together with the Purchasing Department, will serve as liaison between Williamson County Commissioners Court and the Successful Respondent.

## 1.5 Time for Performance

A time frame of three hundred thirty-four (334) days (three hundred four (304) to substantial completion / thirty (30) to final completion) is given for completion of plans on this bid. This may begin at the time specified by the County within the three hundred sixty-five (365) days of the pricing quoted on this bid, starting on the day of award. The Contractor will be given written notice to begin work on this project. The Work on this project shall begin within five (5) calendar days after such notification.

Liquidated damages for failure to substantially complete the work within the allotted time will be applied. Liquidated damages are $500 per working day.

The Contractor will be given written notice to begin work on this project. Work on this project shall begin within five (5) working days after such notification. Failure to begin work within the allotted time will result in liquidated damages being incurred at the rate of $500 per working day.

## 1.6 Performance and Payment Bonds

To the extent, this IFB is for the procurement of a public work contract, and the following shall apply:

Texas Local Government Code, Chapter 262.032, governs the requirements for performance bonds for government entities making public work contracts. A performance bond is required if the contract is in excess of $50,000 and is to be made for the full amount of the contract.

Texas Government Code, Chapter 2253.021, governs the requirements for payment bonds for government entities making public work contracts. A payment bond is required if the contract is in excess of $25,000 and is to be made for the full amount of the contract.

The bonds are to be executed and delivered to the County **prior to issuing Notice to Proceed**. The bonds must be executed by a corporate surety or sureties in accordance with the Texas Insurance Code. For unit price contracts, the total contract price shall be estimated and calculated by multiplying the estimated quantities to the Bidder's unit bid price.

If the public works contract is less than $50,000, the performance bond will not be required as long as the contract provides that payment is not due until the work is completed and accepted by the County.

## 1.7 Bidder's Bonds

All Bids requiring a Bid Bond shall be accompanied by a certified cashier's check upon a National or State bank in an amount not less than five (5) percent of the total maximum bid price, payable without recourse to the County, or a bid bond in the same amount from a reliable surety company, as a guarantee that the Bidder will enter into a contract and **execute and deliver to the County performance and payment bonds prior to being recommended for award of the Contract**. **Bid guarantees must be submitted in the same sealed envelope with the Bid**. Bids submitted without check or bid bonds will not be considered. For unit price contracts, the total maximum bid price shall be estimated and calculated by multiplying the estimated quantities to the unit bid price.

## 1.8 Warranty Bonds

**When a Warranty Bond is required it shall be submitted by the Successful Bidder prior to issuing Notice to Proceed,** and shall be in the amount of **twenty (20) percent of the total project construction cost.** This Warranty Bond shall be security for the true and faithful performance of all warranties for two (2) years from the date of final payment. For unit price contracts, the total project construction cost shall be estimated and calculated by multiplying the estimated quantities to the bidder's unit bid price.

## 1.9 Insurance Requirements

By signing its Bid, the Bidder agrees to maintain at all times during any term of the Contract and any ensuing Agreement at Bidder's cost, insurance in accordance with this provision.

Bidder will be required to submit Certificates of Insurance **prior to contract award and any renewals.**

All certificates of insurance coverage as specified below must be provided to the following location:

Williamson County Purchasing Department
100 Wilco Way, Suite P101
Georgetown, Texas 78626

Failure to comply with these Insurance Requirements may result in the termination of the Contract and any ensuing Agreement(s) between the Successful Bidder and County. The following coverage limits shall be required at a minimum:

| | | |
|---|---|---|
| A. | Worker's Compensation | Statutory – Texas Law |
| B. | Employer's Liability: | |
| | Bodily Injury by Accident | $500,000 Ea. Accident |
| | Bodily Injury by Disease | $500,000 Ea. Employee |
| | Bodily Injury by Disease | $500,000 Policy Limit |

C. Comprehensive general liability including completed operations and contractual liability insurance for bodily injury, death, or property damages in the following amounts:

| COVERAGE | PER PERSON | PER OCCURRENCE |
|---|---|---|
| Comprehensive General Liability | $1,000,000 | $1,000,000 |

Aggregate policy limits: $2,000,000

Successful Bidder's property will not be covered by any insurance that may be carried by the County. Successful Bidder assumes the risk of loss on its contents and property that are situated on/in/around the County property. The Successful Bidder is strongly encouraged to obtain insurance on its property to the extent deemed necessary by the Successful Bidder.

The deductible for an insurance policy required hereunder shall not exceed $100,000. **The County shall be named as an additional insured under any policy of insurance required hereunder.**

Successful Bidder shall not commence any work until it has obtained all required insurance and such insurance has been approved by County. Successful Bidder shall not allow any subcontractor(s) to commence work to be performed until all required insurance has been obtained by such subcontractor(s) and approved by County. Approval of the insurance by County shall not relieve or decrease the liability of Successful Bidder or its subcontractor(s) hereunder.

The required insurance must be written by a company approved to do business in the State of Texas with a financial standing of at least an A- rating, as reflected in Best's insurance ratings or by a similar rating system recognized within the insurance industry at the time the policy is issued. Successful Bidder shall furnish County with a certificate of coverage issued by the insurer. Successful Bidder shall not cause any insurance to be canceled nor permit any insurance to lapse. ALL INSURANCE CERTIFICATES SHALL INCLUDE A CLAUSE TO THE EFFECT THAT THE POLICY SHALL NOT BE CANCELED OR REDUCED, RESTRICTED OR LIMITED UNTIL TEN (10) CALENDAR DAYS AFTER COUNTY HAS RECEIVED WRITTEN NOTICE AS EVIDENCED BY RETURN RECEIPT OF REGISTERED OR CERTIFIED LETTER.

It is the intention of the County, and agreed to and hereby acknowledged by the Successful Bidder, that no provision of this Contract or any ensuing Agreement shall be construed to require the County to submit to mandatory arbitration or mediation in the settlement of any claim, cause of action or dispute, except as specifically required in direct connection with an insurance claim or threat of claim under an insurance policy required hereunder which absolutely requires arbitration or mediation of such claim, or as otherwise required by law or a court of law with jurisdiction over the provisions of this Contract or any ensuing Agreement.

**Workers' Compensation Coverage Requirements**

The Texas Labor Code, Section 406.096, requires workers' compensation insurance coverage for all persons providing services on a building or construction project for a governmental entity such as the County. The rule requires the County to timely obtain certificates of coverage and retain them for the duration of the project. The rule also sets out the language to be included in the Bid specifications and in contracts awarded by a governmental entity and the information required to be in the posted notice to employees. The rule is adopted under the Texas Labor Code, Section 402.061.

The information provided below is a result of this rule. By submitting your Bid to the County, you are acknowledging that this rule is a part of these Bid specifications, and that you will observe and abide by all of the requirements outlined in the rule. You are further agreeing that should your Bid be accepted by the Williamson County Commissioners Court, the necessary certificates of coverage showing workers' compensation coverage, will be provided to the following name and address prior to beginning work:

Williamson County Purchasing Department
100 Wilco Way, Suite P101
Georgetown, TX 78626

Failure to comply with this request may result in termination of the Contract and any ensuing Agreement. If you have any questions related to this ruling and/or requirement, you are encouraged to contact either the Williamson County Purchasing Department at (512) 943-1546, or you may call the Texas Workers' Compensation Commission at (800) 372-7713.

A. The following words and terms, when used in this provision, shall have the following meanings. Terms not defined in this rule shall have the meaning defined in the Texas Labor Code, if so defined.

1. Certificate of coverage (certificate) – A copy of a certificate of insurance, a certificate of authority to self-insure issued by the commission, or a workers' compensation coverage agreement (TWCC-81, TWCC-82, TWCC-83, or TWCC-84), showing statutory workers' compensation insurance coverage for the person's or entity's employees (including those subject to a coverage agreement) providing services on a project, for the duration of the project.

2. Building or Construction – Has the meaning defined in the Texas Labor Code, Section 406.096(e)(1).

3. Contractor – A person bidding for or awarded a building or construction project by Williamson County.

4. Coverage – Workers' compensation insurance meeting the statutory requirements of the Texas Labor Code, Section 401.011(44).

5. Coverage agreement – A written agreement on form TWCC-81, form TWCC-82, form TWCC-83, or form TWCC-84, filed with the Texas Workers' Compensation Commission which establishes a relationship between the parties for purposes of the Texas Workers' Compensation Act, pursuant to the Texas Labor Code, Chapter 406, Subchapters F and G, as one of employer/employee and establishes who will be responsible for providing workers' compensation coverage for persons providing services on the project.

6. Duration of the project--Includes the time from the beginning of work on the project until the work on the project has been completed and accepted by the County.

7. Persons providing services on the project ("subcontractor" in the Texas Labor Code, Section 406.096) – includes all persons or entities performing all or part of the services the contractor has undertaken to perform on the project, regardless of whether that person contracted directly with the contractor and regardless of whether that person has employees. This includes, without limitation, independent contractors, subcontractors, leasing companies, motor carriers, owner-operators, employees of any such entity, or employees of any entity which furnishes persons to provide services on the project. "Services" include, without limitation, providing, hauling, or delivering equipment or materials, or providing labor, transportation, or other service related to a project. "Services" does not include activities unrelated to the project, such as food/beverage vendors, office supply deliveries, and delivery of portable toilets.

8. Project – Includes the provision of all services related to a building or construction contract for the County.

B. The contractor shall provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of the Texas Labor Code, Section 401.011(44), for all employees of the contractor providing services on the project, for the duration of the project.

C. The Contractor must provide a certificate of workers compensation coverage to Williamson County prior to being awarded the Contract.

D. If the coverage period shown on the contractor's current certificate of coverage ends during the duration of the project, the contractor must, prior to the end of the coverage period, file a new certificate of coverage with Williamson County showing that coverage has been extended.

E. The contractor shall obtain from each person providing services on a project, and provide to the County:

1. A certificate of coverage, prior to that person beginning work on the project, so Williamson County will have on file certificates of coverage showing coverage for all persons providing services on the project; and

2. No later than seven days after receipt by the contractor, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the project.

F. The contractor shall retain all required certificates of coverage for the duration of the project and for one year thereafter.

G. The contractor shall notify the County in writing by certified mail or personal delivery, within ten (10) days after the contractor knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the project.

H. The contractor shall post on each project site a notice, in the text, form and manner prescribed by the Texas Workers' Compensation Commission, informing all persons providing services on the project that they are required to be covered, and stating how a person may verify coverage and report lack of coverage.

I. The contractor shall contractually require each person with whom it contracts to provide services on a project, to:

1. Provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code, Section 401.011(44), for all of its employees providing services on the project, for the duration of the project;

2. Provide to the contractor, prior to that person beginning work on the project, a certificate of coverage showing that coverage is being provided for all employees of the person providing services on the project, for the duration of the project;

3. Provide the contractor, prior to the end of the coverage period, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the project;

4. Obtain from each other person with whom its contracts, and provide to the contractor:

    i. (a) a certificate of coverage, prior to the other person beginning work on the project; and
    ii. (b) a new certificate of coverage showing extension of coverage, prior to the end of the coverage period, if the coverage period shown on the current certificate of coverage ends during the duration of the project;

5. Retain all required certificates of coverage on file for the duration of the project and for one year thereafter;

6. Notify the County in writing by certified mail or personal delivery, within ten (10) days after the person knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the project; and

7. Contractually require each person with whom it contracts, to perform as required by paragraphs 1 – 7, with the certificates of coverage to be provided to the person for whom they are providing services

J. By signing this Contract or providing or causing to be provided a certificate of coverage, the contractor is representing to Williamson County that all employees of the contractor who will provide services on the project will be covered by workers' compensation coverage for the duration of the project, that the coverage will be based on proper reporting of classification codes and payroll amounts, and that all coverage agreements will be filed with the appropriate insurance carrier or, in the case of a self-insured, with the commission's Division of Self-Insurance Regulation. Providing false or misleading information may subject the contractor to administrative penalties, criminal penalties, civil penalties, or other civil actions.

K. The contractor's failure to comply with any of these provisions is a breach of Contract by the contractor which entitles the County to declare the contract void if the contractor does not remedy the breach within ten (10) days after receipt of notice of breach from the County.

# River Ranch County Park Interpretive Center

Williamson County, Texas

**SPECIFICATIONS**
for
**SITE CIVIL, LANDSCAPE ARCHITECTURE AND ARCHITECTURE IMPROVEMENTS**

**Issue Date: March 18, 2019**

## Bid Documents




DESIGNWORKSHOP

812 San Antonio St #401,
Austin, TX 78701
Phone: (512) 499-0222

River Ranch County Park
Interpretive Center Bid Documents March 18, 2019

**TABLE OF CONTENTS**

## DIVISION 00 – PROCUREMENT AND CONTRACTING DOCUMENTS:


| Section | Title |
|---|---|
| 000001 | Table of Contents |
| 000107 | Seals Page |
| 000115 | List of Drawing Sheets |


## SPECIFICATIONS:


| Section | Title |
|---|---|
| **DIVISION 01 - GENERAL REQUIREMENTS** | |
| 010000 | Governing Specifications |
| 010450 | Cutting & Patching |
| 013000 | Submittals |
| 014000 | Quality Requirements |
| 014529 | Testing Lab Services |
| 015000 | Construction Site |
| 016000 | Materials, Equipment, Minimum Standards & Workmanship |
| **DIVISION 2 – EXISTING CONDITIONS** | |
| 024119 | Selective Demolition (Supplemental Specification) |
| **DIVISION 3 - CONCRETE** | |
| 031000 | Formwork |
| 032000 | Reinforcement |
| 033000 | Cast-In-Place Concrete |
| 033460 | Finishing |
| 033500 | Concrete Sealing |
| **DIVISION 4 - MASONRY** | |
| 042000 | Masonry |
| 044400.10 | Landscape Boulders |
| **DIVISION 5 - METALS** | |
| 051200 | Structural Steel |
| 055000 | Miscellaneous Metal Fabrications |
| 055213 | Pipe and Tube Railings |
| **DIVISION 6 – WOOD, PLASTICS AND COMPOSITES** | |
| 061000 | Rough Carpentry |
| 062000 | Finish Carpentry |
| 062013 | Exterior Finish Carpentry |
| 064100 | Casework |

River Ranch County Park
Interpretive Center Bid Documents March 18, 2019

**Section Title**

**DIVISION 7 – THERMAL AND MOISTURE PROTECTION**
071600 Bituminous Dampproofing
072000 Building Insulation
074100 Metal Roofing
074213 Metal Siding
075423 TPO Roofing
076200 Sheet Metal Flashing, Trim, & Roof Accessories
079200 Sealants

**DIVISION 8 – DOORS AND WINDOWS**
082010 Interior Doors
082020 Exterior Doors
084000 Aluminum Entrances & Storefront
085000 Windows
087100 Door Hardware

**DIVISION 9 – FINISHES**
092900 Gypsum Board Systems
093000 Tiling
095113 Acoustical Panel Ceilings
096513 Resilient Base
099000 Painting & Coatings
099010 Painting of Steel

**DIVISION 10 - SPECIALTIES**
102800 Bath & Accessories
104416 Fire Extinguishers

**DIVISION 12 – FURNISHINGS**
123600 Specialty Countertops & Surfacing

**DIVISION 13 – Special Construction**
133419 Metal Building Systems

**DIVISION 14 thru 30**
200000 General Provisions - MEP
200100 Basic Materials and Methods – MEP
200700 Insulation
220100 Inside Utility Trench Excavation, Backfill and Compaction
220200 Outside Utility Trench Excavation, Backfill and Compaction
221116 Water Distribution System
221117 Water Heaters
221316 Liquid Waste Transfer
223000 Plumbing Fixtures and Trim
230593 Test and Balance
230802 Contractor Start-Up
233000 Air Distribution
237000 Mechanical Equipment: D-X Systems

**Section Title**

**VISION 31 – EARTHWORK**
313116 Termite Control

**VISION 32 – EXTERIOR IMPROVEMENTS**
321316 Decorative Concrete Paving
321373 Concrete Paving Joint Sealants
321540 Crushed Stone Surfacing
321726 Tactile Warning Surfacing
329113 Soil Preparation
329200 Turf and Grasses
329300 Plants

**DIVISION 33 – UTILITIES**
*Not Used at this Time*

## SITE ENGINEERING SPECIFICATIONS:

**Section Title Issue Date**

**Technical Specifications**

NOTE: ALL SPECIFICATIONS ARE CITY OF AUSTIN UNLESS OTHERWISE NOTED.

| | | |
|---|---|---|
| 101S | Preparing Right of Way | 1/4/11 |
| 102S | Clearing and Grubbing | 8/20/07 |
| 110S | Street Excavation | 11/18/04 |
| 111S | Excavation | 9/26/12 |
| 120S | Channel Excavation | 9/26/12 |
| 130S | Borrow | 9/26/12 |
| 132S | Embankment | 8/20/07 |
| 201S | Subgrade Preparation | 8/20/07 |
| 202S | Hydrated Lime and Lime Slurry | 8/18/00 |
| 203S | Lime Treatment for Materials in Place | 9/26/12 |
| 210S | Flexible Base | 2/24/10 |
| 220S | Sprinkling for Dust Control | 2/24/10 |
| 230S | Rolling (Flat Wheel) | 8/20/07 |
| 232S | Rolling (Pneumatic Tire) | 8/20/07 |
| 234S | Rolling (Tamping) | 8/20/07 |
| 236S | Proof Rolling | 8/20/07 |
| 301S | Asphalts, Oils, and Emulsions | 8/20/07 |
| 302S | Aggregated for Surface Treatments | 9/26/12 |

| Section | Title | |
|---|---|---|
| 306S | Prime Coat | 2/24/10 |
| 307S | Tack Coat | 2/24/10 |
| 312S | Seal Coat | 9/26/12 |
| 313S | Cleaning and/or Sealing Joints and Cracks (Asphaltic Concrete) | 2/24/10 |
| 340S | Hot Mix Asphaltic Concrete Pavement | 9/26/12 |
| 360S | Concrete Pavement | 9/26/12 |
| 401S | Structural Excavation and Backfill | 9/26/12 |
| 402S | Controlled Low Strength Material | 11/13/07 |
| 403S | Concrete for Structures | 9/26/12 |
| 404S | Pneumatically Placed Concrete | 9/26/12 |
| 405S | Concrete Admixtures | 11/13/07 |
| 406S | Reinforcing Steel | 9/26/12 |
| 408S | Concrete Joint Materials | 11/13/07 |
| 409S | Membrane Curing | 11/13/07 |
| 410S | Concrete Structures | 9/26/12 |
| 411S | Surface Finished for Concrete | 11/13/07 |
| 413S | Cleaning and/or Sealing Joints and Cracks (Portland Cement Concrete) | 11/13/07 |
| 432S | Portland Cement Concrete Sidewalks | 1/4/10 |
| 435S | P.C. Concrete Steps | 11/13/07 |
| 438S | Elastomeric Materials | 9/26/12 |
| 439S | Parking Lot Bumper Curbs | 11/13/07 |
| 504S | Adjusting Structures | 2/24/10 |
| 505S | Concrete Encasement and Encasement Pipe | 2/24/10 |
| 506 | Manholes | 3/15/11 |
| 507S | Bulkheads | 3/26/08 |
| 508S | Miscellaneous Structures and Appurtenances | 2/24/10 |
| 509* | Trench Safety Systems | |
| 510* | Pipe | |
| 511* | Water Valves | |
| 551 | Pipe Underdrains | 5/16/97 |
| 558 | Structural Plate Structures | 9/26/12 |
| 559S | Portland Cement Concrete Box Culverts | 10/3/13 |
| 591S | Riprap for Slope Protection | 1/4/16 |
| 593S | P.C. Concrete Retards | 2/24/10 |
| 594S | Gabions and Revet Mattresses | 9/26/12 |
| 601S | Salvaging and Placing Topsoil | 11/14/16 |
| 605S | Soil Retention Blanket | 6/21/07 |
| 607S | Slope Stabilization Applications for Erosion Control | 5/23/00 |
| 620S | Filter Fabric | 1/4/16 |

| Section | Title | |
|---|---|---|
| 633S | Landgrading | 11/26/01 |
| 634S | Level Spreader | 6/21/07 |
| 639S | Rock Berm | 8/18/10 |
| 641S | Stabilized Construction Entrance | 6/21/07 |
| 642S | Silt Fence | 9/1/11 |
| 658S | Void and Water Flow Mitigation | 4/4/12 |
| 700S | Mobilization | 9/26/12 |
| 703 | Fencing for Excavations | 9/22/88 |
| 704 | Metal Beam Guard Railing | 9/26/12 |
| 720S | Metal for Structures | 9/26/12 |
| 722S | Protective Coatings | 9/26/12 |
| 723 | Structural Welding | 9/26/12 |
| 725S | Survey Markers | 9/26/12 |

*CITY OF LIBERTY HILL STANDARD SPECIFICATIONS FOR WATER LINE
(CITY OF ROUND ROCK SPECIFICATIONS ADOPTED BY CITY OF LIBERTY HILL)

# DOCUMENT 000107 - SEALS PAGE

## 1.1 DESIGN PROFESSIONALS OF RECORD

A. Landscape Architect:

1. Design Workshop, Inc., Claire Hempel.
2. TX 2455, Texas.
3. Responsible for Drawings L0-0 through L9-02 and Technical Specification Divisions 00, 02-33 Sections: 000001, 000107, 024119 , 033000, 044300, 044313.16, 044400.10, 055213, 116800, 129300, 321313, 321540, 321713, 321736, 321816.13, 323100, 329113, 329200, 329300 except where indicated as prepared by other design professionals of record.

B. Civil Engineer:

1. Binkley & Barfield, Inc, Reynaldo Gonzalez Jr, PE
2. PE 91803, Texas.
3. Responsible for Drawings C1.0 through C6.11 and Technical Specifications 101S-725S.

C. Architect:

1. McKinney York Architect, Charles A York
2. TX 17821, Texas.
3. Responsible for Drawings A-000 through A-900 and Technical Specification Divisions 01-33 Sections: 010450, 013000, 014000, 015000, 016000, 033500, 042000, 055000, 061000, 062000, 062013, 064100, 066400, 072000, 074100, 076200, 079200, 082010, 082020, 084000, 085000, 085619, 087100, 092900, 093000, 095113, 096513, 099000, 099010, 102113, 102800, 104416, 123600, 133413, 313446

D. MEP Engineer:

1. Hendrix Consulting Engineers (HCA), Byron Hendrix, P.E.
2. PE 94813, Texas.
3. Responsible for Drawings E000-P000 and Technical Specifications Divisions 20, 22 and 23.

E. Structural Engineer:

1. Engineering 360, Inc., Laurence J. Fischer, P.E.
2. PE 50110, Texas.
3. Responsible for Drawings S000-S411 and Technical Specifications are provided on Drawings notes and NOT included within Project Manual.
4. Responsible for Drawings I10-01-I10-22 and Technical Specifications (included on drawings).

END OF DOCUMENT 000107

# DOCUMENT 000115 - LIST OF DRAWING SHEETS

## 1.1 LIST OF DRAWINGS

A. Drawings: There is one set of drawings consisting of the Contract Drawings and other drawings listed on the Table of Contents page of the separately bound drawing set titled 1) 'River Ranch County Park Phase 1 Improvements: Issue For Bid dated May 25, 2018, as modified by subsequent Addenda and Contract modifications.

B. List of Drawings: Drawings consist of the following Contract Drawings and other drawings of type indicated:

| SHEET NO. | DESCRIPTION |
|---|---|
| L0-0 | Cover |
| L0-1 | Landscape Notes |
| L0-2 | Reference Plan |
| C1-01 | Site & Dimension Control |
| C2-01 | Grading & Drainage |
| C3-01 | Utility Plan |
| C4-01 | Demolition Plan |
| C5-01 | Erosian & Sedimentation Control Plan |
| C6-01 | Site Details (1 of 2) |
| C6-02 | Site Details (1 of 2) |
| L3-01 | Materials Plan |
| L4-01 | Layout Plan |
| L7-01 | Site Details |
| L7-02 | Site Details |
| L7-03 | Site Details |
| L8-01 | Planting Plan |
| L9-01 | Planting Details |
| A000 | General Information Sheet |
| A-001 | Accessibility Standards |
| A-002 | Code Analysis |
| A-231 | Floor Plan |
| A-232 | Dimension Plan |
| A-233 | Bathrooms Floor Plan and Bathroom Roof Plan |
| A-234 | Slab Plan and Roof Plan |
| A-241 | Reflected Ceiling Plan |
| A-311-312 | Exterior Elevations |
| A-411-412 | Building Sections |
| A-421 | Building & Wall Sections |
| A-510-520 | Interior Elevations |
| A-611-614 | Details |
| A-630 | Standard Details |
| A-700 | Construction Assemblies & Partition Types |
| A-800 | Fenestration Types |

| | |
|---|---|
| A-900 | Finishes and Schedules |
| S0.1 | Framing Notes |
| S1.1 | Foundation Plan |
| S1.2 | Roofing Plan |
| S2.1 | Foundation Notes |
| S2.2 | Details |
| S2.3 | Details |
| S2.4 | Details |
| E000 -001 | Schedules, Notes and Legends - Electrical |
| E002 | Schedules and Details |
| E210-310 | Floor Plan |
| M000-002 | Schedules, Notes, and Legends – Mechanical |
| M003-M004 | Details-Mechanical |
| M210 | Floor Plan |
| P000 | Schedules, Notes and Legends – Plumbing |
| P001 | Details - Plumbing |
| P210 | Floor Plan - Plumbing |
| Reference | Reference ‘RRCP Septic Supplemental Information’ for additional drawings and specifications |

END OF DOCUMENT 000115

# SECTION 013300 - SUBMITTAL PROCEDURES

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

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

### 1.2 SUMMARY

A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

B. Related Requirements:

1. Section 012900 "Payment Procedures" for submitting Applications for Payment and the schedule of values.
2. Section 013200 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
3. Section 017823 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
4. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.

### 1.3 DEFINITIONS

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

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

C. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.

D. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.4 ACTION SUBMITTALS

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

1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.

1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Architect's Digital Data Files: Electronic digital data files of the Contract Drawings **will not** be provided by Architect for Contractor's use in preparing submittals.

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

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

a. Architect and Construction Manager reserve the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

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

1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Construction Manager will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow 15 days for review of each resubmittal.
4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal.
5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 15 days for review of each submittal. Submittal will be returned to Construction Manager, before being returned to Contractor.

D. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:

1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
2. Name file with submittal number or other unique identifier, including revision identifier.

    a. File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., Moncus1A-061000.01). Resubmittals shall include “REV” and associated revision number after another decimal point (e.g., Moncus1A-061000.01.REV1).

3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.
4. Transmittal Form for Electronic Submittals: Use software-generated form from electronic project management software or electronic form acceptable to Owner**,** containing the following information:

    a. Project name.
    b. Date.
    c. Name of Contractor.
    d. Name of firm or entity that prepared submittal.
    e. Category and type of submittal.
    f. Submittal purpose and description.
    g. Drawing number and detail references, as appropriate.
    h. Location(s) where product is to be installed, as appropriate.
    i. Related physical samples submitted directly.
    j. Indication of full or partial submittal.
    k. Transmittal number, numbered consecutively.
    l. Remarks.

5. Metadata: Include the following information as keywords in the electronic submittal file metadata:

    a. Project name.
    b. Number and title of appropriate Specification Section.
    c. Manufacturer name.
    d. Product name.

E. Options: Identify options requiring selection by Architect.

F. Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect and Construction Manager on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.

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

1. Note date and content of previous submittal.

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

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

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

## PART 2 - PRODUCTS

### 2.1 SUBMITTAL PROCEDURES

A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Post electronic submittals as PDF electronic files directly to Project Web site specifically established for Project.

    a. Architect**,** through Construction Manager, will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.

2. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.

    a. Provide a digital signature with digital certificate on electronically submitted certificates and certifications where indicated.
    b. Provide a notarized statement on original paper copy certificates and certifications where indicated.

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

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

    a. Manufacturer's catalog cuts.
    b. Manufacturer's product specifications.
    c. Standard color charts.
    d. Statement of compliance with specified referenced standards.
    e. Testing by recognized testing agency.

f. Application of testing agency labels and seals.
g. Notation of coordination requirements.
h. Availability and delivery time information.

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

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

5. Submit Product Data before or concurrent with Samples.
6. Submit Product Data in the following format:

a. PDF electronic file.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

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

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

2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches, but no larger than 30 by 42 inches.
3. Submit Shop Drawings in the following format:

a. PDF electronic file.

D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

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

a. Generic description of Sample.
b. Product name and name of manufacturer.
c. Sample source.
d. Number and title of applicable Specification Section.

3. For projects where electronic submittals are required, provide corresponding electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record.
4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

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

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

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

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

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

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

E. Coordination Drawing Submittals: Comply with requirements specified in Section 013100 "Project Management and Coordination."

F. Contractor's Construction Schedule: Comply with requirements specified in Section 013200 "Construction Progress Documentation."

G. Application for Payment and Schedule of Values: Comply with requirements specified in Section 012900 "Payment Procedures."

H. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Section 014000 "Quality Requirements."

I. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Section 017700 "Closeout Procedures."

J. Maintenance Data: Comply with requirements specified in Section 017823 "Operation and Maintenance Data."

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

L. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.

M. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

N. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

O. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

P. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

Q. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

R. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

S. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:

1. Name of evaluation organization.
2. Date of evaluation.
3. Time period when report is in effect.
4. Product and manufacturers' names.
5. Description of product.
6. Test procedures and results.

7. Limitations of use.

T. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.

U. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

V. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

W. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

## 2.2 DELEGATED-DESIGN SERVICES

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

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

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

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

# PART 3 - EXECUTION

## 3.1 CONTRACTOR'S REVIEW

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

B. Project Closeout and Maintenance Material Submittals: See requirements in Section 017700 "Closeout Procedures."

C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

## 3.2 ARCHITECT'S ACTION

A. Action Submittals: Architect and Construction Manager will review each submittal, make marks to indicate corrections or revisions required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.

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

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

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

E. Submittals not required by the Contract Documents may be returned by the Construction Manager without action.

END OF SECTION 013300

# SECTION 014000 - QUALITY REQUIREMENTS

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

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

### 1.2 SUMMARY

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

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

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

### 1.3 DEFINITIONS

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

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

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

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

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

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

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

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

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

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

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

## 1.4 CONFLICTING REQUIREMENTS

A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Construction Manager for a decision before proceeding.

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

## 1.5 INFORMATIONAL SUBMITTALS

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

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

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

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

1. Specification Section number and title.
2. Entity responsible for performing tests and inspections.
3. Description of test and inspection.
4. Number of tests and inspections required.
5. Time schedule or time span for tests and inspections.

## 1.6 CONTRACTOR'S QUALITY-CONTROL PLAN

A. Quality-Control Plan, General: Submit quality-control plan within 10 days of Notice to Proceed, and not less than five days prior to preconstruction conference. Submit in format acceptable to Construction Manager. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities. Coordinate with Contractor's construction schedule.

B. Quality-Control Personnel Qualifications: Engage qualified full-time personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.

1. Project quality-control manager may also serve as Project superintendent.

C. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:

1. Contractor-performed tests and inspections including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections.
2. Special inspections required by authorities having jurisdiction.
3. Owner-performed tests and inspections indicated in the Contract Documents.

D. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and approved mockups.

E. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work Construction Manager and Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.7 REPORTS AND DOCUMENTS

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

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

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

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

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

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

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

1.8 QUALITY ASSURANCE

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

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

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

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

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

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

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

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

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

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

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

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

1. Contractor responsibilities include the following:

    a. Provide test specimens representative of proposed products and construction.
    b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
    c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
    d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
    e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
    f. When testing is complete, remove test specimens, assemblies, and mockups; do not reuse products on Project.

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

K. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:

1. Build mockups in location and of size indicated or, if not indicated, as directed by Construction Manager.
2. Notify Construction Manager seven days in advance of dates and times when mockups will be constructed.
3. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed during the construction at Project.
4. Demonstrate the proposed range of aesthetic effects and workmanship.
5. Obtain Architect's and Construction Manager's approval of mockups before starting work, fabrication, or construction.

    a. Allow seven days for initial review and each re-review of each mockup.

6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
7. Demolish and remove mockups when directed unless otherwise indicated.

## 1.9 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.

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

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

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

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

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

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

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

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

1. Notify Construction Manager and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.

3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
6. Do not perform any duties of Contractor.

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

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

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

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

I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents as a component of Contractor's quality-control plan. Coordinate and submit concurrently with Contractor's construction schedule. Update as the Work progresses.

1. Distribution: Distribute schedule to Owner, Construction Manager, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

## 1.10 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Engage a qualified testing agency or special inspector as required to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, and as follows:

1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews the completeness and adequacy of those procedures to perform the Work.
2. Notifying Construction Manager and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.

3. Submitting a certified written report of each test, inspection, and similar quality-control service to Construction Manager with copy to Contractor and to authorities having jurisdiction.
4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
6. Retesting and reinspecting corrected work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

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

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

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

3.2 REPAIR AND PROTECTION

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

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."

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

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

END OF SECTION 014000

# SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

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

### 1.2 SUMMARY

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

B. Related Requirements:

1. Section 011000 "Summary" for work restrictions and limitations on utility interruptions.
2. Section S-012 "Stormwater Pumping" for disposal of ground water at Project site.

### 1.3 USE CHARGES

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

B. Sewer Service: Pay sewer-service use charges for sewer usage by all entities for construction operations. Existing sewer service is NOT available on-site.

C. Water Service: Pay water-service use charges for water used by all entities for construction operations. Existing water service is available on-site.

D. Electric Power Service: Pay electric-power-service use charges for electricity used by all entities for construction operations. Existing electric service is available on-site.

### 1.4 INFORMATIONAL SUBMITTALS

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

B. Erosion- and Sedimentation-Control Plan: Show compliance with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.

1.5 QUALITY ASSURANCE

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

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

PART 2 - PRODUCTS

2.1 MATERIALS

A. Chain-Link Fencing: Minimum 2-inch, 0.148-inch-thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch-OD line posts and 2-7/8-inch-OD corner and pull posts, with 1-5/8-inch-OD top rails.

1. See also Civil Engineer’s Phase 1A drawings.

2.2 TEMPORARY FACILITIES

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

B. Common-Use Field Office: Of sufficient size to accommodate needs of Owner, Architect**,** Construction Manager, and construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly. Furnish and equip offices as follows:

1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
2. Conference room of sufficient size to accommodate meetings of 10 individuals or more. Provide electrical power service and 120-V ac duplex receptacles, with no fewer than one receptacle on each wall. Furnish room with conference table, chairs, and 4-foot-square tack and marker boards.
3. Drinking water and private toilet.
4. Coffee machine and supplies.
5. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F.
6. Lighting fixtures capable of maintaining average illumination of 20 fc at desk height.

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

2.3 EQUIPMENT

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

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

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

1. Locate facilities to limit site disturbance and as directed by Construction Manager.

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

3.2 TEMPORARY UTILITY INSTALLATION

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

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

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

1. Provide and regularly maintain temporary portable toilets with hand sanitizing station. Coordinate location with Construction Manager and with requirements of authorities having jurisdiction.

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

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

E. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.

1. Coordinate with and install electric power service in accordance with Louisiana Utility Service and Construction Manager.

F. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install one telephone line(s) for each field office.

1. At each telephone, post a list of important telephone numbers.

a. Police and fire departments.
b. Ambulance service.
c. Contractor's home office.
d. Contractor's emergency after-hours telephone number.
e. Construction Manager’s office and mobile phone number.

f. Superintendent’s mobile phone number.
g. Architect's office.
h. Engineers' offices.
i. Principal subcontractors' field and home offices.

2. Provide superintendent with cellular telephone for use when away from field office.

## 3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

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

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

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

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

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

D. Parking: Provide temporary parking areas for construction personnel.

E. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.

1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
2. Remove snow and ice as required to minimize accumulations.

F. Project Signs: Provide Project signs as directed by Construction Manager, as required and in accordance with authorities having jurisdiction. Unauthorized signs are not permitted. Maintain and touchup signs so they are legible at all times.

G. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017300 "Execution."

## 3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

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

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

1. Comply with work restrictions specified in Section 011000 "Summary."

C. Temporary Erosion and Sedimentation Control: Comply with requirements of 2003 EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent and requirements specified in Section III-22 "Clearing." And Plans. Maintain through Phase 1B until completion.

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

E. Tree and Plant Protection: Comply with requirements specified in Section 015639 "Temporary Tree and Plant Protection."

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

1. Extent of Fence: As indicated on Drawings.

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

## 3.5 OPERATION, TERMINATION, AND REMOVAL

A. Maintenance: Maintain facilities in good operating condition until removal.

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

B. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.

2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION 015000

# SECTION 016000 - PRODUCT REQUIREMENTS

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

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

### 1.2 SUMMARY

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

B. Related Requirements:

1. Section 012500 "Substitution Procedures" for requests for substitutions.
2. Section 014200 "References" for applicable industry standards for products specified.

### 1.3 DEFINITIONS

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

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

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

1.4 ACTION SUBMITTALS

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

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

    a. Form of Approval: As specified in Section 013300 "Submittal Procedures."
    b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.

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

1.5 QUALITY ASSURANCE

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

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

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

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

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.

4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

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

## 1.7 PRODUCT WARRANTIES

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

1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
3. See other Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Section 017700 "Closeout Procedures."

# PART 2 - PRODUCTS

## 2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.

2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures:

1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
3. Products:

    a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.
    b. Nonrestricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.

4. Manufacturers:

    a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.
    b. Nonrestricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.

5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable

Products" Article for consideration of an unnamed product by one of the other named manufacturers.

C. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.

1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 012500 "Substitution Procedures" for proposal of product.

D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

## 2.2 COMPARABLE PRODUCTS

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

1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
3. Evidence that proposed product provides specified warranty.
4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
5. Samples, if requested.

# PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

# SECTION 024119 - SELECTIVE DEMOLITION

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

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

### 1.2 SUMMARY

A. Section Includes:

1. Demolition and removal of selected portions of building or structure.
2. Demolition and removal of selected site elements.
3. Salvage and Site Harvesting of existing items to be reused or recycled.

B. Related Requirements:
1. Section 102S ‘Clearning and Grubbing’ in Site Engineering Specifications
2. Section 700S ‘Mobilization in Site Engineering Specifications.

### 1.3 DEFINITIONS

A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.

B. Remove and Salvage: Detach items from existing construction or harvest items from existing site, in a manner to prevent damage, and store.

C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.

D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

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

F. Site Harvest: To gather items from existing site that are scheduled to be removed through demolition- see also ‘Remove and Salvage’ definition. Do not remove and salvage items that are not included in demolition.

### 1.4 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.

1. Notify Owner in writing. Obtain written consent to carefully salvage in a manner to prevent damage and promptly return to Owner.

## 1.5 PREINSTALLATION MEETINGS

A. Predemolition Conference: Conduct conference at Project site.

1. Inspect and discuss condition of construction and site to be selectively demolished.
2. Review structural load limitations of existing site.
3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
5. Review areas where existing construction is to remain and requires protection.

## 1.6 INFORMATIONAL SUBMITTALS

A. Schedule of Selective Demolition Activities: Indicate the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity

B. Written work plan detailing tree pruning and grubbing of existing trees and plants, detailing blade cleaning and prevention of disease and weed spreading.

C. Written work plan and schedule of activities to allow limestone to be harvested and stored from demolition for use on site.

## 1.7 CLOSEOUT SUBMITTALS

A. Inventory: Submit a list of items that have been removed and salvaged.

## 1.8 FIELD CONDITIONS

A. Owner will occupy portions of site immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

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

C. Notify Landscape Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

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

1. Hazardous materials will be removed by Owner before start of the Work.
2. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

E. Historic Areas: Demolition and hauling equipment and other materials shall be of sizes that clear surfaces within historic spaces, areas, rooms, and openings, including temporary protection, by 12 inches or more.

## PART 2 - EXECUTION

### 2.1 EXAMINATION

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

B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.

C. Verify that hazardous materials have been remediated before proceeding with building demolition operations.

D. Catalogue items proposed for salvage or reuse.

### 2.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
2. Arrange to shut off utilities with utility companies.
3. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
4. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.

    a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
    b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
    c. Equipment to Be Removed: Disconnect and cap services and remove equipment.

d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

## 2.3 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
5. Maintain fire watch during and for at least 72 hours after flame-cutting operations.
6. Maintain adequate ventilation when using cutting torches.
7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
8. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
9. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
10. Dispose of demolished items and materials promptly and following governing laws and regulations.

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

C. Work in Historic Areas: Selective demolition may be performed only in areas of Project that are not designated as historic. In historic spaces, areas, and rooms, or on historic surfaces, the terms "demolish" or "remove" shall mean historic "removal" or "dismantling" as specified in Section 024296 "Historic Removal and Dismantling."

D. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area approved by Construction Manager.
5. Protect items from damage during transport and storage.

E. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

F. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Landscape Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

## 2.4 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Concrete: Demolish in small sections. Using power-driven saw, cut concrete to a depth of at least 3/4 inch at junctures with construction to remain. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete. Neatly trim openings to dimensions indicated. If concrete is in the Critical Root Zone of existing trees to remain consult Construction Manager and Landscape Architect to see if airspading and hand excavation, or other special practices are necessary to prevent damage to the tree and proceed only after given written consent by Construction Manager and Landscape Architect.

B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.

C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.

## 2.5 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
4. Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."

B. Burning: Do not burn demolished materials.

2.6 CLEANING

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

2.7 SELECTIVE DEMOLITION SCHEDULE

A. Remove and Salvage: Limestone boulders and gravel. Cedar (Ash Juniper trees)

B. Existing to Remain: Refer to drawings.

END OF SECTION 024119

SECTION 033000 - CAST-IN-PLACE CONCRETE
SUPPLEMENT TO STRUCTURAL ENGINEERING DRAWINGS AND NOTES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Works includes the following as detailed on the Drawings. (See also Structural and Civil Engineering Drawings and Specifications).

1. Wall Type 2~~7~~ – Cast-in-Place Wall

B. Related Requirements:

**1. Structural Engineer's drawings and notes for prescribed requirements. This Section only outlines site work specific deviations.**

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review concrete finishes and finishing, forms and form removal limitations, and concrete protection.

1.4 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Wall Type 2~~7~~ – Cast-in-Place Wall
   a. Provide a mockup of final finish, minimum full height x 4' long, including front, top and back of wall and end condition. Build mockup of full-thickness sections to demonstrate typical joints, tie marks, surface color, pattern, texture, curing, and standard of workmanship.
   b. Location of mockup must be confirmed with Construction Manager.
   c. Use as part of completed work must be confirmed and approved by Construction Manager and Landscape Architect prior to performing work.
   d. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Landscape Architect specifically approves such deviations in writing.

2. General Finish Provisions: In the event the cast mockup is unacceptable, in lieu of rejecting the mockup, the Landscape Architect reserves the right to request repairs to the wall finish surface through top coat applications such as but not limited to cement, paint.

## PART 2 - PRODUCTS

### 2.1 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete Type-1: Form-facing panels that provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and Medium-density overlay, Class 1 or better, treated with a clear, non-staining release agent and edge sealed.

1. Wall Type 2~~7~~ – Cast-in-Place Wall – Front, top, sides and exposed back of wall to a depth of 6 inches below finished grade.

### 2.2 FORM-FACING MATERIALS

1. Form Ties: Fiberglass system, free of defects that could leave holes larger than 1 inch in concrete.

## PART 3 - EXECUTION

### 3.1 FORMWORK INSTALLATION

A. Smooth-Formed Concrete Type 1: Forms butt together, secured with form ties. Form surfaces to be flush with one another. No intermediate, horizontal seams shall be provided in exposed vertical wall.

1. Wall Type 2~~7~~ – Cast-in-Place Wall – Front, top, sides and back of wall.

### 3.2 REMOVING AND REUSING FORMS

A. Forms shall not be reused.

### 3.3 CLEANING

A. Remove efflorescence, stains, oil, grease, and foreign materials from exposed surfaces.

END OF SECTION 033000

# SECTION 044400.10 - LANDSCAPE BOULDERS

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

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

### 1.2 SUMMARY

A. Section Includes:
   1. Boulder Wall: Irregular Boulders integrated with wall.
   2. Irregular Boulders

B. Related Sections:
   1. See Civil Drawings and Specifications "Earth Moving" for excavation for installation.

### 1.3 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved for installation of units required for this Project.

B. Source Limitations: Salvage and stockpile landscape boulders from on-site during site demolition. Ensure stockpiling does not damage, scar or break boulders.

C. Preinstallation Conference: Conduct conference at Project site.

   1. Review methods and procedures related to landscape boulders including, but not limited to, the following:

      a. Landscape boulder salvaging.
      b. Landscape boulder installation.
      c. Landscape boulders to be used as rock carins.
      d. Landscape boulders for Marker Sign.

D. Mockups: Build mockups to demonstrate aesthetic effects and set quality standards for materials and execution.

   1. General Provisions:
      a. Location of mockups must be confirmed with the Construction Manager.
      b. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Landscape Architect specifically approves such deviations in writing.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store and handle landscape boulders to prevent deterioration or damage due to contaminants, breaking, chipping, scarring or other causes.

1.5 PROJECT CONDITIONS

A. Do not install landscape boulders that are damaged, scarred or broken. Landscape Architect to give final boulder selection approval.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Landscape Boulders: Use boulders found on site or created as part of site demolition and stockpile on site first. Only use sound, durable natural limestone boulders. Should sufficient quantity of boulders not be available, contractor shall bring additional boulders needed to the site. Size range should include: Small (approximately 14”-20” minimal dimension in any direction) Medium (approximately 24”-30” minimal dimension in any direction) and Large (approximately 30”+ dimension in any direction). Sizes for Main Entry Sign as shown on drawings.

1. Final selection and location of landscape boulders shall be determined in the field under the direction of the Landscape Architect.

a. Refer to Drawings for approximate quantity, size and locations.

2.2 FABRICATION

A. General: Select or Fabricate boulder stone units in sizes and shapes required to comply with requirements indicated.

B. Cut, split or select boulder stone to produce pieces of thickness, size, and shape indicated, including details on Drawings.

C. Scrape joints (bed and vertical) straight and at right angle to appear as a dry stack finish unless otherwise indicated. Shape beds to fit supports.

D. Cut and drill sinkages and holes in stone for anchors and supports.

E. If additional stone beyond site harvested stone is required, carefully inspect stone at quarry for compliance with requirements for appearance, material, and fabrication. Replace defective units before shipment.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for excavation tolerances, condition of subgrades, and other conditions affecting performance of landscape boulders.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 LANDSCAPE BOULDER INSTALLATION

A. Leveling Base: Place and compact base material to thickness indicated and with not less than 95 percent maximum dry unit weight according to ASTM D 698.

B. Install boulders in locations as directed by Landscape Architect in the field. Bury boulders per drawings.

C. Rock carins to be constructed and connected to earth as shown in drawings.

3.3 PROTECTION

A. Remove and replace landscape boulders that are damaged, scarred or broken during or after installation.

END OF SECTION 044400.10

# SECTION 055213 - PIPE AND TUBE RAILINGS

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

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

### 1.2 SUMMARY

A. Section Includes:

1. Handrail

B. Related Requirements:

1. Architecture Drawings for foundation and Stair details

### 1.3 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages that are to be embedded in concrete and masonry. Deliver such items to Project site in time for installation.

### 1.4 ACTION SUBMITTALS

A. Product Data: For the following:

1. Grout, anchoring cement, and paint products.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

C. Samples: For each type of exposed finish required.

1. Sections of 4-inch length by full width and thickness, demonstrating final finish of each distinctly different linear railing member, including handrails, posts and wood.
2. (1) sample at full scale of Fittings and brackets of each distinctly different type used.
3. Assembled Sample of railing system, made from full-size components, including post, handrail, and infill. Sample need not be full height.

a. Show method of connecting and finishing members at intersections.

1.5 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
3. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

1.7 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of Steps and other construction contiguous with Handrail by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 HANDRAIL

A. Posts:
1. Steel tubing: Size as indicated in drawings. Paint color: Sherwin Williams SW7020 Black Fox.

B. Handrail:
1. As indicated in drawings.

2.2 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.

B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.

2.3 FASTENERS

A. General: Provide the following:

1. Ungalvanized-Steel Railings: Plated steel fasteners complying with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5 for zinc coating.
2. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.

B. Fasteners for Interconnecting Railing Components:

1. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless otherwise indicated.
2. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless exposed fasteners are unavoidable or are the standard fastening method for railings indicated.
3. Provide tamper resistant flat-head machine screws for exposed fasteners unless otherwise indicated.

## 2.4 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

B. Shop Primers: Provide primers that comply with Section 099000 "Painting and Coatings" and Section 099010 "Painting of Steel" for exterior painting applications only.

C. Intermediate Coats and Topcoats: Provide products that comply with Section 099000 "Painting and Coatings" and Section 099010 "Painting of Steel" for exterior painting applications only.

D. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

E. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.

1. Water-Resistant Product: At handrail post anchoring provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended by manufacturer for exterior use.

## 2.5 FABRICATION

A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.

B. Shop assemble railings to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.

C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

D. Form work true to line and level with accurate angles and surfaces.

E. Fabricate connections that are exposed to weather in a manner that excludes water. Provide weep holes where water may accumulate.

F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.

G. Connections: Fabricate railings with either welded or nonwelded connections unless otherwise indicated.

H. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove flux immediately.
4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.

I. Nonwelded Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.

1. Fabricate splice joints for field connection using an epoxy structural adhesive if this is manufacturer's standard splicing method.

J. Form Changes in Direction as Follows:
1. By bending.

K. For changes in direction made by bending, use jigs to produce uniform curvature for each repetitive configuration required. Maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.

L. Close exposed ends of railing members with prefabricated end fittings.

M. Provide inserts for connecting railings by core drilling concrete and masonry work.

## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

A. Fit exposed connections together to form tight, hairline joints.

B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.

1. Do not weld, cut, or abrade surfaces of railing components that are coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
2. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.

C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1. Coat, with a heavy coat of bituminous paint, concealed surfaces of aluminum that are in contact with grout, concrete, masonry, wood, or dissimilar metals.

D. Adjust railings before anchoring to ensure matching alignment at abutting joints.

## 3.2 RAILING CONNECTIONS

A. Nonwelded Connections: Use mechanical or adhesive joints for permanently connecting railing components. Seal recessed holes of exposed locking screws using plastic cement filler colored to match finish of railings.

B. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in "Fabrication" Article whether welding is performed in the shop or in the field.

## 3.3 ANCHORING POSTS

A. Core-drill holes not less than 5 inches deep and 3/4 inch larger than OD of post for installing posts in concrete and masonry. Clean holes of loose material, insert posts, and fill annular space between post and concrete with anchoring cement, mixed and placed to comply with anchoring material Stuctural Engineers drawings and notes.

B. Leave anchorage joint exposed with 1/8-inch (3-mm) buildup, sloped away from post.

## 3.4 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 requirements for touching up shop-painted surfaces.

## 3.5 PROTECTION

A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.

END OF SECTION 055213

# SECTION 129300 - SITE FURNISHINGS

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

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

### 1.2 SUMMARY

A. Section Includes:

1. Bicycle Rack

B. Related Requirements:

1. Structural Engineer’s drawings and notes.
2. Section 024119 Selective Demolition for criteria regarding site harvested stone.
3. Section 044300.10 Landscape Boulders for criteria regarding site harvested stone.
4. Section 312000 "Earth Moving" for excavation for installing concrete footings.

### 1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples for Initial Selection:
1. For units with factory-applied finishes.

C. Shop Drawings:
1. Bicycle Rack: Indicate profiles, sizes, thickness, grade class, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection, drawings, elections and details where applicable.

### 1.4 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer approved by the selected manufacturer..

B. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for materials and execution.

1. General Provisions:
   a. Location of mockups must be confirmed with the Construction Manager.
   b. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Landscape Architect specifically approves such deviations in writing.

c. Protect accepted mockups from the elements with weather-resistant membrane.

2. Bicycle Rack:
   a. One full scale mockup showing final finishes, graphic cutout and mounting type, quality of workmanship.
   b. Use of mockup as part of completed work must be confirmed and approved by Construction Manager and Landscape Architect prior to performing work.

## 1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For site furnishings to include in maintenance manuals.

## 1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

# PART 2 - PRODUCTS

## 2.1 BICYCLE RACK

A. Custom fabricated weathering steel panel. Refer to drawings.

# PART 3 - EXECUTION

## 3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for correct and level finished grade, mounting surfaces, installation tolerances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 INSTALLATION

A. Comply with manufacturer's written installation instructions unless more stringent requirements are indicated. Complete field assembly of site furnishings where required.

B. Unless otherwise indicated, install site furnishings after landscaping and paving have been completed.

C. Spray or stake proposed locations for field confirmation prior to installation.

D. Install site furnishings level, plumb, true, and securely anchored or positioned at locations indicated on Drawings.

E. Post Setting: Set cast-in support posts in concrete footing with smooth top, shaped to shed water. Protect portion of posts above footing from concrete splatter. Verify that posts are set plumb or at correct angle and are aligned and at correct height and spacing. Hold posts in position during placement and finishing operations until concrete is sufficiently cured.

F. Pipe Sleeves: Use steel pipe sleeves preset and anchored into concrete for installing posts. After posts have been inserted into sleeves, fill annular space between post and sleeve with nonshrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions, with top smoothed and shaped to shed water.

G. Protect furniture from damage or construction activity until substantial completion.

END OF SECTION 129300

# SECTION 321316 - DECORATIVE CONCRETE PAVING

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

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

### 1.2 SUMMARY

A. Section includes Salt Finish concrete paving.

B. Related Requirements:

1. Section 033000 "Cast-in-Place Concrete for general building applications of concrete.
2. Section 321313 "Concrete Paving" for cast-in-place concrete paving with other finishes, curbs and gutters, and stamped detectable warnings.
3. Section 321373 "Concrete Paving Joint Sealants" for joint sealants in expansion and contraction joints within decorative concrete paving and in joints between decorative concrete paving and other paving or adjacent construction.

### 1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash, slag cement, and other pozzolans.

B. W/C Ratio: The ratio by weight of water to cementitious materials.

### 1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples for Initial Selection: For each type of product, ingredient, or admixture requiring color, pattern, or texture selection.

C. Samples for Verification: For each type of exposed color, pattern, or texture indicated.

D. Design Mixtures: For each decorative concrete paving mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

### 1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Material Certificates: For the following, from manufacturer:

1. Cementitious materials.
2. Steel reinforcement and reinforcement accessories.
3. Admixtures.
4. Curing compounds.
5. Applied finish materials.
6. Bonding agent or epoxy adhesive.
7. Joint fillers.

C. Material Test Reports: For each of the following:

1. Aggregates.

D. Field quality-control reports.

## 1.6 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer of decorative concrete paving systems.

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

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities" (Quality Control Manual - Section 3, "Plant Certification Checklist").

C. Testing Agency Qualifications: Qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.

D. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockups of full-thickness sections of decorative concrete paving to demonstrate typical joints; surface color, pattern, and texture; curing; and standard of workmanship.
2. Build mockups of decorative concrete paving in the location and of the size indicated or, if not indicated, build mockups where directed by Architect and not less than 96 inches by 96 inches. Up to three mockups showing a range of finishes and variations should be expected.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

PART 2 - PRODUCTS

2.1 FORMS

A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, and smooth exposed surfaces.

1. Use flexible or uniformly curved forms for curves of a radius of 100 feet (30.5 m) or less.

2.2 STEEL REINFORCEMENT

A. Match Section 033000 "Cast-in-Place Concrete”

2.3 CONCRETE MATERIALS

A. Match Section 033000 "Cast-in-Place Concrete”

B. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.

C. Cementitious Materials:

1. Portland Cement: ASTM C 150/C 150M, gray portland cement
2. Fly Ash: ASTM C 618, Class C or F.
3. Slag Cement: ASTM C 989/C 989M, Grade 100 or 120.
4. Blended Hydraulic Cement: ASTM C 595/C 595M, Type IL, Portland-limestone cement.

D. Normal-Weight Aggregates: ASTM C 33, Class 5S, uniformly graded. Provide aggregates from a single source with documented service-record data of at least 10 years' satisfactory service in similar paving applications and service conditions using similar aggregates and cementitious materials].
1. Maximum Aggregate Size: ½ inch nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

E. Water: Potable and complying with ASTM C 94/C 94M.

F. Air-Entraining Admixture: ASTM C 260.

G. Chemical Admixtures: Admixtures certified by manufacturer to be compatible with other admixtures and to contain no more than 0.1 percent water-soluble chloride ions by mass of cementitious material.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A, colored.
2. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D, colored.
3. Water-Reducing and Accelerating Admixture: ASTM C 494/C 494M, Type E.

2.4 CONCRETE MIXTURES

A. Obtain each color, size, type, and variety of concrete mixture from single manufacturer with resources to provide concrete of consistent quality in appearance and physical properties.

B. Prepare design mixtures, proportioned according to ACI 301 for each type and strength of normal-weight concrete, and as determined by either laboratory trial mixtures or field experience.

1. Use a qualified independent testing agency for preparing and reporting proposed concrete design mixtures for the trial batch method.

C. Cementitious Materials: Use fly ash, as needed to reduce the total amount of portland cement, which would otherwise be used. Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:

1. Fly Ash: 20 percent.

D. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

E. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing and retarding admixture in concrete as required for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

F. Cementitious Materials: Match Section 033000 "Cast-in-Place Concrete”

2.5 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Furnish batch certificates for each batch discharged and used in the Work.

1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove loose material from compacted subbase surface immediately before placing concrete.

B. Protect adjacent construction from discoloration and spillage during application of color hardeners, release agents, stains, curing compounds, and sealers.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.

B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 STEEL REINFORCEMENT INSTALLATION

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

B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.

C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.

D. Install fabricated bar mats in lengths as long as practicable. Handle units to keep them flat and free of distortions. Straighten bends, kinks, and other irregularities, or replace units as required before placement. Set mats for a minimum 6-inch overlap to adjacent mats.

3.5 JOINTS

A. General: Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.

1. When joining existing paving, place transverse joints to align with previously placed joints unless otherwise indicated.

B. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving terminates at isolation joints.

1. Continue steel reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of paving strips unless otherwise indicated.
2. Butt Joints: Use bonding agent at joint locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

3. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.

C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated.

1. Locate expansion joints at intervals of 30 feet unless otherwise indicated.
2. Extend joint fillers full width and depth of joint.
3. Terminate joint filler not less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
6. During concrete placement, protect top edge of joint filler with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.

D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows

1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.

2. Doweled Contraction Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.

E. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 1/4-inch radius. Repeat tooling of edges after applying surface finishes. Eliminate edging-tool marks on concrete surfaces.

## 3.6 CONCRETE PLACEMENT

A. Before placing concrete, inspect and complete formwork installation, steel reinforcement**,** and items to be embedded or cast-in.

B. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

C. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.

D. Do not add water to concrete during delivery or at Project site. Do not add water to fresh concrete after testing.

E. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

F. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.

1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement dowels and joint devices.

G. Screed paving surface with a straightedge and strike off.

H. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleedwater appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

## 3.7 FLOAT FINISHING

A. General: Do not add water to concrete surfaces during finishing operations.

B. Float Finish: Begin the second floating operation when bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.

## 3.8 SALTED CONCRETE FINISH

A. Salted Concrete Finish: After final floating, apply the following finishes (up to three mockups required):
1. Maintain smooth float finish and repair all damaged surfaces after salt application.

2. Salted Finish: Contractor shall provide medium texture finish of sizes ranging from 1/8 to 3/8 inch with sharp, clean edges. Mockups shall consist of the following:
a. Evenly distributed medium texture.
b. Concentrated textured finish along edges with evenly distributed medium finish throughout slab
c. Concentrated gradient broadcast from one edge of slab to the opposite edge.

## CONCRETE PROTECTION AND CURING

B. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

C. Comply with ACI 306.1 for cold-weather protection.

D. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete but before float finishing.

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

F. Curing Compound: Apply curing compound immediately after final finishing. Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas that have been subjected to heavy rainfall within three hours after application. Maintain continuity of coating, and repair damage during curing period.

G. Curing and Sealing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

H. Curing Paper: Cure with unwrinkled curing paper in pieces large enough to cover the entire width and edges of slab. Do not lap sheets. Fold curing paper down over paving edges and secure with continuous banks of earth to prevent displacement or billowing due to wind. Immediately repair holes or tears in paper.

## 3.9 PAVING TOLERANCES

A. Comply with tolerances in ACI 117 and as follows:

1. Elevation: 3/4 inch (19 mm).
2. Thickness: Plus 3/8 inch (10 mm), minus 1/4 inch (6 mm).
3. Surface: Gap below 10-foot- (3-m-) long, unleveled straightedge not to exceed 1/2 inch (13 mm).
4. Lateral Alignment and Spacing of Dowels: 1 inch (25 mm).
5. Vertical Alignment of Dowels: 1/4 inch (6 mm).
6. Alignment of Dowel-Bar End Relative to Line Perpendicular to Paving Edge: 1/4 inch per 12 inches (6 mm per 300 mm) of dowel.
7. Joint Spacing: 3 inches (75 mm).
8. Contraction Joint Depth: Plus 1/4 inch (6 mm), no minus.
9. Joint Width: Plus 1/8 inch (3 mm), no minus.

## 3.10 FIELD QUALITY CONTROL

A. Match Section 033000 "Cast-in-Place Concrete”

## 3.11 REPAIR AND PROTECTION

A. Remove and replace decorative concrete paving that is broken or damaged or does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Architect.

B. Protect decorative concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.

C. Maintain decorative concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 321316

# SECTION 321373 - CONCRETE PAVING JOINT SEALANTS

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

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

### 1.2 SUMMARY

A. Section Includes:

1. Cold-applied joint sealants.
2. Joint-sealant backer materials.

B. Related Requirements:

1. Section 079200 "Joint Sealants" for sealing nontraffic and traffic joints in locations not specified in this Section.

### 1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site

### 1.4 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of joint sealant and accessory.

### 1.5 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. Product Testing: Test joint sealants using a qualified testing agency.

### 1.6 FIELD CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer.
2. When joint substrates are wet.

3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

## PART 2 - PRODUCTS

### 2.1 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backing materials, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

### 2.2 COLD-APPLIED JOINT SEALANTS

A. Single-Component, Self-Leveling, Silicone Joint Sealant: ASTM D 5893/D 5893M, Type SL.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Crafco Inc; RoadSaver Silicone SL.
b. Dow Corning Corporation; 890-SL.
c. Pecora Corporation; 300 SL.

### 2.3 JOINT-SEALANT BACKER MATERIALS

A. Joint-Sealant Backer Materials: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by joint-sealant manufacturer, based on field experience and laboratory testing.

B. Round Backer Rods for Cold-Applied Joint Sealants: ASTM D5249, Type 3, of diameter and density required to control joint-sealant depth and prevent bottom-side adhesion of sealant.

### 2.4 PRIMERS

A. Primers: Product recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Before installing joint sealants, clean out joints immediately to comply with joint-sealant manufacturer's written instructions.

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

B. Joint Priming: Prime joint substrates where indicated or where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

3.3 INSTALLATION OF JOINT SEALANTS

A. Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated unless more stringent requirements apply.

B. Joint-Sealant Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions.

C. Install joint-sealant backings to support joint sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of joint-sealant backings.
2. Do not stretch, twist, puncture, or tear joint-sealant backings.
3. Remove absorbent joint-sealant backings that have become wet before sealant application and replace them with dry materials.

D. Install joint sealants immediately following backing installation, using proven techniques that comply with the following:

1. Place joint sealants so they fully contact joint substrates.
2. Completely fill recesses in each joint configuration.

3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

E. Tooling of Nonsag Joint Sealants: Immediately after joint-sealant application and before skinning or curing begins, tool sealants according to the following requirements to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint:

1. Remove excess joint sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by joint-sealant manufacturer and that do not discolor sealants or adjacent surfaces.

F. Provide joint configuration to comply with joint-sealant manufacturer's written instructions unless otherwise indicated.

## 3.4 CLEANING AND PROTECTION

A. Clean off excess joint sealant as the Work progresses, by methods and with cleaning materials approved in writing by joint-sealant manufacturers.

B. Protect joint sealants, during and after curing period, from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately and replace with joint sealant so installations in repaired areas are indistinguishable from the original work.

## 3.5 PAVING-JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Joints within concrete paving.

1. Joint Location:

a. Expansion and isolation joints in concrete paving.
b. Contraction joints in concrete paving.
c. Other joints as indicated.

2. Joint Sealant: Single-component, self-leveling, silicone joint sealant.
3. Joint-Sealant Color: Matching standard/natural color concrete

END OF SECTION 321373

# SECTION 321540 – CRUSHED STONE SURFACING

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

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

### 1.2 SUMMARY

A. Section Includes:

1. Gravel Type 1 – Cibolo Rock
2. Gravel Type 2 – Decomposed Granite

B. Related Requirements:

1. No.302S – Aggregates for Surface Treatments for the Trail Type 2 – Improved and Gravel Type 1 – Parking caliche installation.

### 1.3 ACTION SUBMITTALS

A. Samples: For the following:

1. Gravel Type 1 – Cibolo Rock: 2-lb bag of loose material.
2. Gravel Type 2 – Decomposed Granite: 1-lb bag of loose material.

### 1.4 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Build mockups for the following in location where directed by Construction Manager and of size indicated:
   a. Gravel Type 1 – Not less than 60-inches long by 60-inches wide by full thickness, including all materials profiled in typical detail.
   b. Gravel Type 2 – Decomposed Granite: Not less than 96-inches long by 96-inches wide by full thickness, including materials profiled in typical detail.

2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store aggregates in a location approved by the Construction Manager where grading and other required characteristics can be maintained and contamination avoided.

B. Store liquids in tightly closed containers protected from freezing.

PART 2 - PRODUCTS

2.1 CRUSHED STONE SURFACING

A. Gravel Type 1 – Cibolo Rock

1. Crushed Aggregate/Rock: Clean, washed, sound, regionally-sourced Cibolo stone or gravel as follows:
   a. Source: Cibolo rock from manufacturer in Cibolo TX to be selected by Landscape Architect from Manufacturer's range of tan colored stone.

B. Gravel Type 2 – Decomposed Granite

1. Crushed Aggregate/Rock: Clean, washed, sound, regionally-sourced natural crushed granite stone or gravel as follows:
   a. Color: tan, to be selected by Landscape Architect from Manufacturer's full range.
   b. Aggregate shall be composed of a mixture of unwashed, durable particles or fragments of granite containing clay fines to meet the following gradations:
      1) 90% minimum shall pass a No 40 mesh screen
   c. Material can be site harvested or a combination of site harvested and regionally sourced within 150 miles if not sufficient material from site. If adding sourced crushed limestone to site harvested, crushed stones must be blended to maintain consistent color and appearance across the site.

2.2 EDGING

A. Steel Edging

1. ¼-inch thick by 4" tall steel edging
2. Finish: black, powder-coated
3. Stakes: 12-inch minimum stakes

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine grading and subsoil conditions. Do not proceed until conditions are acceptable.

3.2 PREPARATION

A. Excavation: Excavate to depth required so edges of crushed stone surfacing will match adjacent grades. Hand excavate where existing trees to be preserved roots are present.

B. Edging: Install ¼-inch above finished grade. Provide sufficient stakes to secure in place at no more than 72-inch maximum spacing. Overlap ends of edging segments by 8-inches maximum or per manufacturer's recommendations.

3.3 INSTALLATION

A. Gravel Type 1: Cibolo Rock:

1. Compact soil subgrade uniformly to at least 95 percent of ASTM D 698 laboratory density.
2. Treat subgrade with lime as indicated in drawings.
3. Do not proceed if subgrade is deficient or not approved by Landscape Architect. Contractor is responsible for correcting deficiencies at no additional cost to the Owner.
4. Place limestone gravel material and screed to thickness as indicated on Drawings, taking care that moisture content remains constant and density is loose and constant until compacted.
    a. Compact to a minimum density of 95 percent.
5. Lines and Levels: Install aggregate course true to grade, properly coinciding with adjacent work and elevations with a maximum 2% cross slope.
    a. Do not create low points for water to pond.
    b. All surfaces shall be flush and meet smoothly and evenly.
6. Provide a finished surface uniform in texture and appearance.

B. Gravel Type 2: Decomposed Granite:

1. Compact soil subgrade uniformly to at least 95 percent of ASTM D 698 laboratory density.
2. Do not proceed if subgrade is deficient or not approved by Landscape Architect. Contractor is responsible for correcting deficiencies at no additional cost to the Owner.
3. Place drainage geotextile over prepared subgrade, overlapping ends and edges at least 12 inches and staple into place per drawings.
4. Place decomposed granite material and screed to thickness as indicated on Drawings, taking care that moisture content remains constant and density is loose and constant until compacted.
    a. Compact to a minimum density of 95 percent.
5. Lines and Levels: Install aggregate course true to grade, properly coinciding with adjacent work and elevations with a maximum 2% cross slope.
    a. Do not create low points for water to pond.
    b. All surfaces shall be flush and meet smoothly and evenly.
6. Provide a finished surface uniform in texture and appearance.

END OF SECTION 321540

# SECTION 321726 - TACTILE WARNING SURFACING

## PART 1 GENERAL

### 1.01 SUMMARY

A. Work Included: Provide unit paving complete, as shown and as specified.

B. Related Work:

Concrete Paving – 321212

### 1.03 REFERENCES

B. ASTM - American Society for Testing and Materials

### 1.04 SUBMITTALS

A. Conform to requirements of Section 01330 - Submittal Procedures.

B. Product Data: Manufacturers' current catalog cuts and printed Specifications of each of the following:

1. Neenah Foundry Quick Connect Plates

C. Samples
1. One sample of Quick Connect Plates

### 1.04 QUALITY ASSURANCE

A. Qualifications: Show successful and continuous experience of not less than three (3) years’ experience in unit paving construction.

B. Mock-ups: One (1) Quick Connect Plate installed in concrete to show contractors ability to install fully parallel to all sides with no gaps in between concrete and plate. Mock up shall be completed and approved prior to installation. Contractor may prepare mock up in place for Landscape Architect’s approval. Mock up may remain if it meets all quality assurance standards.

### 1.05 DELIVERY, STORAGE, AND HANDLING

A. Packing and Delivery: Deliver plates to the job in original sealed packaging with legible labels and seals unbroken. No damage shall occur to product during hauling, handling or unloading

B. Storage: Keep protected and dry.

C. Protection: Protect plates from staining or other visible damage. Replace damaged or defective plates at no cost to Owner.

1.06 PROJECT/SITE CONDITIONS

A. Establish and maintain required levels of grade elevations. Review installation procedures and coordinate paving work with other work affected by the paver work.

B. Pavers should be installed in one installation, however, should site conditions prevent this, cover the work area and protect pavers.

C. Provide temporary barricades as required for protection of project work and public safety.

D. Protect adjacent work from damage, soiling and staining during installation.

1.07 SEQUENCING AND SCHEDULING

A. Coordination: Coordinate with work in other sections to insure the following:

1. Sleeving and Conduits: Place all applicable sleeves and conduits before pouring concrete slab for unit paving.
2. Drainage Structures: Cooperate with storm drainage contractor to set all inverts and rim elevations for drains to be located in concrete unit paving.
3. Pour concrete ramps and install per manufacturer's recommendation to ensure proper adhesion.

PART 2.00 PRODUCTS

2.01 TRUNCATED DOME PLATES

A. **Neenah Foundry Quick Connect Plates**
Manufacturer: Neenah Foundry
2121 Brooks Ave.
Neenah, Wisconsin 54956
920-725-7000
construction.sales@neenahenterprises.com

Product # 4984-24Q, 4984-30Q
Color: As manufactured
Pattern: As shown on drawings. To be installed parallel all sides.
Sizes: 24" x 30"

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verification of Conditions:

1. Notify Landscape Architect of discovered conflicts and discrepancies on Drawings with conditions on the site which would prevent proper installation of paver work.
2. Review site and verify that other trades have completed their work and that site is acceptable to receive work.
3. Verify that subgrade preparation for pavers has been completed before commencement of work and that subgrade has been graded to allow for placement of concrete base material and concrete slab.

3.02 PREPARATION

A. Controls: All pavers should be placed parallel to surrounding concrete. Be responsible for proper drainage on paving surfaces.

C. Cleaning: Clean pavers before and after setting. Use only mild cleaning compounds containing no caustic or harsh fillers or abrasives. Cleaning solution should in no way harm the metal finish.

3.03 INSTALLATION

A. General: Install pavers in accordance with manufacturer’s recommendations.
1. Controls: Install pavers level on the concrete and parallel to all concrete edges.
2. Cleaning: Clean exposed surfaces thoroughly after completion
3. Protection: Protect finished work until completion of project

3.04 TOLERANCES

A. Do not permit finished paving surfaces to vary more than 1/4 in. measured with a 20 ft. metal straightedge.

B. No "birdbaths" or other surface irregularities are permitted. Correct irregularities to satisfaction of Landscape Architect.

END OF SECTION 02520

END OF SECTION 321726

# SECTION 329113 - SOIL PREPARATION

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

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

### 1.2 SUMMARY OF WORK INCLUDED

A. Provide materials, testing, equipment and labor required to prepare amended plant mediums for:

1. Planting Backfill Mix
2. Tree Planting Pit Backfill Mix
3. Shrub Bed Planting Backfill Mix

B. Section includes planting soils specified by composition of the mixes.

C. Section includes performance expectations for planting soils specified by plant type.

D. Related Requirements:

1. Section 311000 "Site Clearing" for topsoil stripping and stockpiling.
2. Section 329200 "Turf and Grasses" for placing planting soil for turf and grasses.
3. Section 329300 "Plants" for placing planting soil for plantings.
4. Section 329600 "Transplanting" for placing planting soil in tree planting pits.

### 1.3 DEFINITIONS

A. AAPFCO: Association of American Plant Food Control Officials.

B. Backfill: The earth used to replace or the act of replacing earth in an excavation. This can be amended or unamended soil as indicated.

C. CEC: Cation exchange capacity.

D. Compost: The product resulting from the controlled biological decomposition of organic material that has been sanitized through the generation of heat and stabilized to the point that it is beneficial to plant growth.

E. Duff Layer: A surface layer of soil, typical of forested areas, that is composed of mostly decayed leaves, twigs, and detritus.

F. Imported Soil: Soil that is transported to Project site for use.

G. Manufactured Soil: Soil produced by blending soils, sand, stabilized organic soil amendments, and other materials to produce planting soil.

H. NAPT: North American Proficiency Testing Program. An SSSA program to assist soil-, plant-, and water-testing laboratories through interlaboratory sample exchanges and statistical evaluation of analytical data.

I. Organic Matter: The total of organic materials in soil exclusive of undecayed plant and animal tissues, their partial decomposition products, and the soil biomass; also called "humus" or "soil organic matter."

J. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified as specified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

K. RCRA Metals: Hazardous metals identified by the EPA under the Resource Conservation and Recovery Act.

L. SSSA: Soil Science Society of America.

M. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

N. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.

O. Surface Soil: Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil"; but in disturbed areas such as urban environments, the surface soil can be subsoil.

## 1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

## 1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include recommendations for application and use.
2. Include test data substantiating that products comply with requirements.
3. Material Certificates: For each type of imported soil before delivery to the site, according to the following:

    a. Manufacturer's qualified testing agency's certified analysis of standard products.
    b. Analysis of fertilizers, by a qualified testing agency, made according to AAPFCO methods for testing and labeling and according to AAPFCO's SUIP #25.
    c. Analysis of nonstandard materials, by a qualified testing agency, made according to SSSA methods, where applicable.

B. Samples: For each bulk-supplied material, 1-quart volume of each in sealed containers labeled with content, source, and date obtained. Each Sample shall be typical of the lot of material to be furnished; provide an accurate representation of composition, color, and texture. Contractor shall provide submittals small to landscape architect for approval prior to delivery to the job site.

C. Planting media mix data from manufacturer.

D. Manufacturer’s product data information.

E. Organic Mulch(es): 1-pint (0.5 liter) volume of the organic mulch required; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch. Each sample shall be typical of the lot of material to be furnished; provide an accurate representation of color, texture and organic makeup.

## 1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For each testing agency.

B. Field quality-control reports.

## 1.7 INSPECTIONS

A. Testing will be at the expense of the contractor.

## 1.8 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent, state-operated, or university-operated laboratory; experienced in soil science, soil testing, and plant nutrition; with the experience and capability to conduct the testing indicated; and that specializes in types of tests to be performed. Texas Plant and Soil Labs or approved equal.

1. Multiple Laboratories: At Contractor's option, work may be divided among qualified testing laboratories specializing in physical testing, chemical testing, and fertility testing.

B. For delivered material, test one grab sample for each 100 cy of bulk material delivered to the site.

C. Excavated material from tree pits and shrub beds shall not be used for preparation of backfill mix.

## 1.9 TESTING REQUIREMENTS

A. General: Perform tests on soil samples according to requirements in this article.

B. Physical Testing:

1. Soil Texture: Soil-particle, size-distribution analysis by one of the following methods according to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods":

    a. Sieving Method: Report sand-gradation percentages for very coarse, coarse, medium, fine, and very fine sand; and fragment-gradation (gravel) percentages for fine, medium, and coarse fragments; according to USDA sand and fragment sizes.
    b. Hydrometer Method: Report percentages of sand, silt, and clay.

2. Total Porosity: Calculate using particle density and bulk density according to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods."
3. Water Retention: According to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods."
4. Saturated Hydraulic Conductivity: According to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods"; at 85% compaction according to ASTM D 698 (Standard Proctor).

C. Chemical Testing:

1. CEC: Analysis by sodium saturation at pH 7 according to SSSA's "Methods of Soil Analysis - Part 3- Chemical Methods."
2. Clay Mineralogy: Analysis and estimated percentage of expandable clay minerals using CEC by ammonium saturation at pH 7 according to SSSA's "Methods of Soil Analysis - Part 1- Physical and Mineralogical Methods."
3. Metals Hazardous to Human Health: Test for presence and quantities of RCRA metals including aluminum, arsenic, barium, copper, cadmium, chromium, cobalt, lead, lithium, and vanadium. If RCRA metals are present, include recommendations for corrective action.
4. Phytotoxicity: Test for plant-available concentrations of phytotoxic minerals including aluminum, arsenic, barium, cadmium, chlorides, chromium, cobalt, copper, lead, lithium, mercury, nickel, selenium, silver, sodium, strontium, tin, titanium, vanadium, and zinc.

D. Fertility Testing: Soil-fertility analysis including the following:

1. Percentage of organic matter.
2. CEC, calcium percent of CEC, and magnesium percent of CEC.
3. Soil reaction (acidity/alkalinity pH value).
4. Buffered acidity or alkalinity.
5. Nitrogen ppm.
6. Phosphorous ppm.
7. Potassium ppm.
8. Manganese ppm.
9. Manganese-availability ppm.
10. Zinc ppm.
11. Zinc availability ppm.
12. Copper ppm.
13. Sodium ppm
14. Soluble-salts ppm.
15. Presence and quantities of problem materials including salts and metals cited in the Standard protocol. If such problem materials are present, provide additional recommendations for corrective action.

16. Other deleterious materials, including their characteristics and content of each.

E. Organic-Matter Content: Analysis using loss-by-ignition method according to SSSA's "Methods of Soil Analysis - Part 3- Chemical Methods."

F. Recommendations: Based on the test results, state recommendations for soil treatments and soil amendments to be incorporated to produce satisfactory planting soil suitable for healthy, viable plants indicated. Include, at a minimum, recommendations for nitrogen, phosphorous, and potassium fertilization, and for micronutrients.

1. Fertilizers and Soil Amendment Rates: State recommendations in weight per 1000 sq. ft. for 6-inch depth of soil

## 1.10 DELIVERY, STORAGE, AND HANDLING

A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and compliance with state and Federal laws if applicable.

B. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Do not move or handle materials when they are wet.
4. Accompany each delivery of bulk fertilizers and soil amendments with appropriate certificates.

C. Deliver material to site when permitted by the Owner and only when project is ready for related work.

# PART 2 - PRODUCTS

## 2.1 MATERIALS

A. Regional Materials: Manufactured planting soil and soil amendments and fertilizers shall be manufactured within 500 miles of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of Project site.

## 2.2 PLANTING SOILS SPECIFIED BY COMPOSITION

A. General: Soil amendments, fertilizers, and rates of application specified in this article are guidelines that may need revision based on testing laboratory's recommendations after preconstruction soil analyses are performed.

2.3 INORGANIC SOIL AMENDMENTS

A. Sulfur: Granular, biodegradable, and containing a minimum of 90 percent elemental sulfur, with a minimum of 99 percent passing through a No. 6 (3.35-mm) sieve and a maximum of 10 percent passing through a No. 40 (0.425-mm) sieve.

B. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.

C. Perlite: Horticultural perlite, soil amendment grade.

D. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through a No. 50 (0.30-mm) sieve.

E. Sand: Clean, washed, natural or manufactured, free of toxic materials, and according to ASTM C 33/C 33M.

2.4 ORGANIC SOIL AMENDMENTS

A. Compost: Well-composted, stable, and weed-free organic matter produced by composting feedstock, and bearing USCC's "Seal of Testing Assurance," and as follows:

1. Feedstock: Limited to leaves.
2. Reaction: pH of 7 to 8..
3. Soluble-Salt Concentration: Less than 4 dS/m.
4. Moisture Content: 35 to 55 percent by weight.
5. Organic-Matter Content: 50 to 60 percent of dry weight.
6. Particle Size: Minimum of 98 percent passing through a 2-inch sieve.

B. Wood Derivatives: Shredded and composted, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture and free of chips, stones, sticks, soil, or toxic materials.

1. Partially Decomposed Wood Derivatives: In lieu of shredded and composted wood derivatives, mix shredded and partially decomposed wood derivatives with ammonium nitrate at a minimum rate of 0.15 lb/cu. ft. of loose sawdust or ground bark, or with ammonium sulfate at a minimum rate of [0.25 lb/cu. ft. of loose sawdust or ground bark.

2.5 ON-SITE MATERIALS

A. Fertilizer

1. For Planting areas: Shall be commercial all organic, all natural biological fertilizer, which includes humates, rock minerals, bio-inoculants and bio-stimulants. Fertilizer shall be granular, uniform in composition, free flowing, and suitable for application with approved equipment. Fertilizer which has been exposed to high humidity and moisture, has become caked or otherwise damaged making it unsuitable for use, will not be acceptable. Fertilizer shall be Microlife Ultimate (8-4-6) as manufactured by San Jacinto Environmental Supply, 2221 A West 34th Street, Houston, TX 77018, or approved equal. Broadcast fertilizer at the rate of 40 lbs. fertilizer per 1000 square feet and mix to 4”-6” depth into prepared planting soil. Contractor shall top-dress with an additional

application of the same fertilizer at the end of the maintenance period, approximately 365 days after planting at 1/2 the manufacturer's recommend rate (20 lbs. fertilizer per 1000 square feet).

2. Additional Microlife Ultimate fertilizer shall be evenly dispersed through soil in planting pits at the following rate:

| Material | No. of OZ. Per Planting Pit |
|---|---|
| 15 gallon | 3 |
| 30 gallon | 6 |
| 65 gallon | 12 |
| 100 gallon | 18 |
| 200 gallon | 36 |

3. Fertilizer for turf areas shall be Majestic Gro (18-5-9) as manufactured by San Jacinto Environmental Supply or approved equal commercial blend of high quality, low salt synthetic fertilizer, 50% slow-release, with Houactinite (as carrier), 3% Fe, 8% Sulfur, 1% Mg and Micronutrients including Zinc, Boron, Copper, Molybdenum and Potassium Sulfate. Fertilizer shall be free flowing and suitable for application with approved equipment. Fertilizer which has been exposed to high humidity and moisture, has become caked or otherwise damaged making it unsuitable for use will not be acceptable. Fertilizer shall be applied at the rate of one 50 lb. bag per 7500 square feet to all turf areas and raked into the topsoil prior to application of sod. For hydromulched areas, Majestic Gro fertilizer shall be mixed in the tank at the rate specified in Section 02921 – Hydromulch. Contractor shall top-dress all sod and hydromulch areas with an additional application of Majestic Gro fertilizer approximately 60 days after planting, at half the manufacturer's recommended rate (one 50 lb. bag per 15,000 square feet). Apply preventative fire-ant treatment over all sod and hydromulch areas during the 1-year maintenance period.

4. Sharp Sand: Sand shall be thoroughly washed, coarse grade sharp, construction or brick sand, free of clay balls, weeds, and grass. So-called cushion sand, blow sand, or creek silt is not acceptable for substitution where sharp sand is specified.

5. Herbicide: Pre-emergent herbicide shall be Team Pro as manufactured by Bonus Crop Fertilizer, Houston, TX, or approved equal. Apply pre-emergent over all planting areas prior to spreading mulch at the rate of 7 lbs. per 1000 square feet.
If necessary, contact herbicide shall be Roundup by Monsanto, 800 N. Lindbergh, St. Louis, MO 63167, 314-694-1000, or approved equal. Apply Roundup only if necessary and if approved by Owner or Owner's representative. Do not exceed manufacturer's recommended rate of application.

6. Mulch for top dressing: Organic mulch free from deleterious materials and suitable for top dressing of trees, shrubs or plants. Mulch shall be composted, well-rotted, blended double-shredded hardwood mulch (70%) and composted pine bark mulch (30%), black or dark brown in color. Mulch pieces shall not exceed 2" in any dimension. No dyes, mushroom compost or other additives shall be used to artificially enhance the appearance of the level of composting.

7. Biological Inoculant: MicroGro Granular as manufactured by San Jacinto Environmental Supply, or approved equal multi-purpose biological inoculant with humates, select sugars and bio-stimulants. Apply to all seasonal, perennial and groundcover areas at the rate of 10 lbs. per 1000 square feet.

8. Compost for bed prep/soil backfill mix: Compost must be made from organic materials approved by the State of Texas as specified in Chapter 332 of the Health & Safety Code as listed in the Texas register. Compose must less than 1% by dry weight of inert contaminants such as glass, plastic, rocks, etc. Industrial or hazardous waste cannot be used in the production of the compost (i.e. boiler ash, rice hull ash, etc.). Compost shall be free of fillers such as rice hulls or pine bark. Compost shall not exceed the heavy metal limits as specified in the US EPA Part 503 Regulations. Compost shall be as supplied by Nature's Way Resources, Inc., Conroe, Texas or approved equal. Contractor shall furnish copies of manufacturer's literature, certifications, sources, samples, or laboratory analytical data for the following items: Certificates of inspection required for transportation shall accompany each shipment of materials. Provide certificates to Landscape Architect.

9. Testing:
   a. Chemical and Physical - All compost components shall be tested by one of the following testing laboratories for conformity to the specifications:
      1) Texas Plant and Soil Lab, 5115 West Monte Cristo, Edinburg, Texas 78539, (956) 383-0739
      2) A&L Plains Agricultural Laboratories, Inc., 302 34th Street, Lubbock, Texas 79404, (806) 763-4278
   b. If herbicide contamination is suspected, then a radish/rye-grass growth trial must be performed. For delivered material, test one grab sample for each fifty (50) cubic yards of bulk material delivered to the site. Testing will be at the expense of Contractor. Deviations greater than plus or minus twenty (20%) percent from control data may be grounds for rejection of mixes tested. Non-conforming materials shall not be used and shall be removed from the site.

10. Biological, physical and chemical specifications:
    a. Biological Specifications: Stability/Maturity (Carbon Dioxide Evolution Rate) Shall be less than 8 mg CO2-C per g OM (organic matter) per day and greater than 6.0 on the SolvitaTM Compost Maturity Test.
    b. Biological components: Bacteria (active) - Minimum of 15-25 micrograms per gram of compost; Bacteria (total) - minimum of 150 micrograms per gram of compost; Fungus (active) - minimum of 15-25 micrograms per gram of compost; Fungus (total) - minimum of 150 micrograms per gram of compost; Fungus (hyphal diameter) – should be greater than 1 mm; Protozoa: flagellates - 8,000 or higher per gram of compost; amoebae - 8,000 or higher per gram of compost; ciliates - 50-100 or higher per gram of compost; Root Feeding Nematodes should not be present (beneficial nematodes are a benefit).

11. Physical Specifications: Moisture Content - 30-60%, wet weight basis; Moisture Holding Capacity - 75-200% of dry weight; Organic Matter Content - 30-70% (40-50% preferred), dry weight basis; Particle Size: Standard Grade Compost - 100% passing through a 1" rectangular mesh screen or smaller; Fine Grade Compost - 100% passing through a 3/8" rectangular mesh screen or smaller; Bulk Density - 700-1,200 (800-1,000

preferred), pounds per cubic yard; Electrical Conductivity (Soluble Salt Concentration) - 10 dS/m (mmhos/cm.) maximum, (2.0-3.6 or less preferred).

12. Chemical Specifications: pH 6.0-8.5; Total Salinity-2,000 ppm or lower; Chemical components (H2O extraction): Nitrogen-10 ppm or higher, Phosphorus-100 ppm or higher, Potassium- 400 ppm or higher, Calcium-2000 ppm or higher, Magnesium-200 ppm or higher, Zinc-6 ppm or higher, Iron-25 ppm or higher, Manganese - 8 ppm or higher, Copper-1 ppm or higher, Sodium-1000 ppm or less, Sulfur-10 ppm or higher, Boron-1 ppm or higher.

13. Root Stimulator: Root stimulator shall be Super Seaweed as manufactured by San Jacinto Environmental Supply, or approved equal.

14. Soil Acidifier: 90% Sulfur.

15. Fire Ant Prevention: Award as manufactured by Syngenta, 1800 Concord Pike, Wilmington, DE 19850 or Amdro as manufactured by Ambrands, 2255 Cumberland Parkway Building 600-B, Atlanta, GA, 30339, or approved equal. Preventative fire ant control shall be broadcast over all landscaped area at manufacturer's recommended rate of 1 ½ lbs. per acre.

16. Insecticide: No insecticide shall be applied on this site without the permission of the Owner.
17. Topsoil

    a. Provide topsoil which is a fertile, friable, natural loam or sandy loam, surface soil, free of subsoil, clay lumps, brush, weeds and other litter, and free of roots, stumps, stones larger than 2 inches in any dimension and other extraneous or toxic matter harmful to plant growth.
    b. Obtain topsoil only from naturally, well-drained sites where topsoil occurs in a depth of not less than 4 inches. Topsoil shall not be collected from sites that are infected with growth of, or the reproductive parts of noxious weeds, especially nut grass. Topsoil shall not be stripped, collected or deposited while wet. Topsoil shall not be excessively acid or alkaline or contain toxic substances which may be harmful to plant growth. Topsoil shall be without admixture of subsoil.
    c. Filter Fabric – Filter fabric shall be non-woven filter bond. Soil separator as manufactured by DeWitt Co. with a minimum permeability rate of 219 gals./SF/minute or approved equal.

## 2.6 PLANTING SOILS MIX

A. Planting mix shall be thoroughly mixed in the following proportions:
   1. Tree planting, shrub bed planting and plater backfill mixes:
      a. Contain sandy loam topsoil
      b. Double ground aged rice hull compost
      c. #1 bank sand
      d. Growers grade pine bark
      e. Forest floor mulch (Black Humus)

f. All material are screened to provide 99% 1” minus sizing then blended to provide a uniform mixture. A minimum of 30% composted organic are utilized to add natural nutrients, provide aeration and optimum moisture retention capacities.

B. Planting soils for spade dug or cured trees should follow specifications from:
1. Environmental Design, Inc., 23544 Coons Road Tomball, Texas, 800-376-4260
2. Approved Equal to Environmental Design, Inc. Contractor to submit qualifications for review and approval by Landscape Architect and Owner.

C. Actual mixes and additives may vary depending on samples extracted from actual plant sources.
1. Unacceptable Properties: Soil mixes shall not contain the following:

a. Unacceptable Materials: Concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials that are harmful to plant growth.
b. Unsuitable Materials: Stones, roots, plants, sod, clay lumps, and pockets of coarse sand that exceed a combined maximum of 3 percent by dry weight of the manufactured soil.
c. Large Materials: Stones, clods, roots, clay lumps, and pockets of coarse sand exceeding 1-1/2 inches in any dimension.

D. Mulch shall be “Native Hardwood” mulch as supplied by Nature’s Way Resources, 101 Sherbrook Circle, Conroe, Texas 77385, 936-321-6990 or approved equal.

E. Prepared backfill mixes shall come from the following source:
1. Living Earth Technology, Houston, Texas (713) 466-7360. Select the branch that is closest to the job site

2. Nature’s Way Resources, Conroe, Texas (936) 321-1200 101 Sherbrook Circle, Conroe, Texas 77385

F. All planting beds shall receive one application of post planting fertilization with Microlife Ultimate as supplied by San Jacinto Environmental Supplies, 2221 W 34th Street, Houston, Texas 77018, 713.957.0909

## PART 3 - EXECUTION

### 3.1 GENERAL

A. Place planting soil and fertilizers according to requirements in other Specification Sections.

B. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in planting soil.

C. Proceed with placement only after unsatisfactory conditions have been corrected.

D. For placed soils with organic content over 10 percent, place soils 2” higher than desired condition to allow for shrinkage of soils.

E. All soils should be sloped to allow for positive drainage (¼ inch per linear foot) unless otherwise noted.

3.2 PLACING AND MIXING PLANTING SOIL OVER EXPOSED SUBGRADE

A. General: Mix soil base, amendments, and chemical additives by mechanical means. Do not mix additives with excavated material at the plant pit site.

B. Thoroughly mix all amendments in specified proportions prior to installation. Mix may be pre-blended or blended on site. Mix shall be approved by landscape architect prior to installation.

C. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.

D. Subgrade Preparation: Till subgrade to a minimum depth of 12 inches. Soil and sand bases shall be completely pulverized and free of lumps or aggregated material. Moisture content of base materials shall not be such that chemical, granular or pelletized additives become dissolved during the mixing process.

E. Remove stones larger than 3 inches in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

1. Apply, add soil amendments, and mix approximately half the thickness of unamended soil over prepared, loosened subgrade according to "Mixing" Paragraph below. Mix thoroughly into top 4 inches of subgrade. Spread remainder of planting soil.

F. Mixing: Spread unamended soil to total depth 6 inches, but not less than required to meet finish grades after mixing with amendments and natural settlement. Do not spread if soil or subgrade is frozen, muddy, or excessively wet.

1. Amendments: Apply soil and fertilizer, if required, evenly on surface, and thoroughly blend them with unamended soil to produce planting soil.

2. Lifts: Apply and mix soil and amendments in lifts not exceeding 12 inches in loose depth for material compacted by compaction equipment, and not more than 6 inches in loose depth for material compacted by hand-operated tampers.

G. Compaction: Compact each blended lift of planting soil to 75 to 82 percent of maximum Standard Proctor density according to ASTM D 698 and tested in-place except where a different compaction value is indicated on Drawings.

H. Finish Grading: Grade planting soil to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

3.3 BLENDING PLANTING SOIL IN PLACE

A. General: Mix amendments with in-place, unamended soil to produce required planting soil. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.

B. Preparation: Till unamended, existing soil in planting areas to a minimum depth of of 4 inches. Remove stones larger than 2 inches in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

C. Mixing: Apply soil amendments and fertilizer, if required, evenly on surface, and thoroughly blend them into full depth of unamended, in-place soil to produce planting soil.

1. Mix fertilizer with planting soil no more than seven days before planting.

D. Finish Grading: Grade planting soil to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

3.4 PROTECTION

A. Protection Zone: Identify protection zones according to Section 015639 "Temporary Tree and Plant Protection."

B. Protect areas of in-place soil from additional compaction, disturbance, and contamination. Prohibit the following practices within these areas except as required to perform planting operations:

1. Storage of construction materials, debris, or excavated material.
2. Parking vehicles or equipment.
3. Vehicle traffic.
4. Foot traffic.
5. Erection of structures.
6. Impoundment of water.
7. Excavation or other digging unless otherwise indicated.

C. If planting soil or subgrade is over compacted, disturbed, or contaminated by foreign or deleterious materials or liquids, remove the planting soil and contamination; restore the subgrade as directed by Architect and replace contaminated planting soil with new planting soil.

3.5 CLEANING

A. Protect areas adjacent to planting-soil preparation and placement areas from contamination. Keep adjacent paving and construction clean and work area in an orderly condition.

B. Remove surplus soil and waste material including excess subsoil, unsuitable materials, trash, and debris and legally dispose of them off Owner's property unless otherwise indicated.

1. Dispose of excess subsoil and unsuitable materials on-site where directed by Owner.

END OF SECTION 329113

# SECTION 329200 - TURF AND GRASSES

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

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

### 1.2 SUMMARY

A. Section Includes:

1. Seeding.
2. Hydroseeding.
3. Sodding.
4. Plugging.
5. Sprigging.
6. Meadow grasses and wildflowers.
7. Erosion-control material(s).

B. Related Sections:

1. See Civil Drawings for "Site Clearing" for topsoil stripping and stockpiling.
2. See Civil Drawings "Earth Moving" for excavation, filling and backfilling, and rough grading.
3. Section 329300 "Plants" for border edgings.
4. See Civil Drawings "Subdrainage" for subsurface drainage.

### 1.3 DEFINITIONS

A. Duff Layer: The surface layer of native topsoil that is composed of mostly decayed leaves, twigs, and detritus.

B. Finish Grade: Elevation of finished surface of planting soil.

C. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils with stabilized organic soil amendments to produce topsoil or planting soil.

D. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.

E. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents

(gophers, moles, mice and rats), unwanted plants (weedy, non-native plants), fungi, bacteria, and viruses.

F. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

G. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or top surface of a fill or backfill before planting soil is placed.

H. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

I. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil, but in disturbed areas such as urban environments, the surface soil can be subsoil.

## 1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

1. Pesticides and Herbicides: Include product label and manufacturer's application instructions specific to this Project.

B. Certification of Grass Seed: From seed vendor for each grass-seed monostand or mixture stating the botanical and common name, percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.

1. Certification of each seed mixture for turfgrass sod. Include identification of source and name and telephone number of supplier.

2. Certification of each seed mixture for ‘Seed Mix 1.’

C. Qualification Data: For qualified landscape Installer.

D. Product Certificates: For soil amendments from manufacturer.

E. Material Test Reports: For standardized ASTM D 5268 topsoil, existing native surface topsoil, existing in-place surface soil, and imported or manufactured topsoil.

F. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of turf and meadows during a calendar year. Submit before expiration of required initial maintenance periods.

## 1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscape Installer whose work has resulted in successful native turf and meadow establishment. Must provide three meadow establishment projects and

project references in the Central Texas area in the past five years demonstrating quality of species

1. Professional Membership: Installer shall be a member in good standing of either the Professional Landcare Network or the American Nursery and Landscape Association.
2. Experience: Five years' experience in turf installation in addition to requirements in Division 01 Section "Quality Requirements."
3. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
4. Personnel Certifications: Installer's field supervisor shall have certification in one of the following categories from the Professional Landcare Network:

    a. Certified Landscape Technician - Exterior, with installation, maintenance and irrigation specialty area(s), designated CLT-Exterior.
    b. Certified Turfgrass Professional, designated CTP.
    c. Certified Turfgrass Professional of Cool Season Lawns, designated CTP-CSL.

5. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.
6. Pesticide Applicator: State licensed, commercial.

B. Soil-Testing Laboratory Qualifications: An independent laboratory or university laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.

C. Soil Analysis: For each unamended and amended soil type, furnish soil analysis and a written report by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; deleterious material; pH; and mineral and plant-nutrient content of the soil.

1. Testing methods and written recommendations shall comply with USDA's Handbook No. 60.
2. The soil-testing laboratory shall oversee soil sampling, with depth, location, and number of samples to be taken per instructions from Architect. A minimum of thee representative samples shall be taken from varied locations for each soil to be used or amended for planting purposes.
3. Report suitability of tested soil for turf growth.

    a. Based on the test results, state recommendations for soil treatments and soil amendments to be incorporated. State recommendations in weight per 1000 sq. ft. or volume per cu. yd. for nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory planting soil suitable for healthy, viable plants.
    b. Report presence of problem salts, minerals, or heavy metals, including aluminum, arsenic, barium, cadmium, chromium, cobalt, lead, lithium, and vanadium. If such problem materials are present, provide additional recommendations for corrective action.

D. Preinstallation Conference: Conduct conference at Project Site.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws, as applicable.

B. Sod: Harvest, deliver, store, and handle sod according to requirements in "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" in TPI's "Guideline Specifications to Turfgrass Sodding." Deliver sod in time for planting within 24 hours of harvesting. Protect sod from breakage and drying.

C. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Accompany each delivery of bulk fertilizers, lime, and soil amendments with appropriate certificates.

1.7 PROJECT CONDITIONS

A. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with initial maintenance periods to provide required maintenance from date of Substantial Completion

1. Spring Planting: between March 15 – May 1
2. Fall Planting: between August 15 – November 1

B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions. DO NOT drive equipment on soils when conditions are wet or muddy.

1.8 MAINTENANCE SERVICE

A. Initial Turf Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after each area is planted and continue until acceptable turf is established but for not less than the following periods:

1. Seeded Turf: 60 days from date of Substantial Completion.

a. When initial maintenance period has not elapsed before end of planting season, or if turf is not fully established, continue maintenance during next planting season.

2. Sodded Turf: 60 days from date of Substantial Completion.

B. Initial Meadow Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after each area is planted and continue until acceptable meadow is established, but for not less than 40 days after Substantial Completion.

C. Continuing Maintenance Proposal: From Installer to Owner, in the form of a standard yearly (or other period) maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.
   1. Native Plant Maintenance: Contractor to provide maintenance plan based on seed mix from provider.

## PART 2 - PRODUCTS

### 2.1 SEED

A. Seed shall be from the previous year’s crop, not more than 12 months old at delivery.

B. Seed analysis shall comply with Association of Official Seed Analysts' "Journal of Seed Technology; Rules for Testing Seeds" for purity and germination tolerances.

C. Seed Species:
   1. All quantities are in PLS (pure live seed).
   2. Each species shall not exceed 0.1 % weed seed.

### 2.2 TURFGRASS SOD

A. Turfgrass Sod: Number 1 Quality/Premium, including limitations on thatch, weeds, diseases, nematodes, and insects, complying with "Specifications for Turfgrass Sod Materials" in TPI's "Guideline Specifications to Turfgrass Sodding." Furnish viable sod of uniform density, color, and texture, strongly rooted, and capable of vigorous growth and development when planted.

### 2.3 MEADOW GRASSES AND WILDFLOWERS

A. Seed Mix 1 - Native Seed Mixes.
   1. Native American Seed Company: ‘Caliche Mix’

| Latin name | common name | variety | lbs. PLS/acre | no-till seed box |
|---|---|---|---|---|
| *Buchloe dactyloides* | Buffalo Grass | Texoca or native, primed | 5.8 | fluffy |
| *Bouteloua gracilis* | Blue Grama | native | 1.1 | fluffy |
| *Bouteloua curtependula* | Sideoats Grama | Haskell | 3.2 | fluffy |
| *Leptochloa dubia* | Green Sprangletop | Van Horn | 1.4 | fluffy |
| *Sorghastrum nutans* | Indiangrass | | | |
| *Schizachyrium scoparium* | Little Bluestem | *na* | 0.2 | small |
| *Elymus canadensis* | Prairie Wildrye | *na* | 2.4 | small |
| *Eragrostis trichodes* | Sand Lovegrass | *na* | 0.2 | small |
| *Sporobolus cryptandrus* | Sand Dropseed | *na* | 0.8 | fluffy |
| *Eriochloa sericea* | Texas Cupgrass | *na* | 0.2 | small |
| *Bothriochloa barbinodis* | Cane Bluestem | *na* | 0.1 | small |
| *Hilaria belangeri* | Curly Mesquite | *na* | 0.0 | small |
| *Tridens albescens* | White Tridens | *na* | 0.6 | small |
| *Panicum hallii* | Hall's Panicum | *na* | 0.6 | small |
| *Eragrostis secundiflora* | Red Lovegrass | *na* | 0.6 | small |
| *Tridens muticus* | Slim Tridens | *na* | 1.0 | small |
| | | total | 18.2 | |

B. When planting with a no-till drill, seed within planting zone should be mixed according to the mechanical requirements of the drill and separated into the appropriate bin. See native seed tables for the recommended seed bin selection.

C. When hand broadcasting, all seed within each planting zone should be mixed together evenly before planting.

D. Seed mixes are specific to planting zones and should be kept separate.

E. Seed Carrier: Sharp clean sand or perlite mixed with seed at a ratio of not less than two parts seed carrier to one part seed.

## 2.4 INORGANIC SOIL AMENDMENTS

A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:

1. Class: T, with a minimum of 99 percent passing through No. 8 (2.36-mm) sieve and a minimum of 75 percent passing through No. 60 (0.25-mm) sieve.
2. Class: O, with a minimum of 95 percent passing through No. 8 (2.36-mm) sieve and a minimum of 55 percent passing through No. 60 (0.25-mm) sieve.
3. Provide lime in form of ground dolomitic limestone, calcitic limestone, or approved equal.

B. Sulfur: Granular, biodegradable, containing a minimum of 90 percent sulfur, and with a minimum of 99 percent passing through No. 6 (3.35-mm) sieve and a maximum of 10 percent passing through No. 40 (0.425-mm) sieve.

C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.

D. Aluminum Sulfate: Commercial grade, unadulterated.

E. Perlite: Horticultural perlite, soil amendment grade.

F. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through No. 50 (0.30-mm) sieve.

G. Sand: Clean, washed, natural or manufactured, and free of toxic materials.

H. Diatomaceous Earth: Calcined, 90 percent silica, with approximately 140 percent water absorption capacity by weight.

I. Zeolites: Mineral clinoptilolite with at least 60 percent water absorption by weight.

## 2.5 ORGANIC SOIL AMENDMENTS

A. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1/2-inch (12.5-mm)]sieve; soluble salt content of 5 to 10 decisiemens/m; Carbon to Nitrogen ratio below 25:1, not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:

1. Organic Matter Content: 60 percent of dry weight.
2. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.

B. Wood Derivatives: Decomposed, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture and free of chips, stones, sticks, soil, or toxic materials.

1. In lieu of decomposed wood derivatives, mix partially decomposed wood derivatives with ammonium nitrate at a minimum rate of 0.15 lb/cu. ft. (2.4 kg/cu. m) of loose sawdust or ground bark, or with ammonium sulfate at a minimum rate of 0.25 lb/cu. ft. (4 kg/cu. m) of loose sawdust or ground bark.

C. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, and material harmful to plant growth.

## 2.6 FERTILIZERS

Fertilizers should only be applied after the soil is tested and a deficiency that cannot be amended with compost is shown. This shall be approved by the Landscape Architect prior to installation. The contractor shall tests soils prior to fertilizer application. Native areas shall not receive fertilizer.

A. Bonemeal: Commercial, raw or steamed, finely ground; a minimum of 1 percent nitrogen and 10 percent phosphoric acid.

B. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20 percent available phosphoric acid.

C. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:

1. Composition: 1 lb/1000 sq. ft. (0.45 kg/92.9 sq. m) of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.
2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

D. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:

1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.
2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

## 2.7 PLANTING SOILS

A. Planting Soil ASTM D 5268 topsoil, with pH range of 7-8 (for native areas), a minimum of 6 percent organic material content; free of stones 1 inch (25 mm) or larger in any dimension and other extraneous materials harmful to plant growth. Mix ASTM D 5268 topsoil with the following soil amendments in the following quantities to produce planting soil:

1. Ratio of Loose Compost to Topsoil by Volume: 1:4 . Use native topsoils from site with composts first.
2. Ratio of Loose Wood Derivatives to Surface Soil by Volume: 1:4

B. Planting Soil: Existing, native surface topsoil formed under natural conditions with the organic (O) and topsoil (A) horizonsduff layer retained during excavation process and stockpiled on-site]. Verify suitability of native surface topsoil to produce viable planting soil. If soil is currently supporting native plant communities, compost amendments will only be necessary. Clean soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.

1. Supplement with off site planting soils of the same type when quantities are insufficient. Use all on site soil and compost mix first.
2. Mix existing, native surface topsoil with the following soil amendments in the following quantities to produce planting soil:

1. Ratio of Loose Compost to Surface Soil by Volume: 1:4
2. Ratio of Loose Wood Derivatives to Surface Soil by Volume: 1:4

C. Planting Soil: Existing, in-place surface soil. Verify suitability of existing surface soil to produce viable planting soil. Remove stones, roots, plants, sod, clods, clay lumps, pockets of coarse sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris, and other extraneous materials harmful to plant growth. Mix surface soil with the following soil amendments in the following quantities to produce planting soil:

1. Ratio of Loose Compost to Surface Soil by Volume: 1:4

2. Ratio of Loose Wood Derivatives to Surface Soil by Volume: 1:4

D. Planting Soil: Imported topsoil or manufactured topsoil from off-site sources within 50 miles of site that match existing healthy native soil conditions. Obtain topsoil displaced from naturally well-drained construction or mining sites where topsoil occurs at least 4 inches (100 mm) deep; do not obtain from agricultural land, bogs or marshes.

1. Additional Properties of Imported Topsoil or Manufactured Topsoil: Screened and free of stones 1 inch (25 mm) or larger in any dimension; free of roots, plants, sod, clods, clay lumps, pockets of coarse sand, paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials harmful to plant growth; free of obnoxious weeds and invasive plants including quackgrass, Johnsongrass, poison ivy, nutsedge, nimblewill, Canada thistle, bindweed, bentgrass, wild garlic, ground ivy, perennial sorrel, and bromegrass; not infested with nematodes, grubs, other pests, pest eggs, or other undesirable organisms and disease-causing plant pathogens; friable and with sufficient structure to give good tilth and aeration. Continuous, air-filled, pore-space content on a volume/volume basis shall be at least 15 percent when moisture is present at field capacity. Soil shall have a field capacity of at least 15 percent on a dry weight basis.
2. Mix imported topsoil or manufactured topsoil with the following soil amendments in the following quantities to produce planting soil:

1. Ratio of Loose Compost to Surface Soil by Volume: 1:4
2. Ratio of Loose Wood Derivatives to Surface Soil by Volume: 1:4

## 2.8 MULCHES

A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.

B. Compost Mulch: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1-inch (25-mm) sieve; soluble salt content of 2 to 5 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:

1. Organic Matter Content: 60 percent of dry weight.
2. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.
3. Produced within 100 miles of the site.

C. Fiber Mulch: Biodegradable, dyed-wood, cellulose-fiber mulch; nontoxic and free of plant-growth or germination inhibitors; with a maximum moisture content of 15 percent and a pH range of 4.5 to 6.5.

D. Nonasphaltic Tackifier: Colloidal tackifier recommended by fiber-mulch manufacturer for slurry application; nontoxic and free of plant-growth or germination inhibitors.

E. Asphalt Emulsion: ASTM D 977, Grade SS-1; nontoxic and free of plant-growth or germination inhibitors.

## 2.9 PESTICIDES

A. General: Pesticide, registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

B. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.

C. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.

## 2.10 EROSION-CONTROL MATERIALS

A. Erosion-Control Blankets: Biodegradable wood excelsior, straw, or coconut-fiber mat enclosed in a photodegradable plastic mesh. Include manufacturer's recommended steel wire staples, 6 inches (150 mm) long.

B. Erosion-Control Fiber Mesh: Biodegradable burlap or spun-coir mesh, a minimum of 0.92 lb/sq. yd. (0.5 kg/sq. m), with 50 to 65 percent open area. Include manufacturer's recommended steel wire staples, 6 inches (150 mm) long.

C. Erosion-Control Mats: Cellular, non-biodegradable slope-stabilization mats designed to isolate and contain small areas of soil over steeply sloped surface, of 3-inch (75-mm) nominal mat thickness. Include manufacturer's recommended anchorage system for slope conditions.

1. Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

a. Invisible Structures, Inc.; Slopetame 2.
b. Presto Products Company, a business of Alcoa; Geoweb.
c. Tenax Corporation - USA; Tenweb.
d. Approved equal.

# PART 3 - EXECUTION

## 3.1 EXAMINATION

A. Examine areas to be planted for compliance with requirements and other conditions affecting performance.

1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.

## 3.2 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.

1. Protect adjacent and adjoining areas from hydroseeding and hydromulching overspray.
2. Protect grade stakes set by others until directed to remove them.

B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

## 3.3 TURF AREA PREPARATION

A. Limit turf subgrade preparation to areas to be planted.

B. Newly Graded Subgrades: Loosen subgrade to a minimum depth of 6 inches (150 mm. Remove stones larger than 1 inch (25 mm) in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

a. Fertilizers should not be necessary in any turf application.

2. Spread planting soil to a depth of 6 inches (150 mm) but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.

a. Spread approximately 1/2 the thickness of planting soil over loosened subgrade. Mix thoroughly into top 4 inches (100 mm)]of subgrade. Spread remainder of planting soil.
b. Reduce elevation of planting soil to allow for soil thickness of sod.

C. Unchanged Subgrades: If turf is to be planted in areas unaltered or undisturbed by excavating, grading, or surface-soil stripping operations, prepare surface soil as follows:

1. Remove existing grass, vegetation, and turf. Do not mix into surface soil.

2. Loosen surface soil to a depth of at least 6 inches (150 mm). Apply soil amendments and according to planting soil mix proportions and mix thoroughly into top 4 inches (100 mm) of soil. Till soil to a homogeneous mixture of fine texture.

3. Remove stones larger than 1 inch (25 mm) in any dimension and sticks, roots, trash, and other extraneous matter.
4. Legally dispose of waste material, including grass, vegetation, and turf, off Owner's property.

D. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch (13 mm) of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit finish grading to areas that can be planted in the immediate future.

E. Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

F. Before planting, obtain Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

## 3.4 PREPARATION FOR EROSION-CONTROL MATERIALS

A. Prepare area as specified in "Turf Area Preparation" Article.

B. For erosion-control mats, install planting soil in two lifts, with second lift equal to thickness of erosion-control mats. Install erosion-control mat and fasten as recommended by material manufacturer.

C. Fill cells of erosion-control mat with planting soil and compact before planting.

D. For erosion-control blanket or mesh, install from top of slope, working downward, and as recommended by material manufacturer for site conditions. Fasten as recommended by material manufacturer.

E. Moisten prepared area before planting if surface is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

## 3.5 PREPARATION FOR GRASS-PAVING MATERIALS-NA

## 3.6 SEEDING

A. Where site conditions allow, native seed shall be planted with a no-till seed drill equipped with a fluffy seed box and a small seed box. Seed within each planting zone (tallgrass, shortgrass, bioswale, etc…) should be mixed according to the mechanical requirements of the drill and separated into the appropriate bin. See native seed tables for the recommended seed bin selection.

B. On slopes that are greater than the maximum slope recommended by equipment manufacturer, or on sites that otherwise prevent the use of a no-till seed drill such as rocky sites or areas of dense brush or woodland, native seed should be broadcast using hand-operated equipment or spread by hand. Following broadcast, seed shall be raked and into the top 1/8” of soil.

C. Seed shall not be broadcast when wind velocity exceeds 5 mph (8 km/h).

D. Seed shall be evenly distributed, covering all areas completely. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other for soccer field areas.

E. When planting with a no-till seed drill, it is preferable to seed perpendicular to the slope as the furrows will help collect moisture and resist erosion.

F. Do not use wet seed or seed that is moldy or otherwise damaged.

G. Limit extent of seed to outside edge of planting saucer.

H. Sow seed at a total rate as required in mix.

I. Rake seed lightly into top 1/8 inch (3 mm) of soil, roll lightly, and water with fine spray for soccer field area.

J. Protect seeded areas with slopes exceeding 1:4 with BIODEGRADABLE erosion-control blankets installed and stapled according to manufacturer's written instructions.

K. Protect seeded areas with BIODEGRADABLE erosion-control mats where shown on Drawings; install and anchor according to manufacturer's written instructions.

## 3.7 HYDROSEEDING

A. Hydroseeding: For Soccer Fields Only: Mix specified seed, fertilizer, and fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.

1. Mix slurry with fiber-mulch manufacturer's recommended tackifier.
2. Apply slurry uniformly to all areas to be seeded in a one-step process. Apply slurry at a rate so that mulch component is deposited at not less than 1500-lb/acre (15.6-kg/92.9 sq. m) dry weight, and seed component is deposited at not less than the specified seed-sowing rate.
3. Apply slurry uniformly to all areas to be seeded in a two-step process. Apply first slurry coat at a rate so that mulch component is deposited at not less than 500-lb/acre (5.2-kg/92.9 sq. m) dry weight, and seed component is deposited at not less than the specified seed-sowing rate. Apply slurry cover coat of fiber mulch (hydromulching) at a rate of 1000 lb/acre (10.4 kg/92.9 sq. m).

## 3.8 SODDING

A. Lay sod within 24 hours of harvesting. Do not lay sod if dormant or if ground is frozen or muddy.

B. Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent courses. Avoid damage to subgrade or sod during installation. Tamp and roll lightly to ensure contact with subgrade, eliminate air pockets, and form a smooth surface. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass.

1. Lay sod across angle of slopes exceeding 1:3.
2. Anchor sod on slopes exceeding 1:6 with wood pegs spaced as recommended by sod manufacturer but not less than 2 anchors per sod strip to prevent slippage.

C. Saturate sod with fine water spray within two hours of planting. During first week after planting, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 1-1/2 inches (38 mm) below sod.

## 3.9 TURF MAINTENANCE

A. Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation.

1. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace materials and turf damaged or lost in areas of subsidence.
2. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.
3. Apply treatments as required to keep turf and soil free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards.

B. Watering: Install and maintain temporary piping, hoses, and turf-watering equipment to convey water from sources and irrigation to keep turf uniformly moist to a depth of 4 inches (100 mm).

1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
2. Water turf with fine spray at a minimum rate of 1 inch (25 mm) per week unless rainfall precipitation is adequate.
3. Irrigate according to the plant and seed mix requirements and avoid fixed schedules.
4. Water early in the mornings.
5. Use sprinkler heads to create large droplets instead of mists.

C. Mow turf as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than 1/3 of grass height. Remove no more than 1/3 of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowings to maintain the following grass height:
1. Mow [bermudagrass to a height of 1/2 to 1 inch (13 to 25 mm).
2. Mow zoysiagrass to a height of 1 to 2 inches (25 to 50 mm).

D. Turf Post fertilization: Apply fertilizer after initial mowing and when grass is dry.

1. Use fertilizer only after soils has been tested and deficiencies are present. that will provide actual nitrogen of at least 1 lb/1000 sq. ft. (0.45 kg/92.9 sq. m) only to zoysiagrass and bermudagrass area. No fertilizers should be used on St. Augustinegrass.

## 3.10 SATISFACTORY

A. Installation shall meet the following criteria as determined by Landscape Architect:

1. Satisfactory Seed: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. (0.92 sq. m).
2. Satisfactory Sodded Turf: At end of maintenance period, a healthy, well-rooted, even-colored, viable turf has been established, free of weeds, open joints, bare areas, and surface irregularities.
3. Satisfactory Plugged Turf: At end of maintenance period, the required number of plugs has been established as well-rooted, viable patches of grass, and areas between plugs are free of weeds and other undesirable vegetation.
4. Satisfactory Sprigged Turf: At end of maintenance period, the required number of sprigs has been established as well-rooted, viable plants, and areas between sprigs are free of weeds and other undesirable vegetation.

B. Use specified materials to reestablish turf that does not comply with requirements and continue maintenance until turf is satisfactory.

## 3.11 MEADOW

A. Where site conditions allow, native seed shall be planted with a no-till seed drill equipped with a fluffy seed box and a small seed box.

B. On slopes that are greater than the maximum slope recommended by equipment manufacturer, or on sites that otherwise prevent the use of a no-till seed drill such as rocky sites or areas of dense brush or woodland, native seed should be broadcast using hand-operated equipment or spread by hand. Following broadcast, seed shall be raked and into the top 1/8” of soil.

C. When planting with a no-till seed drill, it is preferable to seed perpendicular to the slope as the furrows will help collect moisture and resist erosion.

D. Seed shall not be broadcast when wind velocity exceeds 5 mph (8 km/h).

E. Seed shall be evenly distributed.

F. Do not use wet seed or seed that is moldy or otherwise damaged.

G. Limit extent of seed to outside edge of planting saucer.

H. All seed mix shall be 90% germinated before considered established. Contractor to provide irrigation and maintenance for these areas until 90% germination is established.

I. Sow seed at a total rate as required in mix.

J. Watering: Install and maintain temporary piping, hoses, and meadow-watering to convey water from sources and to keep meadow uniformly moist.

1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed. Lay out temporary watering system to avoid walking over muddy or newly planted areas.

2. All piping and appliances shall be installed aboveground and fully removed from site after irrigation is no longer necessary.

3. Water meadow with large droplets at a maximum rate of 3 inches per week unless rainfall is adequate. Irrigate through the first growing season (April 1 to October 15) after planting or until the meadow is established.

## 3.12 NATIVE PLANTING MAINTENANCE

1. Contractor to provide maintenance plan based on seed mix from provider.

## 3.13 PESTICIDE APPLICATION

A. Apply pesticides and other chemical products and biological control agents in accordance with requirements of authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.

B. Pesticides (Selective and Non-Selective): Apply only as necessary and in accordance with manufacturer's written recommendations.

## 3.14 CLEANUP AND PROTECTION

A. Promptly remove soil and debris created by turf work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

B. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after plantings are established.

C. Remove nondegradable erosion-control measures after grass establishment period.

END OF SECTION 329200

# SECTION 329300 - PLANTS

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

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

### 1.2 SUMMARY

A. Section Includes:

1. Plants.
2. Planting soils.
3. Tree stabilization.
4. Landscape edgings.

B. Related Sections:

1. Division 01 Section "Temporary Tree and Plant Protection" for protecting, trimming, pruning, repairing, and replacing existing trees to remain that interfere with, or are affected by, execution of the Work.
2. See Civil Drawings for protection of existing trees and plantings, topsoil stripping and stockpiling, and site clearing.
3. See Civil Drawings "Earth Moving" for excavation, filling, and rough grading and for subsurface aggregate drainage and drainage backfill materials.
4. Division 32 Section "Turf and Grasses" for turf (lawn) and meadow planting, hydroseeding, and erosion-control materials.
5. See Civil Drawings "Subdrainage" for below-grade drainage of landscaped areas, paved areas, and wall perimeters.
6. Section 321540 ‘Crushed Stone Surfacing’ for ‘Gravel Type 3- Planting’ gravel applied to planting areas indicated in drawings.

### 1.3 DEFINITIONS

A. Backfill: The earth used to replace or the act of replacing earth in an excavation.

B. Balled and Burlapped Stock: Plants dug with firm, natural balls of earth in which they were grown, with ball size not less than sizes indicated; wrapped with burlap, tied, rigidly supported, and drum laced with twine with the root flare visible at the surface of the ball as recommended by ANSI Z60.1.

C. Balled and Potted Stock: Plants dug with firm, natural balls of earth in which they are grown and placed, unbroken, in a container. Ball size is not less than sizes indicated.

D. Bare-Root Stock: Plants with a well-branched, fibrous-root system developed by transplanting or root pruning, with soil or growing medium removed, and with not less than minimum root spread according to ANSI Z60.1 for type and size of plant required.

E. Container-Grown Stock: Healthy, vigorous, well-rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.

F. Duff Layer: The surface layer of native topsoil that is composed of mostly decayed leaves, twigs, and detritus.

G. Fabric Bag-Grown Stock: Healthy, vigorous, well-rooted plants established and grown in-ground in a porous fabric bag with well-established root system reaching sides of fabric bag. Fabric bag size is not less than diameter, depth, and volume required by ANSI Z60.1 for type and size of plant.

H. Finish Grade: Elevation of finished surface of planting soil.

I. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.

J. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.

K. Pests: Living organisms that occur where they are not desired, or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

L. Planting Area: Areas to be planted.

M. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

N. Plant; Plants; Plant Material: These terms refer to vegetation in general, including trees, shrubs, vines, ground covers, ornamental grasses, bulbs, corms, tubers, or herbaceous vegetation.

O. Root Flare: Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.

P. Stem Girdling Roots: Roots that encircle the stems (trunks) of trees below the soil surface.

Q. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

R. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

S. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.

## 1.4 SUBMITTALS

A. Product Data: For each type of product indicated, including soils.

1. Plant Materials: Include quantities, sizes, quality, and sources for plant materials.
2. Pesticides and Herbicides: Include product label and manufacturer's application instructions specific to the Project.
3. Plant Photographs: Include color photographs in digital format of each required species and size of plant material as it will be furnished to the Project. Take photographs from an angle depicting true size and condition of the typical plant to be furnished. Include a scale rod or other measuring device in each photograph. For species where more than 20 plants are required, include a minimum of three photographs showing the average plant, the best quality plant, and the worst quality plant to be furnished. Identify each photograph with the full scientific name of the plant, plant size, and name of the growing nursery.

B. Samples for Verification: For each of the following:

1. Trees and Shrubs: Three samples of each variety and size delivered to the site for review. Maintain approved samples on-site as a standard for comparison.
2. Cedar Mulch: 1-pint (0.5-liter) volume of each organic mulch required; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch. Each Sample shall be typical of the lot of material to be furnished; provide an accurate representation of color, texture, and organic makeup. Mulch should only be imported once all on-site resources are consumed.
3. Weed Control Barrier: 12 by 12 inches (300 by 300 mm).
4. Edging Materials and Accessories: Manufacturer's standard size, to verify color selected.

C. Qualification Data: For qualified landscape Installer. Include list of similar projects completed by Installer demonstrating Installer's capabilities and experience. Include project names, addresses, and year completed, and include names and addresses of owners' contact persons.

D. Product Certificates: For each type of manufactured product, from manufacturer, and complying with the following:

1. Manufacturer's certified analysis of standard products.
2. Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.

E. Material Test Reports: For standardized ASTM D 5268 topsoil, existing native surface topsoil, existing in-place surface soil with compost and imported or manufactured topsoil.

F. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of plants during a calendar year. Submit before start of required maintenance periods.

G. Warranty: Sample of special warranty.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscape Installer whose work has resulted in successful establishment of native plants.

1. Professional Membership: Installer shall be a member in good standing of either the Professional Landcare Network or the American Nursery and Landscape Association.
2. Experience: Five years' experience in landscape installation specific to native revegetation and wetland restoration in addition to requirements in Division 01 Section "Quality Requirements."
3. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
4. Personnel Certifications: Installer's field supervisor shall have certification in one of the following categories from the Professional Landcare Network:

    a. Certified Landscape Technician - Exterior, designated CLT-Exterior.
    b. Certified Ornamental Landscape Professional, designated COLP.

5. Pesticide Applicator: State licensed, commercial.

B. Soil-Testing Laboratory Qualifications: An independent or university laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.

C. Soil Analysis: For each unamended soil type, furnish soil analysis and a written report by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; deleterious material; pH; and mineral and plant-nutrient content of the soil.

1. Testing methods and written recommendations shall comply with USDA's Handbook No. 60.
2. The soil-testing laboratory shall oversee soil sampling; with depth, location, and number of samples to be taken per instructions from Architect. A minimum of three representative samples shall be taken from varied locations for each soil to be used or amended for planting purposes.
3. Report suitability of tested soil for plant growth.

    a. Based upon the test results, state recommendations for soil treatments and soil amendments to be incorporated. State recommendations in weight per 1000 sq. ft. (92.9 sq. m) or volume per cu. yd. (0.76 cu. m) for nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory planting soil suitable for healthy, viable plants.
    b. Report presence of problem salts, minerals, or heavy metals, including aluminum, arsenic, barium, cadmium, chromium, cobalt, lead, lithium, and vanadium. If such problem materials are present, provide additional recommendations for corrective action.

D. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1.

1. Selection of plants purchased under allowances will be made by Architect, who will tag plants at their place of growth before they are prepared for transplanting.

E. Measurements: Measure according to ANSI Z60.1. Do not prune to obtain required sizes.

1. Trees and Shrubs: Measure with branches and trunks or canes in their normal position. Take height measurements from or near the top of the root flare for field-grown stock and container grown stock. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip to tip. Take caliper measurements 6 inches above the root flare for trees up to 4-inch caliper size, and 12 inches above the root flare for larger sizes.
2. Other Plants: Measure with stems, petioles, and foliage in their normal position.

F. Plant Material Observation: Landscape Architect may observe plant material either at place of growth or at site before planting for compliance with requirements for genus, species, variety, cultivar, size, and quality. Architect retains right to observe trees and shrubs further for size and condition of balls and root systems, pests, disease symptoms, injuries, and latent defects and to reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site.

1. Notify Landscaoe Architect of sources of planting materials ten days in advance of delivery to site.

G. Preinstallation Conference: Conduct conference at Project Site.

## 1.6 DELIVERY, STORAGE, AND HANDLING

A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws if applicable.

B. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Accompany each delivery of bulk organic fertilizers, lime and soil amendments with appropriate certificates.

C. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.

D. Handle planting stock by root ball.

E. Store bulbs, corms, and tubers in a dry place at 60 to 65 deg F (16 to 18 deg C) until planting.

F. Deliver plants after preparations for planting have been completed, and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.

1. Set balled stock on ground and cover ball with soil, sawdust, or other acceptable material.
2. Do not remove container-grown stock from containers before time of planting.
3. Water root systems of plants stored on-site deeply and thoroughly with a fine-mist spray. Water as often as necessary to maintain root systems in a moist, but not overly-wet condition.

## 1.7 PROJECT CONDITIONS

A. Field Measurements: Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.

B. Interruption of Existing Services or Utilities: Do not interrupt services or utilities to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary services or utilities according to requirements indicated:

1. Notify Construction Manager and Owner no fewer than three days in advance of proposed interruption of each service or utility.
2. Do not proceed with interruption of services or utilities without Construction Manager's or Owner's written permission.

C. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion.

1. Spring Planting: Until June 15
2. Fall Planting: After October 1

D. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.

E. Coordination with Turf Areas (Lawns) and Native Seed Mix Areas: Plant trees, shrubs, and other plants after finish grades are established and before planting turf areas unless otherwise indicated.

1. When planting trees, shrubs, and other plants after planting turf areas, protect turf areas, and promptly repair damage caused by planting operations.

1.8 WARRANTY

A. Special Warranty: Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, or neglect by Owner, or incidents that are beyond Contractor's control.
b. Structural failures including plantings falling or blowing over.
c. Faulty performance of tree stabilization.
d. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

2. Warranty Periods from Date of Substantial Completion

a. Trees, Shrubs, Vines, and Ornamental Grasses: 12 months.
b. Ground Covers, Biennials, Perennials, and Other Plants: 12 months.
c. Seedmix: 12 months after 90% germination.

3. Include the following remedial actions as a minimum:

a. Immediately remove dead plants and replace unless required to plant in the succeeding planting season.
b. Replace plants that are more than 25 percent dead or in an unhealthy condition at end of warranty period.
c. A limit of one replacement of each plant will be required except for losses or replacements due to failure to comply with requirements.
d. Provide extended warranty for period equal to original warranty period, for replaced plant material.

1.9 MAINTENANCE SERVICE

A. Initial Maintenance Service for Trees and Shrubs: Provide maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established but for not less than maintenance period below.

1. Maintenance Period: 12 months from date of substantial completion.

B. Initial Maintenance Service for Ground Cover and Other Plants: Provide maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established but for not less than maintenance period below.

1. Maintenance Period: 12 months from date of substantial completion.

C. Continuing Maintenance Proposal: From Installer to Owner, in the form of a standard yearly (or other period) maintenance agreement, starting on date initial maintenance service is

concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

## PART 2 - PRODUCTS

### 2.1 PLANT MATERIAL

A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant Schedule or Plant Legend shown on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.

1. Trees with damaged, crooked, or multiple leaders; tight vertical branches where bark is squeezed between two branches or between branch and trunk ("included bark"); crossing trunks; cut-off limbs more than 3/4 inch (19 mm) in diameter; or with stem girdling roots will be rejected.
2. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless otherwise indicated.

B. Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Plants of a larger size may be used if acceptable to Architect, with a proportionate increase in size of roots or balls.

C. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which shall begin at root flare according to ANSI Z60.1. Root flare shall be visible before planting.

D. Labeling: Label each plant of each variety, size, and caliper with a securely attached, waterproof tag bearing legible designation of common name and full scientific name, including genus and species. Include nomenclature for hybrid, variety, or cultivar, if applicable for the plant as shown on Drawings.

E. If formal arrangements or consecutive order of plants is shown on Drawings, select stock for uniform height and spread, and number the labels to assure symmetry in planting.

### 2.2 INORGANIC SOIL AMENDMENTS-USE ONLY IF APPLICABLE

A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:

1. Class: T, with a minimum of 99 percent passing through No. 8 (2.36-mm) sieve and a minimum of 75 percent passing through No. 60 (0.25-mm) sieve.
2. Class: O, with a minimum of 95 percent passing through No. 8 (2.36-mm) sieve and a minimum of 55 percent passing through No. 60 (0.25-mm) sieve.

B. Sulfur: Granular, biodegradable, and containing a minimum of 90 percent sulfur, with a minimum of 99 percent passing through No. 6 (3.35-mm) sieve and a maximum of 10 percent passing through No. 40 (0.425-mm) sieve.

C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.

D. Aluminum Sulfate: Commercial grade, unadulterated.

E. Perlite: Horticultural perlite, soil amendment grade.

F. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through No. 50 (0.30-mm) sieve.

G. Sand: Clean, washed, natural or manufactured, and free of toxic materials.

H. Diatomaceous Earth: Calcined, 90 percent silica, with approximately 140 percent water absorption capacity by weight.

I. Zeolites: Mineral clinoptilolite with at least 60 percent water absorption by weight.

## 2.3 ORGANIC SOIL AMENDMENTS

A. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.75-7.25; moisture content 35 to 55 percent by weight; 100 percent passing through 1/2-inch (13-mm) sieve; soluble salt content of 5 to 10 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:

1. Organic Matter Content: 50 to 60 percent of dry weight.
2. Dillo Dirt or Approved Equal
3. Integrate to create total soil organic matter of a minimum of 4.25% and maximum of 6.75%.

B. Wood Derivatives: Decomposed, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture and free of chips, stones, sticks, soil, or toxic materials.

1. In lieu of decomposed wood derivatives, mix partially decomposed wood derivatives with ammonium nitrate at a minimum rate of 0.15 lb/cu. ft. (2.4 kg/cu. m)of loose sawdust or ground bark, or with ammonium sulfate at a minimum rate of 0.25 lb/cu. ft. (4 kg/cu. m) of loose sawdust or ground bark.

C. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, debris, and material harmful to plant growth.

## 2.4 FERTILIZERS

Fertilizers should only be used if the specific plant species requires it. Prior to amending the soil, Contractor shall test for deficiencies.

A. Bonemeal: Commercial, raw or steamed, finely ground; a minimum of 4 percent nitrogen and 10 percent phosphoric acid.

B. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20 percent available phosphoric acid.

C. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:

1. Composition: 1 lb/1000 sq. ft. (0.45 kg/92.9 sq. m) of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.
2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

D. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:

1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.
2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

E. Planting Tablets: Tightly compressed chip type, long-lasting, slow-release, commercial-grade planting fertilizer in tablet form. Tablets shall break down with soil bacteria, converting nutrients into a form that can be absorbed by plant roots.

1. Size: 5-gram tablets.
2. Nutrient Composition: 20 percent nitrogen, 10 percent phosphorous, and 5 percent potassium, by weight plus micronutrients.

F. Chelated Iron: Commercial-grade FeEDDHA for dicots and woody plants, and commercial-grade FeDTPA for ornamental grasses and monocots.

## 2.5 PLANTING SOILS

A. Planting Soil: ASTM D 5268 topsoil, with pH range of 7-8 a minimum of six percent organic material content; free of stones 1 inch (25 mm) or larger in any dimension and other extraneous materials harmful to plant growth. Mix ASTM D 5268 topsoil with the following soil amendments of Dillo Dirt.

B. Planting Soil Existing, native surface topsoil formed under natural conditions with the duff layer retained during excavation process and stockpiled on-site in a well drained area and vegetated with a non-invasive cover crop or covered with a loose weave biodegradable erosion control blankets. Tarps or other covers that suffocate the soil are not permitted. Verify suitability of native surface topsoil to produce viable planting soil. Clean soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.

1. Supplement with Dillo Dirt (or approved equal) planting soil when quantities are insufficient.

2. Mix existing top 12” of native surface topsoil with the following soil amendments
3. Retain first paragraph below if existing surface soil is not of topsoil quality or is of unknown quality and will be amended and used.

C. Planting Soil: Existing, in-place surface soil. Verify suitability of existing surface soil to produce viable planting soil. Remove stones, roots, plants, sod, clods, clay lumps, pockets of coarse sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris, and other extraneous materials harmful to plant growth. Mix surface soil with the following soil amendments and organic fertilizers- as applicable - in the following quantities to produce planting soil.

1. Ratio of Loose Compost to Surface Soil by Volume: 1:4
2. Ratio of Loose Wood Derivatives to Surface Soil by Volume: 1:4

D. Planting Soil: Imported topsoil or manufactured topsoil from off-site sources only after all existing soils for reuse has been consumed. Obtain topsoil displaced from naturally well-drained construction or mining sites where topsoil occurs at least 4 inches (100 mm) deep and within 100 miles of the project site; soil characteristics need to match the project site; do not obtain from greenfields, agricultural land**,** bogs, or marshes.

1. Additional Properties of Imported Topsoil or Manufactured Topsoil: Screened and free of stones 1 inch (25 mm) or larger in any dimension; free of roots, plants, sod, clods, clay lumps, pockets of coarse sand, paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials harmful to plant growth; free of obnoxious weeds and invasive plants including quackgrass, Johnsongrass, poison ivy, nutsedge, nimblewill, Canada thistle, bindweed, bentgrass, wild garlic, ground ivy, perennial sorrel, and bromegrass; not infested with nematodes; grubs; or other pests, pest eggs, or other undesirable organisms and disease-causing plant pathogens; friable and with sufficient structure to give good tilth and aeration. Continuous, air-filled pore space content on a volume/volume basis shall be at least 15 percent when moisture is present at field capacity. Soil shall have a field capacity of at least 15 percent on a dry weight basis.
2. Mix imported topsoil or manufactured topsoil with the following soil amendments and organic fertilizers in the following quantities to produce planting soil:

    a. Ratio of Loose Compost to Topsoil by Volume: 1:4 or until achieved desired results
    b. Ratio of Loose Wood Derivatives to Topsoil by Volume: 1:4

E. Lightweight On-Structure Planting Soil: NA

F. Organic Mulch: Free from deleterious materials and suitable as a top dressing of trees and shrubs, consisting of one of the following:

1. Type: Shredded cedar from cedar trees removed from site and locally attained cedar mulch.
2. Size Range: 1” minimum and 3” maximum
3. Color: Natural- uncolored.

2.6 WEED-CONTROL BARRIERS

A. Nonwoven Geotextile Filter Fabric: Polypropylene or polyester fabric, 3 oz./sq. yd. (101g/sq. m) minimum, composed of fibers formed into a stable network so that fibers retain their relative position. Fabric shall be inert to biological degradation and resist naturally-encountered chemicals, alkalis, and acids.

B. Composite Fabric: Woven, needle-punched polypropylene substrate bonded to a nonwoven polypropylene fabric, 4.8 oz./sq. yd. (162 g/sq. m).

2.7 PESTICIDES

A. General: Pesticide registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

B. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.

C. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.

2.8 TREE STABILIZATION MATERIALS

A. Stakes and Guys:

1. Upright and Guy Stakes: Rough-sawn, sound, new hardwood or metal stakes, free of knots, holes, cross grain, and other defects, 2-by-2-inch nominal (38-by-38-mm actual) by length indicated, pointed at one end.
2. Wood Deadmen: Timbers measuring 8 inches (200 mm) in diameter and 48 inches (1200 mm) long, treated with specified wood pressure-preservative treatment.
3. Flexible Ties: Wide rubber or elastic bands or straps of length required to reach stakes or turnbuckles.
4. Guys and Tie Wires: ASTM A 641/A 641M, Class 1, galvanized-steel wire, two-strand, twisted, 0.106 inch (2.7 mm) in diameter.
5. Tree-Tie Webbing: UV-resistant polypropylene or nylon webbing with brass grommets.
6. Guy Cables: Five-strand, 3/16-inch- (4.8-mm-) diameter, galvanized-steel cable, with zinc-coated turnbuckles , a minimum of 3 inches (75 mm) long, with two 3/8-inch (10-mm) galvanized eyebolts.
7. Flags: Standard surveyor's plastic flagging tape, white, 6 inches (150 mm) long.
8. Proprietary Staking-and-Guying Devices: Proprietary stake and adjustable tie systems to secure each new planting by plant stem; sized as indicated and per manufacturer's written recommendations.

    a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

1) Arborbrace; ArborBrace Tree Guying System.
2) Decorations for Generations, Inc.; Megga System.
3) Or approved equal

B. Root-Ball Stabilization Materials:

1. Upright Stakes and Horizontal Hold-Down: Rough-sawn, sound, new hardwood or softwood, free of knots, holes, cross grain, and other defects, 2-by-2-inch nominal (38-by-38-mm actual) by length indicated; stakes pointed at one end.
2. Wood Screws: ASME B18.6.1.
3. Proprietary Root-Ball Stabilization Devices: Proprietary at- or below-grade stabilization systems to secure each new planting by root ball; sized per manufacturer's written recommendations unless otherwise indicated.

a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

1) Border Concepts, Inc.; Tomahawk Tree Stabilizers.
2) Foresight Products, LLC; Duckbill Rootball Fixing System.
3) Tree Staple, Inc.; Tree Staples.
4) Approved equal.

## 2.9 LANDSCAPE EDGINGS

A. Steel Edging: Standard commercial-steel, rolled edge, fabricated in sections of standard lengths, with loops stamped from or welded to face of sections to receive stakes.

1. Edging Size: 3/16 inch (4.8 mm) wide by 4 inches (100 mm) deep
2. Stakes: Tapered steel, a minimum of 12 inches (300 mm) long.
3. Accessories: Standard tapered ends, corners, and splicers.
4. Finish: Standard paint if aluminum, Zinc coated if steel
5. Paint Color: Matte Black

## 2.10 MISCELLANEOUS PRODUCTS

A. Antidesiccant: Water-insoluble emulsion, permeable moisture retarder, film forming, for trees and shrubs. Deliver in original, sealed, and fully labeled containers and mix according to manufacturer's written instructions.

B. Burlap: Non-synthetic, biodegradable.

C. Planter Filter Fabric: Woven geotextile manufactured for separation applications and made of polypropylene, polyolefin, or polyester fibers or combination of them.

D. Mycorrhizal Fungi: Dry, granular inoculant containing at least 5300 spores per lb of vesicular-arbuscular mycorrhizal fungi and 95 million spores per lb of ectomycorrhizal fungi, 33 percent hydrogel, and a maximum of 5.5 percent inert material.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive plants for compliance with requirements and conditions affecting installation and performance.

1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area. Dispose only in a proper facility.
2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Landscape Architect and replace with new planting soil.

3.2 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities and turf areas and existing plants from damage caused by planting operations.

B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

C. Lay out individual tree and shrub locations and areas for multiple plantings. Stake locations, outline areas, adjust locations when requested, and obtain Landscape Architect's acceptance of layout before excavating or planting. Make minor adjustments as required.

D. Lay out plants at locations directed by Landscape Architect. Stake locations of individual trees and shrubs and outline areas for multiple plantings.

E. Apply antidesiccant to trees and shrubs using power spray to provide an adequate film over trunks (before wrapping), branches, stems, twigs, and foliage to protect during digging, handling, and transportation.

1. If deciduous trees or shrubs are moved in full leaf, spray with antidesiccant at nursery before moving and again two weeks after planting.

F. Wrap trees and shrubs with burlap fabric over trunks, branches, stems, twigs, and foliage to protect from wind and other damage during digging, handling, and transportation.

## 3.3 PLANTING AREA ESTABLISHMENT

A. Loosen subgrade of planting areas to a minimum depth of 12 inches. In areas where existing trees are to be preserved hand excavate or till soil to prevent root damage.

1. Thoroughly blend planting soil on-site before spreading
2. Spread planting soil to a minimum depth of 12 inches (300 mm) but not less than required to meet finish grades after natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.

    a. Spread approximately one-half the thickness of planting soil over loosened subgrade. Mix thoroughly into top 12 inches (100 mm)] of subgrade. Spread remainder of planting soil.

B. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

C. Before planting, obtain Landscape Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

## 3.4 EXCAVATION FOR TREES AND SHRUBS

A. Planting Pits and Trenches: Excavate circular planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are not acceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to settling. Scarify sides of planting pit smeared or smoothed during excavation.

1. Excavate approximately three times as wide as ball diameter for balled and burlapped, balled and potted, container-grown and fabric bag-grown stock.
2. Excavate at least 12 inches (300 mm) wider than root spread and deep enough to accommodate vertical roots for bare-root stock.
3. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.
4. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.
5. Maintain required angles of repose of adjacent materials as shown on the Drawings. Do not excavate subgrades of adjacent paving, structures, hardscapes, or other new or existing improvements.
6. Maintain supervision of excavations during working hours.
7. Keep excavations covered or otherwise protected when unattended by Installer's personnel.
8. If drain tile is shown on Drawings or required under planting areas, excavate to top of porous backfill over tile.

B. Subsoil and topsoil removed from excavations shall be used as part of planting soil.

C. Obstructions: Notify Landscape Architect if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.

1. Hardpan Layer: Drill 6-inch- (150-mm-) diameter holes, 24 inches (600 mm) apart, into free-draining strata or to a depth of 10 feet (3 m), whichever is less, and backfill with free-draining material.

D. Drainage: Notify Landscape Architect if subsoil conditions evidence unexpected water seepage or retention in tree or shrub planting pits.

E. Fill excavations with water and allow to percolate away before positioning trees and shrubs. It drainage in hole does not occur within 2 two hours, contact Architect.

## 3.5 TREE, SHRUB, AND VINE PLANTING

A. Before planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.

B. Trees with girdling roots are not acceptable. Shrub and vines- remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.

C. Set balled and burlapped stock plumb and in center of planting pit or trench with root flare 1 inch (25 mm) above adjacent finish grades.

1. Use planting soil: Soils are to be returned in a manner that mimics the existing soil strata. Subsoils should stay at the bottom and top soils on top. Contractor shall not mix the two together.
2. After placing some backfill around root ball to stabilize plant, carefully cut and remove burlap, rope, and wire baskets from tops of root balls and from sides, but do not remove from under root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.
3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
4. Place planting tablets in each planting pit when pit is approximately one-half filled; in amounts recommended in soil reports from soil-testing laboratory. Place tablets beside the root ball about 1 inch (25 mm) from root tips; do not place tablets in bottom of the hole.
5. Continue backfilling process. Water again after placing and tamping final layer of soil.

D. Set balled and potted or container-grown stock plumb and in center of planting pit or trench with root flare 1 inch (25 mm) above adjacent finish grades.

1. Use planting soil: Soils are to be returned in a manner that mimics the existing soil strata. Subsoils should stay at the bottom and top soils on top. Contractor shall not mix the two together.
2. Carefully remove root ball from container without damaging root ball or plant.
3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.

4. Place planting tablets in each planting pit when pit is approximately one-half filled; in amounts recommended in soil reports from soil-testing laboratory. Place tablets beside the root ball about 1 inch (25 mm) from root tips; do not place tablets in bottom of the hole.
5. Continue backfilling process. Water again after placing and tamping final layer of soil.

E. Set fabric bag-grown stock plumb and in center of planting pit or trench with root flare 1 inch above adjacent finish grades.

1. Use planting soil: Soils are to be returned in a manner that mimics the existing soil strata. Subsoils should stay at the bottom and top soils on top. Contractor shall not mix the two together.
2. Carefully remove root ball from fabric bag without damaging root ball or plant. Do not use planting stock if root ball is cracked or broken before or during planting operation.
3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
4. Place planting tablets in each planting pit when pit is approximately one-half filled; in amounts recommended in soil reports from soil-testing laboratory. Place tablets beside the root ball about 1 inch (25 mm) from root tips; do not place tablets in bottom of the hole.
5. Continue backfilling process. Water again after placing and tamping final layer of soil.

F. When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.

## 3.6 TREE, SHRUB, AND VINE PRUNING

A. Remove only dead, dying, or broken branches. Do not prune for shape.

B. Prune, thin, and shape trees, shrubs, and vines as directed by Landscape Architect.

C. Prune, thin, and shape trees, shrubs, and vines according to standard professional horticultural and arboricultural practices. Unless otherwise indicated by Landscape Architect, do not cut tree leaders; remove only injured, dying, or dead branches from trees and shrubs; and prune to retain natural character.

D. Do not apply pruning paint to wounds.

## 3.7 TREE STABILIZATION

A. Install trunk stabilization as follows unless otherwise indicated:

1. Upright Staking and Tying: Stake trees of 2- through 5-inch caliper. Stake trees of less than 2-inch caliper only as required to prevent wind tip out. Use a minimum of two stakes of length required to penetrate at least 18 inches below bottom of backfilled excavation and to extend to the dimension shown on Drawings above grade. Set vertical stakes and space to avoid penetrating root balls or root masses.

2. Use stakes as shown on drawings. Space stakes equally around trees.
3. Support trees with bands of flexible ties at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree.
4. Support trees with two strands of tie wire, connected to the brass grommets of tree-tie webbing at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree.

B. Staking and Guying: Stake and guy trees as shown on drawings. Securely attach no fewer than three guys to stakes 30 inches long, driven to grade.

1. Site-Fabricated Staking-and-Guying Method:

a. For trees more than 6 inches in caliper, anchor guys to wood deadmen buried at least 36 inches below grade.

2. Proprietary Staking and Guying Device: Install staking and guying system sized and positioned as recommended by manufacturer unless otherwise indicated and according to manufacturer's written instructions.

C. Root-Ball Stabilization: Install at- or below-grade stabilization system to secure each new planting by the root ball unless otherwise indicated.

1. Wood Hold-Down Method: Place vertical stakes against side of root ball and drive them into subsoil; place horizontal wood hold-down stake across top of root ball and screw at each end to one of the vertical stakes.

a. Install stakes of length required to penetrate at least to the dimension shown on Drawings below bottom of backfilled excavation. Saw stakes off at horizontal stake.
b. Install screws through horizontal hold-down and penetrating at least 1 inch into stakes. Predrill holes if necessary to prevent splitting wood.
c. Install second set of stakes on other side of root trunk for larger trees as indicated.

2. Proprietary Root-Ball Stabilization Device: Install root-ball stabilization system sized and positioned as recommended by manufacturer unless otherwise indicated and according to manufacturer's written instructions.

## 3.8 GROUND COVER AND PLANT PLANTING

A. Set out and space ground cover and plants other than trees, shrubs, and vines as indicated in even rows with triangular spacing.

B. Use planting soil as described above for backfill.

C. Dig holes large enough to allow spreading of roots.

D. For rooted cutting plants supplied in flats, plant each in a manner that will minimally disturb the root system but to a depth not less than two nodes.

E. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.

F. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.

G. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.

## 3.9 PLANTING AREA MULCHING

A. Install weed-control barriers before mulching according to manufacturer's written instructions. Completely cover area to be mulched, overlapping edges a minimum of 6 inches and secure seams with galvanized pins.

B. Mulch backfilled surfaces of planting areas and other areas indicated.

1. Trees and Tree-like Shrubs: Apply mulch ring as shown on drawings.
2. Organic Mulch in Planting Areas: Apply 3-inch average thickness of organic shredded cedar mulch over whole surface of planting area, and finish level with adjacent finish grades. Do not place mulch within 3 inches of trunks or stems.
3. Gravel Type 3- Planting: in Planting Areas: Apply as shown on drawings over whole surface of planting area, and finish level with adjacent finish grades.

## 3.10 EDGING INSTALLATION

A. Steel Edging: Install steel edging where indicated according to manufacturer's written instructions. Anchor with steel stakes spaced approximately 30 inches apart, driven below top elevation of edging.

B. Shovel-Cut Edging: Separate mulched areas from turf areas, curbs, and paving with a 45-degree, 4- to 6-inch- deep, shovel-cut edge.

## 3.11 PLANT MAINTENANCE

A. Maintain plantings by pruning, cultivating, contractor determined-watering (hand watering, gator bags, etc), weeding, fertilizing, mulching, restoring planting saucers, adjusting and repairing tree-stabilization devices, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings. Spray or treat as required to keep trees and shrubs free of insects and disease.

1. Full tree establishment shall be completed before final sign off.

B. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.

C. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated past management practices whenever possible to minimize

the use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.

## 3.12 PESTICIDE APPLICATION

A. Apply pesticides and other chemical products and biological control agents in accordance with authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed. Do not use pesticides within 50-feet of playground areas indicated on plans.

B. Post-Emergent Herbicides (Selective and Non-Selective): Apply only as necessary to treat already-germinated weeds and in accordance with manufacturer's written recommendations. Do not use herbicides within 50-feet of playground areas indicated on plans.

## 3.13 CLEANUP AND PROTECTION

A. During planting, keep adjacent paving and construction clean and work area in an orderly condition.

B. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.

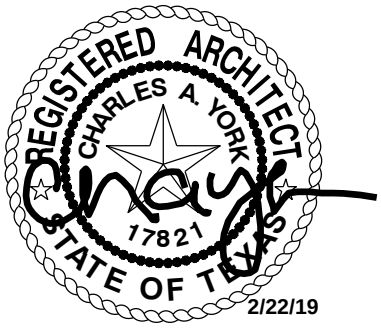
C. After installation and before Substantial Completion remove nursery tags, nursery stakes, tie tape, labels, wire, burlap, and other debris from plant material, planting areas, and Project site.

## 3.14 DISPOSAL

A. Remove surplus soil and waste material including excess subsoil, unsuitable soil, trash, and debris and legally dispose of them off Owner's property.

END OF SECTION 329300

**Division 1 - General Requirements**
010450 Cutting & Patching
013000 Submittals
014000 Quality Requirements
015000 Construction Site
016000 Materials, Equipment, Minimum Standards & Workmanship
**Division 3 - Concrete**
033500 Concrete Sealing
**Division 4 - Masonry**
042000 Masonry
**Division 5 - Metal**
055000 Miscellaneous Metal Fabrications
**Division 6 - Wood & Plastics**
061000 Rough Carpentry
062000 Finish Carpentry
062013 Exterior Finish Carpentry
064100 Casework
**Division 7 - Thermal & Moisture Protection**
071600 Bituminous Dampproofing
072000 Building Insulation
072726 Sheet-Applied Membrane Air Barrier
074100 Metal Roofing
074213 Metal Siding
075423 TPO Roofing
076200 Sheet Metal Flashing, Trim, & Roof Accessories
079200 Sealants
**Division 8 - Doors & Windows**
082010 Interior Doors
082020 Exterior Doors
084000 Aluminum Entrances & Storefront
085000 Windows
087100 Door Hardware
**Division 9 - Finishes**
092900 Gypsum Board Systems
093000 Tiling
095113 Acoustical Panel Ceilings
096513 Resilient Base
099000 Painting & Coatings
099010 Painting of Steel
**Division 10 - Specialties**
102800 Bath & Accessories
104416 Fire Extinguishers
**Division 12 - Furnishings**
123600 Specialty Countertops & Surfacing
**Division 31 - Earthwork**
313116 Termite Control



Section 010450 - Cutting & Patching

Part 1: General

A. Work, including but not limited to:
   1. Cutting, fitting and patching of work as required to:
      a) Make its parts fit together properly
      b) Uncover work to provide for installation of ill-timed work
      c) Remove and replace defective work
      d) Remove and replace work not conforming to Contract Documents
      e) Provide penetrations of non-structural surfaces for installation of piping and electrical conduit
      f) Repair imperfections and discontinuities in elements and surfaces revealed by demolition activities.

B. Quality Assurance
   1. Notify Architect prior to work that affects work of Owner or separate contractor

Part 2: Products

A. Materials
   1. Comply with specifications for each particular product involved. Where areas to be patched are existing, match existing materials.

Part 3: Execution

A. Preparation
   1. Provide temporary support to maintain integrity of affected work.

B. Performance
   1. Execute cutting by methods that will provide proper surfaces to receive installation of repairs.
   2. Fit work tight to pipes, ducts, conduit and penetrations through surface.
   3. For continuous surfaces, refinish to nearest intersection if required.
   4. Execute patch work in such a manner that it is indistinguishable from adjacent unpatched areas of work by the naked eye at a distance of 24 inches well lit.

END OF SECTION 010450

Section 013000 - Submittals

Part 1: General

A. Requirements, including but not limited to:
   1. Construction Schedule
   2. Shop Drawings
   3. Product Data
   4. Samples
   5. Mock-Ups

B. Procedures
   1. Construction Schedule
      a) Separate work into each trade.
      b) Show time of work to nearest week, minimum.
   2. Contractor’s Responsibility:
      a) Review all submittals and, as indication of Contractor’s certification that submittal does not represent a deviation from the contract documents, submit to Architect for review.
      b) On a separate page, itemize each deviation from the contract documents contained in the submittal with key to location in submittal of deviation and a specification reference or drawing reference to the contract document information from which the submittal item deviates.
      c) Contractor shall remove any item not complying with the Contract Documents or expressly indicated in writing as an “acceptable deviation” by the Architect as well as overtopping construction, and install work in conformance with the Contract Documents, all cost of which shall be solely borne by the Contractor.
   3. Architect’s Responsibility: To assist the Contractor with the Contractor’s obligation to comply with the Contract Documents, the Architect will review and take action on submittals required by these specifications. Without regard to the action taken by Architect, all deviations from the Contract Documents not expressly accepted by the Architect with the written statement “acceptable deviation” are rejected.
   4. Shop Drawings, Product Data and Manufacturer’s Literature; General
      a) Submit in PDF format via email or, if directed by Architect, post to Architect’s FTP site and notify Architect of posting via email.
      b) Include fully completed “Shop Drawing Submittal Form” or “Product Data Submittal Form” appended to the end of this project manual for each item for which shop drawings or Product Data are required. Shop drawings and Product Data submitted without the required form will be held pending receipt of form.
      c) After Architect's review, revise and resubmit as indicated.
   5. Product Data & Manufacturers' Literature
      a) Identify applicable products, models, options and other data.
      b) Supplement manufacturer's data to provide information unique to the work.
      c) Include manufacturers' installation instructions when referenced by specifications.
   6. Samples
      a) Submit four samples unless indicated otherwise. Three will be retained. Distribute submittals as follows.
         (1) Two to Architect,
         (2) One to Owner,
         (3) One to third Party in continental US as directed by Architect.

b) Submit full range of manufacturer's available colors, textures and patterns to Architect for selection.
c) Identify each sample.
d) Provide the following sizes, unless indicated otherwise:
(1) Flat or sheet products: minimum 4"x4"
(2) Linear products: minimum 6"

7. Mock-Ups
a) Construct mock-ups on site.
b) Construct in a location where the lighting will match the lighting in the final work.
c) Maintain mock-ups for the duration of the project unless approved by the Architect.
d) Mock-ups may be incorporated in final work unless indicated otherwise.
8. Architects review
a) Contractor shall reimburse the Owner for Architects' time spent reviewing any submittal beyond the first re-submission. Reimbursement shall be at Architects standard hourly rates.

C. Required Submittals
1. As indicated in technical Sections
2. Mock-Ups:
a) Interior gypsum board system, minimum 4'x4', paint top half
b) Stone and/or Masonry veneer

END OF SECTION 013000

Section 014000 – Quality Requirements

PART 1 - General

A. Summary
1. Section includes administrative and procedural requirements for quality assurance and quality control.
2. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
   a) Specific quality-assurance and -control requirements for individual construction activities including production of standard products are specified in the Sections that specify those activities.
   b) Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

B. Definitions
1. Mockups: Full-size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.
2. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.
3. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
4. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.
5. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
6. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
7. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
8. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

C. Informational Submittals
1. Schedule of Tests and Inspections
2. Copies of all testing and inspections reports.

D. Reports and Documents
1. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections.
2. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections.
3. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections.
4. Permits, Licenses, and Certificates: Submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

E. Quality Assurance
1. General: Qualifications establish minimum levels required; individual Specification Sections specify additional requirements.
2. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
3. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
4. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
5. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.
6. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
   a) NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
   b) NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
7. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements.
8. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
   a) Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
   b) Notify Architect seven days in advance of dates and times when mockups will be constructed.
   c) Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed during the construction at Project.
   d) Demonstrate the proposed range of aesthetic effects and workmanship.
   e) Obtain Architect's approval of mockups before starting work, fabrication, or construction.
      (1) Allow seven days for initial review and each re-review of each mockup.

f) Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
g) Demolish and remove mockups when directed unless otherwise indicated.

F. Quality Control
1. Owner Responsibilities: Where indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services and Contractor shall notify Owner of the tests for which the Owner is responsible at the start of the project and will coordinate the scheduling.
   a) Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.
2. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
   a) Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction whether specified or not.
   b) Engage a qualified testing agency to perform these quality-control services.
3. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections.
4. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
5. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
6. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
   a) Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
   b) Determine the location from which test samples will be taken and in which in-situ tests are conducted.
   c) Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
   d) Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
   e) Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
   f) Do not perform any duties of Contractor.
7. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
   a) Access to the Work.
   b) Incidental labor and facilities necessary to facilitate tests and inspections.
   c) Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
   d) Facilities for storage and field curing of test samples.
   e) Delivery of samples to testing agencies.

f) Preliminary design mix proposed for use for material mixes that require control by testing agency.
g) Security and protection for samples and for testing and inspecting equipment at Project site.

8. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
   a) Schedule times for tests, inspections, obtaining samples, and similar activities.

G. Special Tests and Inspection
1. Special Tests and Inspections: Conducted by a qualified testing agency or special inspector as required by authorities having jurisdiction.

Part 2- Products (Not Used)

Part 3 - Execution

A. Repair and Protection
1. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
   a) Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching.
2. Protect construction exposed by or for quality-control service activities.
   a) Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

Section 015000 - Construction Site

Part 1: General

A. General
1. Comply with requirements of owners' deed restrictions, rules of the applicable neighborhood association(s), city laws, policies and ordinances, and requirements of other authorities having jurisdiction.

B. Exterior Provisions
1. Dumping of liquid products on site is not allowed.
2. Burning of construction wastes on site is not permitted.
3. Control the accumulation of waste materials on site.
4. Legally dispose of materials off-site on a weekly basis, unless approved by Owner.
5. Provide emergency address sign, post building permit, and provide other temporary measures required by authorities having jurisdiction.
6. Provide sufficient temporary toilets onsite for workers. Do not allow workers to use installed plumbing fixtures.

C. Interior Provisions
1. Minimize area affected by work.
2. Clean interior areas prior to start of finish work.
3. Maintain interior areas free of dust and other contaminates during finishing work.
4. Protecting Finished Floors:
   a) Mop floors clean before beginning work over finished floors and allow to fully dry.
   b) Install protection board over floors within work zone.
   c) Tape all joints.
   d) Do not allow grit under protection board.
5. Install polyethylene dust barrier between rooms affected by work and the rest of the building.
6. Install polyethylene dust barrier to enclose unconditioned and open-air interior spaces where finish work is occurring.

D. Security
1. Provide temporary, lockable closures for exterior openings to protect materials and prevent entry of unauthorized people
2. Provide temporary, lockable storage unit(s) for materials and equipment and take other protective measures necessary to secure materials and equipment on site. Contractor shall be fully responsible for costs of items lost or stolen

END OF SECTION 015000

Section 016000 – Materials, Equipment, Minimum Standards & Workmanship

Part 1: General

A. Products
1. Products include materials, equipment and systems.
2. Comply with specifications and referenced standards as minimum requirements.
3. Provide new materials unless otherwise indicated.
4. Where accessories and related products are indicated, recommended by manufacturer, or required in connection with a specified assembly, product, or system, provide products recommended by the principal system manufacturer for optimal performance.
5. Where accessory products are recommended by the manufacturer of other products, provide those products whether or not specifically mentioned.

B. Single Source Requirements
1. Provide products of the same kind, from a single source, to the fullest extent possible.
2. Provide related products and accessories from one manufacturer, unless approved by Architect.

C. Transportation and Handling
1. Transport and deliver products to avoid damage. The Architect will reject damaged products.
2. Transport and handle products as recommended by manufacturer, fabricator and supplier.

D. Storage
1. Store and stack products to avoid damage due to adverse effects of weather, moisture, traffic, and construction operations. Remove and replace damaged products.
2. Store products in accordance with manufacturer's recommendations, with seals and labels intact.

E. Conditions
1. Examine substrates, areas, and conditions, with Installer(s) present, for compliance with requirements and other conditions affecting performance as indicated by product manufacturers and established industry publications.
2. Correct unsatisfactory conditions.
3. Proceed with installation / application only after unsatisfactory conditions have been corrected.

F. Product Options
1. Provide Manufacturer’s standard components and parts in standard sizes and finishes unless otherwise indicated or required to meet indicated or regulated performance criteria or aesthetic effects. Where options are available within manufacturer’s standards, obtain Architect’s selection.

G. Dimensions
1. Field verify relevant dimensions prior to fabrication of fabricated items or prior to ordering manufactured products.

H. Workmanship
1. Comply with published industry standards for work of a similar nature unless higher standards and/or more precise workmanship are indicated.
2. Assemble/Install work in accordance with manufacturer’s recommendations unless more stringent instructions are indicated.
3. Perform work with craftsmen that are qualified to produce work of specified standards and hold all required licenses and certifications.

4. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking.
5. Install plumb, level, square and true to line unless otherwise indicated.

I. Codes & Requirements
1. Comply with all codes and requirements of Authorities Having Jurisdiction but not less than the minimum standards established.
2. If no code has been adopted by the Authorities Having Jurisdiction, comply with the most recent version of the International Building Code.

J. Envelope Tightness
1. Contractor shall coordinate and supervise the work of all trades, and provide all work necessary, whether indicated in the contract documents or not, to seal the exterior envelope against air infiltration as required to comply with the 2015 IECC as amended by Williamson County. Measures taken by Contractor to air seal the envelope that are additional to those indicated in the Contract Documents shall not reduce the vapor permeance of the envelope or change the aesthetic intent as solely determined by the Architect.
2. Contractor shall obtain Owner's approval of third-party testing agency and shall include the cost of third-party blower-door testing in the Base Bid proposal amount.
3. Blower door testing shall be as required by Austin Energy Green Building Program or a comparable testing standard acceptable to Architect.
   a) If Blower-door test determines the envelope does not limit air infiltration to indicated maximum, Contractor shall take additional measures to seal the structure, and retest and repeat until the test indicates that the envelope meets the infiltration limits, all costs of which shall be included within the Base Bid proposal.

END OF SECTION 016000

Section 033500 – Concrete Sealing

Part 1: General

A. Work, including but not limited to:
   1. Sealed concrete floors

B. Use of Comparable Product:
   1. Products specifically named shall be considered the basis-of-design, and are intended to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products. Comparable products from other manufacturers not indicated that are demonstrated and approved through the submittal process to be equal or better than the basis-of-design are acceptable. Where multiple manufacturers are indicated, only comparable products from those specific manufacturers shall be considered. Products that are not comparable shall be considered substitutions.

C. Submittals
   1. Product data for all materials.
   2. Manufacturer's installation instructions.

D. Mockup:
   1. 4'x6' in plumbing chase with three 4'x2' zones of different amounts of anti-slip additive for review. Allow actual cure time between coats recommended

Part 2: Products

A. Materials
   1. Base Coat: Kretetek Industries, Ghostshield, Wear-Tek 4400, clear
      a) Matte sheen additive: Ghostshield, Matte Pack
      b) Anti-slip additive: Ghostshield, Aspergrit
   2. Top Coat: Kretetek Industries, Ghostshield, Wear-Tek 4400, clear
      a) Matte sheen additive: Ghostshield, Matte Pack
   3. Water: Distilled

Part 3: Execution

A. Preparation
   1. Prepare substrates in accordance with manufacturer's written instructions.
   2. Prepare surface clean, dry and free of foreign contaminates.
   3. Remove all residues with clean water and then dust, vacuum, or sweep.

B. Application
   1. Install in accordance with manufacturer's written instructions.
   2. Apply base and top coat.
   3. Allow a minimum of 24 hours between coats, but not less than recommended in writing by the product manufacturer.

END OF SECTION 033500

Section 042000 – Masonry

Part 1: General

A. Work, including but not limited to:
1. Concrete Masonry Units (CMU)
2. Stone veneer
3. Cut stone
4. Embedded flashing
5. Modular Masonry Fireplace

B. Delivery, Storage, and Handling
1. Store masonry and cementitious materials on non-staining skids. Cypress, white pine, poplar, or yellow pine without an excessive amount of resin are acceptable. Chemically treated wood, chestnut, walnut, oak, fir, or other woods containing tannin are not acceptable.
   a) Store under cover and in dry location
   b) Protect edges of materials with wood
2. Store aggregates to avoid contamination.
3. Store masonry accessories to prevent corrosion and accumulation of dirt and oil.

C. Quality Assurance
1. Cover tops of partially completed masonry work and sills with waterproof sheeting at end of day's work and when construction is not in progress.
   a) Extend sheeting a minimum of 24 inches down both sides and hold cover securely in place.
2. Spread straw or other suitable covering on ground and up base of wall to prevent rain splashed mud and mortar from soiling wall.
3. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt on exposed face of masonry.
4. Cold weather construction
   a) Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen sub-grade or setting beds. Remove and replace unit masonry damaged by frost or freezing conditions.
5. Hot weather construction
   a) Provide artificial shade & wind breaks and use cooled materials when temperature and humidity conditions produce excessive evaporation of water from mortar and grout.
   b) Maximum temperature for mortar application - 100 degrees F.

D. Use of Comparable Product:
1. Products specifically named shall be considered the basis-of-design, and are intended to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products. Comparable products from other manufacturers not indicated that are demonstrated and approved through the submittal process to be equal or better than the basis-of-design are acceptable. Where multiple manufacturers are indicated, only comparable products from those specific manufacturers shall be considered. Products that are not comparable shall be considered substitutions.

E. Submittals
1. Stone samples for verification
2. Cut stone samples for color selection

3. Up to 4 mortar samples for custom aggregate color mixture

F. Mockup
1. 4'x4' mockup to be incorporated into final work

Part 2: Products

A. Materials
1. Stone veneer: Match shape, size, color, pattern, blend, and design of stone specified and approved for site “Thematic Wall”. Thickness to be 4” to 5”.
2. Cut stone: Single color to be selected from all stones included in stone veneer blend.
3. Non load bearing CMU, hollow block, ASTM C90, grade N, normal weight concrete, type I moisture controlled
4. Mortar materials:
   a) Masonry cement is not allowed.
   b) Cement: portland cement, ASTM C 150, Type I, white or grey as required to produce mortar of color to match Architect’s sample.
   c) Lime: hydrated lime, ASTM C 207, Type S.
   d) Sand: ASTM C144 and as indicated below, natural colored sand, granite, or other sound stone to achieve color to match Architect’s sample.
      (1) Setting Mortar: Graded with 100 percent passing the No. 8 sieve and 100 percent passing the No. 16 sieve
      (2) Pointing Mortar: graded with 100 percent passing the No. 16 sieve
   e) Water: clean, non-alkaline, potable
5. Admixtures:
   a) Do not use admixtures, calcium chloride, accelerators, retarders, water-repellant agents, antifreeze compounds unless otherwise indicated.
6. Masonry Accessories:
   a) Trowel applied flashing: Sonoshield HLM 5000T
   b) Exterior masonry anchors at wood stud walls: hot dip galvanized after fabrication in accordance with ASTM A 153/A 153M, Class B-2, screw attached, 2-piece, allowing movement parallel to wall and resisting movement perpendicular to wall, extending into masonry veneer 2-1/2"
      (1) Anchor section: Heckmann #315-D screw-on anchor plate, 12 gauge X 1-1/4 inches wide X 6 inches long
      (2) Tie section: Heckmann #314 tie clip, 3/16 inch diameter X 2 inches wide X 8 inches long
   c) Exterior masonry anchors at CMU backup walls: hot dip galvanized after fabrication in accordance with ASTM A 153/A 153M, Class B-2, screw attached, 2-piece, allowing movement parallel to wall and resisting movement perpendicular to wall, extending into masonry veneer 2”
      (1) Anchor section: Heckman #315-D screw-on anchor plate, 12 gauge X 1-1/4 inches wide X 6 inches long
      (2) Tie section: Heckman #316 triangular wire tie, 3/16 inch diameter X 4 inches long
   d) Special anchors: Stainless steel, as indicated in Drawings
      (1) Dowels: stainless steel
      (2) Plate Dowels: equal to Krando DA-47, stainless steel
   e) Anchor Fasteners: stainless steel screw with hex washer head and neoprene washer
   f) Weep Holes: 3/8" cotton rope – 24” long
   g) Cavity Drainage Material: Mortar Net, stack three 2 inch thick units to fill full depth of cavity X 10" high.

h) Setting Buttons: lead or plastic, non-staining, sized to suit joint thickness, use as required
i) Embedded Flashing:
(1) Concealed: Grace "Perm-a-barrier", self-adhering, 18" minimum width but not less than indicated or required.

7. Masonry cleaners: job mixed detergent solution of 1/2-cup dry measure tetra sodium polyphosphate (Spic & Span) and 1/2-cup dry measure laundry detergent dissolved in 1 gallon of water

B. Mortar and Grout Mixes
1. Stone Veneer Mortar: ASTM C270 property specification, type N. Proportion colored aggregates, colored cement and/or pigment to produce required mortar color
2. CMU mortar: ASTM C270 property specification, type N.
3. Grout: ASTM C476

C. Modular Masonry Fireplace
1. Fireplace: Lightweight precast concrete manufactured fireplace designed for outdoor use, and for field assembly with all interlocking parts necessary for a complete UL listed system, including firebox and compatible chimney.
a) Firebox: Mason-Lite Firebox, MFP63
(1) Concrete: Lightweight concrete with heat-treated aggregate and Portland cement, 2,550 psi compressive strength
(2) Firebox dimensions: 60 inch wide X 30-1/2 tall finished opening
b) Liner: Mason-Lite, MFP63-SHBL
(1) Brick: 1-1/8 inch high temperature refractory
(2) Pattern: Herringbone pattern walls and running bond pattern floor
c) Mortar: Mason-Lite Mortar, premixed
(1) Strength: 2,740 psi compressive and 875 psi tensile, tested per ASTM C109, ASTM C307, and ANSI 118.4
d) Rebar: Mason-Lite, as recommended by manufacturer for installation
2. Chimney: Double-walled stainless steel chimney designed for outdoor use, and for field assembly with all interlocking parts necessary for a complete UL listed system, including compatible firebox and chimney.
a) Chimney Pipe Anchor Plate: Duratech, Anchor Plate, 16 inch.
b) Chimney Pipe: Duratech, 16 inch diameter, stainless steel, length as indicated on Drawings.
c) Chimney Cap: Duratech, Economy chimney cap with spark arrestor screen, 16 inch, stainless steel.
d) Storm Collar: Duratech, Storm Collar, 16 inch.
e) Wall Straps: Duratech, Wall Straps, 16 inch.

Part 3: Execution

A. Fireplace and Chimney: Install in accordance with manufacturer’s written instructions to provide a complete UL listed firebox and chimney system.

B. Tolerances
1. Variation from Plumb: For vertical lines and surfaces of columns and walls, do not exceed 1/4" in 10', or 1/2" maximum. For external corners, expansion joints, control joints, and other conspicuous lines, do not exceed 1/4" in 20', or 1/2" maximum. For vertical alignment of head joints, do not exceed 1/4" in 10', or 1/2" maximum.

2. Variation from level: For bed joints and lines of exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines, do not exceed 1/4" in 20', or 1/2" maximum. For top surface of bearing walls, do not exceed 1/8" in 10', or 1/16" within width of a single unit.
3. Variation of Linear Building Line: For walls, do not exceed 1/2" in 20', or 3/4" maximum.
4. Variation in Cross-Sectional Dimensions: For columns and wall thicknesses, do not exceed minus 1/4" or plus 1/2".
5. Variation in Mortar-Joint Thickness: Do not vary joint thickness by more than 1/8".

C. Preparation
1. General: Lay out chases and openings to accommodate contiguous work
2. Lay out walls, movement joints, returns and offsets as indicated.

D. Setting Masonry
1. Stopping and Resuming Work: In each course, rack back 1/2-unit length for one-half running bond; DO NOT TOOTH. Clean exposed surfaces of set masonry and remove loose masonry units and mortar prior to laying fresh masonry.
2. Joint width
   a) CMU: 3/8”
   b) Stone veneer: As approved for site “Thematic Wall”
3. CMU joint tooling: concave, except strike joints flush at masonry walls to receive plaster, tile or other applied finishes.
4. Veneer joint tooling: As approved for site “Thematic Wall”.
5. Field Cutting Stone:
   a) For cut stone, cast stone and brick masonry, field cut units where needed with motor- driven saws to provide clean, sharp, unchipped edges.
      (1) Allow units cut with water cooled saws to air dry before placing.
      (2) Install cut units with field cut surfaces concealed.
   b) For irregular stone veneer, field chip edges where needed to match appearance of stone image specified.
6. Butter ends with mortar to completely fill bed and head joints. Do not furrow bed joints or slush head joints.
7. Install reinforcing and grout as indicated.
8. Do not allow mortar to obstruct cavity air space.
   a) Slope beds toward cavity to minimize mortar protrusions into cavity walls.
   b) Trowel mortar fins protruding into wall cavity flat against cavity face of stone.
   c) Place wood strips in wall cavity and remove periodically to clear wall cavity of mortar droppings.
9. Place cavity drainage material at the base of wall cavities and other weeped locations.
10. Install lintels at head of all openings unless a true arch is shown
11. Set masonry in full bed of mortar with vertical joints slushed full, unless indicated otherwise.
12. Where ‘Dry Stack’ masonry is indicated, deeply rake joints to produce dry-stack appearance. Retain a minimum of 2” mortar thickness in dry stack veneers, but average not less than 1” less than stone veneer thickness.
13. Tool joints to create densely packed mortar face of profile indicated or, if not indicated, as selected by Architect.
14. Thoroughly clean masonry for interior walls prior to installation.

E. Masonry Anchors
1. General

a) Position anchors to allow maximum vertical movement.
b) Install anchors not more than 16" O.C. vertically and 16" O.C. horizontally with not less than 1 anchor per 2 SF of wall area unless indicated otherwise. Install anchors within 12" of openings and at 8" maximum intervals around perimeter.

2. Wood frame: Fasten each anchor through sheathing to wood studs. Coordinate with carpenter to install blocking or extra studs where anchorage is required.

F. Flashing & Weep holes
1. Install trowel applied flashing.
2. Install embedded flashing and weep holes in masonry at sills, shelf angles, lintels, ledges, horizontal blocking and other obstructions to the downward flow of water in the wall, and where indicated. Fabricate all flashings w/ end dams.
3. Prepare masonry surfaces so they are free from sharp projections that could puncture flashing.
4. Place through-wall flashing on sloping bed of mortar and cover with mortar.
5. Extend through-wall flashing from exterior face of veneer, through the veneer, up face of sheathing, and behind weather barrier a minimum of 8".
6. Extend sill and lintel flashing a minimum of 4" into masonry at each side of opening and turn up at least 2" to form end dam.
7. Seal penetrations in flashing with adhesive or sealant.
8. Space weep holes 16" O.C.
9. Weeps to remain in wall, cut off flush with face of masonry. Leave a minimum of 18 inches of rope weep extending into cavity parallel to veneer to absorb cavity moisture and wick it out.

G. Pointing, Repairing and Cleaning
1. Point open joints with pointing mortar (enlarge voids and holes, except weep holes, and fill with mortar).
2. Replace loose, chipped, broken, stained, and damaged masonry. Install in fresh mortar or grout, pointed to eliminate evidence of replacement.
3. Immediately remove grout, mortar and soil from exposed face of masonry, window frames, door frames, and products with painted or integral finishes by dry brushing to prevent staining during construction.
4. Final Cleaning: Clean masonry after mortar has cured.
a) Do not clean unless temperature is above 40 degrees F and will remain so for 7 days.
b) Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
c) Protect adjacent surfaces during cleaning.
d) Hand scrub masonry with a fiber bristle brush and mild soap or detergent solution. Do not use sandblasting, wire brushes, or acid without written approval of Architect.

END OF SECTION 042000

Section 055000 - Miscellaneous Metal Fabrications

Part 1: General

A. Work, including but not limited to:
1. Steel ridge cap
2. Steel gutter, gutter support and rain chain
3. Steel collector box
4. Chimney cap
5. Fireplace doors and mounting fabrications.
6. Other metal fabrications not specified elsewhere

B. Submittals
1. Shop drawings with details, plans, and sections

Part 2: Products

A. Metals: Furnish all miscellaneous steel sections, clips, bolts, straps, masonry or concrete insert, lintels, and other devices required to accomplish the work

B. Welding Rods and Electrodes: Select in accordance with AWS specifications for the steel alloy to be welded

C. Fasteners and anchors: Corrosion resistant

D. Rain chain: As indicated in Drawings

E. Chimney Cap:
1. Spark Arrestor Screen: McNichols, expanded metal, carbon steel, cold rolled, mill finish, 1/2 inch #20 flattened, 0.500 inch short way of design, 1.250 inch long way of design, long way of opening mounted vertically, 71% open area, 0.031 inch overall thickness.

F. Fireplace doors:
1. Perforated steel plate: Perforated steel plate, G90 galvanized, mill finish, 16 gauge (0.0635 inch thick), 1/8 inch round perforations on 3/16 inch staggered centers, 32.6 holes per square inch, 40% open area.
2. Door track: Crown Industrial, #4 Track, G90 galvanized.
3. Door track brackets: Crown Industrial, Overhead Center Bracket for #4 Track, galvanized.
4. Track trolleys: Crown Industrial, Two Wheel Trolley for #4 Track, clear zinc, field cut to length, weld to door.
5. End blinds: Crown Industrial, End Blind for #4 Track, galvanized.
6. Concealed track stops: Crown Industrial, #4.00STR Concealed Track Stop.

Part 3: Execution

A. General Fabrication
1. Grind exposed welds smooth and flush with adjacent surfaces. Form to exclude water and prevent puddling where exposed to weather.
2. Prior to the application of galvanized, painted or plated finish:
a) Remove rust, scale, grease and oil by wire brushing and chemical cleaning.
b) Dress with Emory cloth.

3. Form steel to accurate sizes and shapes, with sharp lines and angles. Punch and/or shear perpendicular to metal and to leave clean surfaces.
4. Supply components required for proper anchorage of metal fabrications; fabricate anchorage and related components of same material and finish as metal fabrication, unless otherwise indicated.
5. Verify Dimensions on site prior to preparation of shop drawings and fabrication.

B. Finishing
1. All exposed, semi-exposed, and concealed miscellaneous steel: High Performance Coating, unless indicated otherwise.
2. Fireplace doors and mounting fabrications: Hot dipped galvanized.

C. Installation
1. Install items accurately fitted and free from distortion or defects.
2. Do not allow contact between dissimilar metals that are subject to galvanic action.
3. After installation, touch up field welds and scratched and damaged surfaces; use primer consistent with shop coat or recommended for galvanized surfaces, as applicable.

END OF SECTION 055000

Section 061000 - Rough Carpentry

Part 1: Generals

A. Work, including but not limited to:
1. Framing
2. Decking
3. Exterior Sheathing
4. Flexible Flashing
5. Insect Screening

B. Related Documents
1. Refer to Structural drawings for primary specifications of structural wood framing and components. Notify Architect of discrepancies with Structural and obtain clarification. If clarification cannot be obtained prior to bid deadline, include most expensive option in the base bid.

C. Use of Comparable Product:
1. Products specifically named shall be considered the basis-of-design, and are intended to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products. Comparable products from other manufacturers not indicated that are demonstrated and approved through the submittal process to be equal or better than the basis-of-design are acceptable. Where multiple manufacturers are indicated, only comparable products from those specific manufacturers shall be considered. Products that are not comparable shall be considered substitutions.

Part 2: Products

A. Framing: Refer to Structural drawings

B. Decking: Refer to Structural drawings

C. Exterior Sheathing: Huber Engineered Woods LLC, ZIP System Roof and Wall Sheathing
1. Thickness: Refer to Structural drawings
2. Factory laminated integral water-resistive barrier facer
3. Perm rating of integral water-resistive barrier: 12-16 perms
4. Exposure time: Designed to resist weather exposure for 180 days
5. Self-Adhering Seam and Flashing Tape: Huber Engineered Woods LLC, ZIP System Seam and Flashing Tape, .012 inch thick, 3.75 inches wide
6. Sealants, Tapes, Flashings: Provide accessories as recommended in writing by manufacturer of exterior sheathing

D. Flexible Flashing: Grace "Perm-a-barrier”, self-adhering, 12" minimum width not less than indicated or required.

Part 3: Execution

A. General
1. Coordinate with other subcontractors and provide blocking for attachment of wall, and ceiling mounted elements.
2. Coordinate with mechanical and electrical subcontractors for size and location of mechanical and electrical openings.

3. Fire stop and draftstopping: Install fire stop and draftstopping as required by codes and authorities having jurisdiction.
4. Energy Efficiency
   a) This project is intended to achieve a high performing energy conserving exterior envelope. In conditioned spaces, do not install permanent wood members in exterior walls and roof framing that are not essential to structural integrity or required by code.
   b) Layout wall studs in relation to wall openings to minimize the number of wall studs required.

B. Blocking
1. Install concealed 2x wood blocking to support all finish carpentry, casework, bathroom accessories, grab bars, curtain rods, and curtain tracks.

C. Exterior Sheathing: Install in accordance with manufacturer's written recommendations, including "Zip System Sheathing Installation Manual".
1. Install as necessary to maintain a continuous air barrier assembly achieving the manufacturer's published infiltration rates. Tie into roofing, doors and windows, other air barriers, and foundations as necessary.

D. Self-adhering Flexible Flashing: As indicated in Drawings

END OF SECTION 061000

Section 062000 - Finish Carpentry

Part 1: General

A. Work, including but not limited to:
1. Standing and Running Trim
2. Board Paneling
3. Miscellaneous Wood Trim

B. Coordination
1. Coordinate with wood framing and carpentry for provision of all necessary in-wall blocking and necessary bracing and support.

C. Quality Standards
1. Comply with Architectural Woodwork Institute Quality Standards.

D. Materials Handling
1. Do not deliver materials under this division until all drywall has been installed and primed. Do not install until space is adequately conditioned to remove excess moisture from air.

Part 2: Products

A. Standing and Running Trim
1. Species for Paint: Finger jointed poplar or equivalent closed grain hardwood.

B. Board Paneling:
1. Species for Paint: Lodgepole pine or equivalent paint grade, WWPA grade D Select
2. Size: 1 X 6 nominal, minimum 12 foot lengths, V-groove
3. Surface: Smooth
4. Moisture Content: Maximum 15% with at least 85% of shipment at 12% or less.

C. Miscellaneous Trim
1. Species for Paint: Poplar or equivalent closed grain hardwood or edge banded MDF.
2. Size: As indicated

D. Accessories
1. Wood filler: compatible with wood, finish and rated for exposure. For transparent and semi-transparent finishes select color to blend with wood after final finish.

Part 3: Execution

A. Installation
1. Install work with no distortions; shim as required, using concealed shims.
2. Running trim: Use longest pieces practicable and arrange to minimize joints. Where necessary, center joints over vertical trim, or walls, or openings.
3. Scribe and cut for accurate fit to other finished work.
4. Secure work to blocking with countersunk, concealed fasteners and blind nailing where practicable.
5. Obtain Architects approval for use of exposed fastening devices or nails.

B. Board Paneling
1. Stagger end joints in random pattern to uniformly distribute joints on each wall.

2. Install with uniform tight joints between boards.
3. Fasten paneling by blind nailing through tongues.

C. Preparation for Finishing
1. Sand work smooth and set exposed nails and screws.
2. Apply wood filler in exposed nail and screw indentations and leave smooth, ready to receive site applied finishes.

END OF SECTION 062000

Section 062013 - Exterior Finish Carpentry

Part 1: General

A. Work, including but not limited to:
   1. Exterior trim
   2. Exterior siding

B. Related Work Specified Elsewhere
   1. Division 07 Section “Sheet Metal Flashing, Trim & Roof Accessories” for metal wall trim installed in association with siding

C. Use of Comparable Product:
   1. Products specifically named shall be considered the basis-of-design, and are intended to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products. Comparable products from other manufacturers not indicated that are demonstrated and approved through the submittal process to be equal or better than the basis-of-design are acceptable. Where multiple manufacturers are indicated, only comparable products from those specific manufacturers shall be considered. Products that are not comparable shall be considered substitutions.

D. Mockup
   1. One full-size unit mockup to be incorporated into final work

Part 2: Products

A. Trim
   1. Wood Trim for Opaque Finish:
      a) Yellow Pine, D grade and better heart
      b) Douglas Fir, D grade and better
      c) Western Red Cedar, A grade and better clear
      d) Construction Heart Redwood

B. Board and Batten Siding
   1. Fiber cement siding: James Hardie, HardiePanel or equal, 5/16” smooth, factory primed; length as required.
   2. Wood Trim Battens: size as detailed.
      a) Yellow Pine, D grade and better heart
      b) Douglas Fir, D grade and better
      c) Western Red Cedar, A grade and better clear
      d) Construction Heart Redwood

C. Accessories
   1. Nails: Stainless Steel.

Part 3: Execution

A. Exterior Trim
   1. Use longest pieces practicable and arrange to minimize joints. Set adjacent pieces flush.
   2. Secure all trim in place with fasteners selected to minimize visibility but sufficient to maintain trim securely in place permanently.

B. Exterior Siding and Soffits
   1. If not factory primed, prime and back prime exterior finish wood for painted finish exposed on exterior.
   2. Take special care to course siding as indicated to avoid the need to notch boards around openings.

END OF SECTION 062013

Section 064100 - Casework

Part 1: General

A. Work, including but not limited to:
   1. Casework

B. Related Work Specified Elsewhere
   1. Division 12 Section “Specialty Countertops and Surfaces”

C. Quality Standards
   1. Comply with Architectural Woodwork Institute (AWI) Quality Standards.
      a) Where requirements of this specification exceed referenced standard, comply with this specification.

D. Materials Handling
   1. Do not deliver materials under this division until all drywall has been installed and primed. Do not install until space is adequately conditioned to remove excess moisture from air.

E. Use of Comparable Product:
   1. Products specifically named shall be considered the basis-of-design, and are intended to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products. Comparable products from other manufacturers not indicated that are demonstrated and approved through the submittal process to be equal or better than the basis-of-design are acceptable. Where multiple manufacturers are indicated, only comparable products from those specific manufacturers shall be considered. Products that are not comparable shall be considered substitutions.

F. Submittals
   1. Shop drawings including plans, elevations, sections, and details of fabrications.
   2. Samples showing transparent finishes, and countertops.

Part 2: Products

A. AWI Quality Standard:
      a) Painted Casework: Custom grade, unless indicated otherwise

B. Materials
   1. Wood Moisture Content: Comply with requirements of AWI Premium quality standard for wood moisture content in relation to ambient relative humidity during fabrication and in installation areas.
   2. Hardwood lumber species:
      a) Painted casework: birch, maple, poplar, or other closed grained hardwood unless indicated otherwise.
   3. Hardwood plywood:
      a) Transparent finished casework
         (1) Veneer species: match hardwood lumber
         (2) Veneer cut: quarter sawn
         (3) Veneer matching between adjacent leaves: running match
         (4) Veneer matching within a panel face: Slip match

(5) Vertical matching: Architectural end match
(6) Grain Direction: vertical, unless indicated otherwise.
b) Painted casework: birch or maple unless indicated otherwise
4. Softwood lumber: SPF, Hem-Fir or SYP.
5. Softwood plywood: white pine or spruce unless indicated otherwise.
6. Fiberboard: medium density
a) Veneer to match hardwood plywood at transparent finished cabinets.
b) Use standard MDF for painted casework.
c) Use Extra at kitchens, baths and other wet areas.
7. Thermoset decorative panels: fiberboard finished with thermally fused, melamine-impregnated decorative paper.
a) Color: white
8. Cabinet hardware: comply with BHMA 156.9
a) Pulls: allow $8.00 each
b) Frameless concealed hinges: grade 2, steel, nickel-plated finish, 120 degree opening angle, adjustable
c) Drawer slides: grade 1 HD-200, side mounted, full-extension, ball bearing, steel, clear zinc finish
d) Other hardware: grade 1 or 2

C. Fabrication
1. Casework: General
a) Verify all dimensions and build to fit conditions as they occur. Scribe to fit all adjacent conditions unless otherwise indicated. All exposed casework to receive stain or paint as indicated herein or on Drawings.
b) Shop fabricate items where possible.
c) Nails: If approved in advance use size and type to suit application. Obtain Architects approval for use of exposed fastening devices or nails.
d) Shop assemble casework and finish carpentry items for delivery to site in sizes easily handled and to ensure passage through building openings.
2. Casework
a) Cabinet Construction: frameless, full flush overlay.
b) Flat Slab cabinet doors: flat slab, 3/4" fiberboard w/ hardwood edge band.
c) Interior cabinet sides of open shelf units, exterior cabinet sides always open to view: 3/4" hardwood plywood w/ hardwood edge band
d) Semi-exposed surfaces, except drawer subfronts and bodies: thermoset decorative panel
(1) Leading panel edges at gaps between drawer fronts and cabinet doors: hardwood edge band
e) Drawer fronts: flat slab, 3/4" fiberboard w/ hardwood edge band
f) Drawer bodies: 3/8” Baltic Birch plywood with 1/4" Baltic Birch bottoms, clear finished
g) Cabinet Shelves:
(1) Wood shelves: Fixed and adjustable shelves, 3/4" hardwood plywood w/ hardwood edge band, unless otherwise indicated.
(2) Provide two adjustable shelves at each upper cabinet and one adjustable at each base cabinet

Part 3: Execution

A. Installation
1. Scribe counter splash to wall. No caps or exposed filler will be accepted
2. Secure to studs and blocking with wood screws.
3. Conceal fasteners at exposed surfaces.

4. Modify cabinets as required to accommodate electrical and other items indicated.
5. All operable hardware shall be adjusted as required for smooth and easy operation.

End of Section 064100

Section 071600 – Bituminous Dampproofing

Part 1: General

A. Work, including but not limited to:
1. Bituminous Dampproofing applied to CMU back-up wall.

B. Use of Comparable Product:
1. Products specifically named shall be considered the basis-of-design, and are intended to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products. Comparable products from other manufacturers not indicated that are demonstrated and approved through the submittal process to be equal or better than the basis-of-design are acceptable. Where multiple manufacturers are indicated, only comparable products from those specific manufacturers shall be considered. Products that are not comparable shall be considered substitutions.

C. Submittals
1. Product Data: For each type of product indicated

Part 2: Products

A. Dampproofing Materials: Sonneborn or approved equals
1. Asphalt Primer
2. Asphalt Emulsion: semi-fibrated, semi-mastic, ASTM D 1227 Type II (non-asbestos) for below-grade exterior and above-grade interior applications to either damp or dry substrates
3. Glass Fiber Mat: 1.0 to 1.5 lbs per 100 SF, 36" wide, rolled, non-woven fabric of continuous filament or jackstraw filament/yarn, impregnated and bound together with compatible binder
4. Bituminous Grout: ASTM D 147
5. Plastic Cement: asphalt base ASTM D491, except provide coal-tar base where recommended by manufacturer

Part 3: Execution

A. Substrate Preparation
1. Mechanically remove projections from substrate with wire brush, or by scraping and chipping.
2. Remove oil, dirt, debris and detrimental substances from substrate.
3. Fill voids, and cracks with plastic cement.
4. Prime substrate.
5. Mask and protect adjoining work to prevent spillage and migration onto visible surfaces.

B. Installation
1. Brush or trowel apply asphalt emulsion to damp proofed surfaces at a rate of 5 gallons per 100 SF to produce a uniform, dry film thickness of not less than 30 mils.
2. At joints between sheathing and joints between other materials, including flashing, apply two coats of asphalt emulsion in 6" wide strips with glass fiber mat embedded between them.
3. Apply additional coats as required to completely fill all gaps, openings, and pin holes in substrate and mesh.
4. Coat and seal all masonry ties and wall penetrations (conduit, plumbing, etc.).
5. Extend asphalt emulsion 6" onto intersecting walls and flashing, but not onto visible surfaces.

END OF SECTION 071600

Section 072000 - Building Insulation

Part 1: General

A. Summary
1. Section Includes:
a) Spray polyurethane foam insulation and thermal barrier.
b) Rigid mineral wool board.
c) Sound attenuation batts.

B. Use of Comparable Product:
1. Products specifically named shall be considered the basis-of-design, and are intended to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products. Comparable products from other manufacturers not indicated that are demonstrated and approved through the submittal process to be equal or better than the basis-of-design are acceptable. Where multiple manufacturers are indicated, only comparable products from those specific manufacturers shall be considered. Products that are not comparable shall be considered substitutions.

C. Submittals
1. Product Data: For each type of product indicated.

Part 2: Products

A. Spray Polyurethane Foam Insulation
1. Open-Cell Polyurethane Foam Insulation: Demilec APX 1.2 spray-applied polyurethane foam using water as a blowing agent.
a) Thermal resistance: R-3.7 per inch
b) Flame-spread index: 15 maximum
c) Smoke-developed index of 350.
d) Provide product with code approval of installation in thicknesses, locations, and conditions of this project. Provide all supplemental coatings and construction required for product to comply with code requirements and requirements of authorities having jurisdiction.

B. Rigid Mineral Wool Board
1. Rigid Mineral Wool Board: Rockwool Comfortboard 80
a) Thermal resistance: R-4.0 per inch
b) Thickness: As indicated on drawings.
c) Density: 8 lbs/cf
d) Flame Spread Index: 0
e) Smoke Developed Index: 0

C. Sound Attenuation
1. Sound attenuation batts: Thickness as required for each situation. Supply product specifically designed to reduce sound transmission. Thermal batts are not acceptable even though manufacturer’s product material may indicate that they may be used for sound absorption.

Part 3: Execution

A. Preparation
1. Clean substrates of substances that are harmful to insulation or that interfere with insulation attachment.

B. Installation, General
1. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
2. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
3. Provide sizes to fit applications indicated. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

C. Installation of Insulation In Framed Construction
1. Apply insulation units to substrates by method indicated. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
2. Spray-Applied Insulation: Apply spray-applied insulation. Do not apply insulation until installation of pipes, ducts, conduits, wiring, and electrical outlets in walls is completed and windows, electrical boxes, and other items not indicated to receive insulation are masked. After insulation is applied, make flush with face of studs by using method recommended by insulation manufacturer.
   a) Where spray applied polyurethane foam insulation not otherwise protected by minimum ½" gypsum board and where otherwise required by code or recommended by manufacturer, install supplemental coatings and construction required for product to comply with code requirements and requirements of authorities having jurisdiction.
3. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
   a) Loose-Fill Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft..
   b) Spray Polyurethane Insulation: Apply in locations not covered by a thermal barrier acceptable to authorities having jurisdiction or approved by code, apply manufacturer's recommended and tested liquid thermal barrier.
   c) Unfaced glass fiber blanket insulation, of thickness required to fill void.

D. Installation of Insulation in Ceiling for Sound Attenuation
1. Where glass-fiber blankets are indicated for sound attenuation above ceilings, install blanket insulation over entire ceiling area in thicknesses indicated. Extend insulation 48 inches up either side of partitions.

E. Insulation Schedule
1. Roof rafters, exterior walls, and interior walls separating unconditioned & conditioned spaces: Spray-Applied Open-Cell Polyurethane Foam Insulation.
2. Interior walls and ceilings of toilet rooms and mechanical closets to separate from other occupied spaces and where indicated: Sound attenuation batts.

END OF SECTION 072000

Section 072726 – Sheet-Applied Membrane Air Barrier

Part 1: General

A. Work, including but not limited to:
   1. Sheet-Applied Membrane Air Barriers

B. Use of Comparable Product
   1. Products specifically named shall be considered the basis-of-design, and are intended to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products. Comparable products from other manufacturers not indicated that are demonstrated and approved through the submittal process to be equal or better than the basis-of-design are acceptable. Where multiple manufacturers are indicated, only comparable products from those specific manufacturers shall be considered. Products that are not comparable shall be considered substitutions.

C. Submittals
   1. Product Data: For each type pf product indicated.
   2. Sample: For sheet-applied membrane and self-adhered transition membrane
   3. Installation Details
   4. Manufacturer’s Installation Instructions

D. Performance
   1. System shall provide a continuous air barrier to control air leakage into, or out of the conditioned space. All penetrations and air pathways shall be sealed and made airtight.

Part 2: Products

A. Sheet-Applied Air Barrier Membrane: Grace “Perm-a-barrier NPS”, self-adhering membrane.

B. Transition Membrane: Grace “Perm-a-barrier Detail Membrane”, self-adhering membrane, 12” wide minimum

C. Accessories: Primers, liquid membrane for details and substrate patching, and sealant for details

Part 3: Execution

A. Surface Preparation
   1. Refer to manufacturer’s literature for requirements for preparation of substrates. Surfaces shall be sound and free of voids, spalled areas, loose aggregate and sharp protrusions. Remove contaminants such as grease, oil and wax from exposed surfaces. Remove dust, dirt, loose stone and debris. Use repair materials and methods that are acceptable to manufacturer of the sheet-applied air barrier assembly.
   2. Masonry Substrates: Apply air and vapor barrier over concrete block and brick with smooth trowel-cut mortar joints, struck full and flush. Fill all voids and holes, particularly in the mortar joints, with a lean mortar mix, non-shrinking grout or parge coat.
   3. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate patching membrane.
   4. Treat construction joints and install flashing as recommended by manufacturer.
   5. Clean, prepare, treat, and seal substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for air barrier application.

6. At changes in substrate plane, apply Bituthene Liquid Membrane at sharp corners and edges to form a smooth transition from one plane to another.

B. Air Barrier Membrane Installation
1. Apply air barrier membrane within manufacturer's recommended application temperature ranges.
2. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air barrier components.

C. Transition Membrane Installation
1. Install strips, transition membrane, and auxiliary materials according to air barrier manufacturer's written instructions to form a seal with adjacent construction and maintain a continuous air barrier.
2. Apply primer to substrates to receive transition membrane at required rate and allow to dry. Limit priming to areas that will be covered by transition tape in same day. Re-prime areas exposed for more than 24 hours.
3. At end of each working day, seal top edge of strips and transition membrane to substrate with termination sealant.

D. Cleaning and Protection
1. Protect air barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.
2. Protect air barrier from exposure to UV light and harmful weather exposure as required by manufacturer. Remove and replace main air barrier material exposed for more than 12 months.
3. Clean spills, stains, and soiling from construction that would be exposed in the completed work using cleaning agents and procedures recommended by manufacturer of affected construction.
4. Remove masking materials after installation.

END OF SECTION 07272

Section 074100 - Metal Roofing

Part 1: General

A. Work, including but not limited to:
   1. Corrugated panel metal roofing system

B. Delivery, Storage, and Handling
   1. Store in a dry area. Do not allow panels to get wet before installation - this will cause corrosion.

C. Quality Assurance
   1. Installer's Qualifications
      a) Use adequate number of skilled workmen who are trained in the necessary crafts.
      b) Installer must have a minimum of 6 years successful experience installing roofing of this type.
   2. Comply with SMACNA's "Architectural Sheet Metal Manual" for steel and aluminum metal roofing and siding unless more stringent requirements are indicated.

D. Warranty
   1. Installer to warrant installation of roof system for 2 years against leaks and defects in materials and workmanship.

E. Use of Comparable Product:
   1. Products specifically named shall be considered the basis-of-design, and are intended to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products. Comparable products from other manufacturers not indicated that are demonstrated and approved through the submittal process to be equal or better than the basis-of-design are acceptable. Where multiple manufacturers are indicated, only comparable products from those specific manufacturers shall be considered. Products that are not comparable shall be considered substitutions.

F. Submittals:
   1. Product Data
   2. Samples for color verification
   3. Installation Details
   4. Manufacturer’s Installation Instructions

G. Performance
   1. System shall accommodate movement of components due to thermal expansion to permanently prevent buckling, leaking, and other damage or deterioration of work.
   2. System shall be installed to be and remain watertight.

H. Related Work Specified Elsewhere
   1. Division 07 Section “Sheet Metal Flashing, Trim and Roofing Accessories”

Part 2: Products

A. Prefinished Steel:
   1. Prefinished Sheet Material: aluminum-zinc allow coated, AZ-50 Galvalume steel sheet.
      a) Exposed finish: Kynar 500/ Hylar 5000 Fluorocarbon coating
      b) Concealed finish: manufacturer’s standard primer coating and wash.

B. Metal Roofing
1. Sheet material: 22-gauge pre-finished sheet.
2. Panels: Berridge Manufacturing Company, S-Deck**,** nominal 32” coverage, exposed fastener, single panels from ridge to eave.
   a) Color: Lead-cote
3. Underlayment: ASTM D226, Type 1, asphalt saturated, non-perforated, 30#
4. Self-adhering underlayment: Grace Ice and Watershield.
5. Cleats and fasteners: as recommended by roofing and underlayment manufacturers, use galvanically compatible metals.

Part 3: Execution

A. General
1. Fabricate and install all necessary accessories and flashings (whether or not they are indicated in drawings) required for a water and weather tight system.
2. Separate dissimilar metals by painting each metal surface in area of contact with a bituminous coating. Do not allow bituminous coating to be exposed.
3. Shop fabricate work to the greatest extent possible.
4. Install all accessory work such as metal fascia, trim, gutters, cleats, etc. prior to installation of roof and wall panels where possible.
5. Install panels so they are without waves, warps, buckles, fastening stresses, and distortion.
6. Form work to fit substrates, without excessive oil canning or buckling.
7. Conceal fasteners wherever possible.
8. Predrill panels for fasteners.

B. Roofing Installation
1. Install 24-inch wide strip of self-adhering underlayment over edge flashing and across roof deck and at ridge.
2. Install one layer of underlayment over substrate, lapping joints 6" minimum. Where recommended by manufacturer or reference standards, install self-adhered underlayment lapping seams minimum 2”.
3. Trim fasteners that penetrate roof sheathing flush with bottom of roof sheathing at all exposed locations.
   a) Fill and finish for seamless appearance at exterior eaves and porches.

C. Cleaning and Protection
1. Protect metal to ensure it is not damaged before Substantial Completion.
2. Replace roofing and accessories damaged or marred prior to substantial completion.

END OF SECTION 074100

Section 074213 - Metal Siding

Part 1: General

A. Work, including but not limited to:
1. Concealed-fastener, lap-seam metal siding.
2. Flashing and trim for metal siding.

B. Delivery, Storage, and Handling
1. Store in a dry area. Do not allow panels to get wet before installation - this will cause corrosion.

C. Quality Assurance
1. Installer's Qualifications
a) Use adequate number of skilled workmen who are trained in the necessary crafts.
b) Installer must have a minimum of 6 years successful experience installing siding of this type.
2. Comply with SMACNA's "Architectural Sheet Metal Manual" for steel and aluminum metal roofing and siding unless more stringent requirements are indicated.

D. Warranty
1. Installer to warrant installation of wall system for 2 years against defects in workmanship.

E. Use of Comparable Product:
1. Products specifically named shall be considered the basis-of-design, and are intended to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products. Comparable products from other manufacturers not indicated that are demonstrated and approved through the submittal process to be equal or better than the basis-of-design are acceptable. Where multiple manufacturers are indicated, only comparable products from those specific manufacturers shall be considered. Products that are not comparable shall be considered substitutions.

F. Submittals:
1. Product Data
2. Samples for finish verification: Provide minimum of 3 samples to represent full range of finish variation.
3. Installation Details
4. Manufacturer’s Installation Instructions

G. Mockup:
1. Build mockup of outside corner of bathroom walls, including top and bottom of wall to verify aesthetic effects and verify fasteners and review flashing configurations, to be incorporated into final work.

H. Performance
1. System shall accommodate movement of components due to thermal expansion to permanently prevent buckling, leaking, and other damage or deterioration of work.
2. System shall be installed to be and remain watertight.

I. Related Work Specified Elsewhere
1. Division 07 Section “Sheet Metal Flashing, Trim and Roofing Accessories”

J. Delivery, Storage, and Handling
1. Retain strippable protective covering on metal panels to the greatest extent possible during installation.

Part 2: Products

A. Steel Sheet:
1. Steel Sheet Material: ASTM A 606-04 high strength, low alloy weathering steel (aka Corten).
a) Thickness: 22 gauge.
2. Manufacturer: Western States Metal Roofing, www.cortenroofing.com

B. Metal Siding:
1. Panels: Rustwall Panel
a) Exposure: 10 inch width.
b) Nominal height: 1 inch nominal height.
c) Length: Full length without lap joints.
2. Accessories: Provide components required for a complete, weather tight panel system, including trim, copings, fascia, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
a) Flashing: Standard sizes where available, or custom as indicated in Drawings.
b) Fasteners: Stainless steel, provide EPDM sealing washers for exposed fasteners.
c) Sealant: Provide sealant type recommended by manufacturer that are compatible with panel materials, are non-staining, and do not damage panel finish.
d) Metal protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action.

C. Finishes:
1. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one- half of the range of approved samples. Noticeable variations in same piece are unacceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

Part 3: Execution

A. General
1. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.
2. Fabricate and install all necessary accessories and flashings (whether or not they are indicated in drawings) required for a water and weather tight system.
3. Separate dissimilar metals by painting each metal surface in area of contact with a bituminous coating. Do not allow bituminous coating to be exposed.
4. Shop fabricate work to the greatest extent possible.
5. Install all accessory work such as metal fascia, trim, gutters, cleats, etc. prior to installation of roof and wall panels where possible.
6. Install panels so they are without waves, warps, buckles, fastening stresses, and distortion.
7. Form work to fit substrates, without excessive oil canning or buckling.
8. Conceal fasteners wherever possible.
9. Predrill panels for fasteners.

B. Siding Installation
1. Install in accordance with manufacturer’s written installation instructions.
2. Fasten metal panels to substrate with fasteners at each lapped joint at locations and spacing recommended by manufacturer.
3. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and achieve waterproof performance.

C. Cleaning and Protection
1. Protect metal to ensure it is not damaged before Substantial Completion.
2. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions, On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer, Maintain in a clean condition during construction.
3. After metal panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.
4. Replace siding and accessories damaged or marred prior to substantial completion.

END OF SECTION 074100

Section 075423 - TPO Roofing

Part 1: General

A. Work, including but not limited to:
   1. Adhered thermoplastic Polyolefin Roofing System

B. Quality Assurance:
   1. Prior to installation of materials that will form and create joints for sealant, review required widths and preparation of joints with the installing trades.

C. Use of Comparable Product:
   1. Products specifically named shall be considered the basis-of-design, and are intended to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products. Comparable products from other manufacturers not indicated that are demonstrated and approved through the submittal process to be equal or better than the basis-of-design are acceptable. Where multiple manufacturers are indicated, only comparable products from those specific manufacturers shall be considered. Products that are not comparable shall be considered substitutions.

D. Submittals
   1. Product Data: For each type of product indicated.

E. Warranty
   1. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within a period of 20 years from date of Substantial Completion.
   2. Installer’s warranty: Installer agrees to make repairs to or replace faulty and detective work at their own cost o maintain the roofing system in a watertight condition within a period of 2 years from the date of Substantial Completion.

Part 2: Products

A. Membrane Roofing System
   1. TPO Sheet: Internally fabric or scrim reinforced
      a) Thickness: 45 mils, nominal
      b) Color: white
   2. Membrane flashing, adhesives, fasteners, sealants, and accessories: as recommended by membrane roofing manufacturer
   3. Cover board: 1/4” glass mat, water resistant gypsum board
   4. Rigid insulation: Polyisocyanurate, felt of glass fiber mat on both major faces
   5. Tapered insulation: Match rigid insulation

B. Accessories
      a) Flexible flashing contacting TPO sheet or flashing: Tremco ExoAir 110AT.

Part 3: Execution

A. Installation
   1. Mechanically fasten base layer of rigid insulation, then adhere subsequent layers of rigid and tapered insulation above.
   2. Fully adhere cover board and roofing membrane.

3. Use adequate number of skilled workmen who are trained in the necessary crafts.
4. Install system in accordance with manufacturer's 20-year system criteria.

B. Protection and Cleaning
1. Protect roofing membrane from damage and wear during construction.
2. Do not walk of roof during construction, and do not use roof as scaffolding during construction.

END OF SECTION 079200

Section 076200 - Sheet Metal Flashing, Trim, & Roof Accessories

Part 1: General

A. Work, including but not limited to:
1. Metal (steel) roof flashing, trim & drainage
2. Embedded Step flashing
3. Metal Wall flashing
4. Miscellaneous flashing and trim
5. Flashing and metal trim not specified elsewhere
6. Fabricated cricket

B. Quality Assurance
1. For steel and aluminum flashing, comply with SMACNA's "Architectural Sheet Metal Manual" unless more stringent requirements are indicated.

C. Performance
1. System shall accommodate movement of components due to thermal expansion to permanently prevent buckling, leaking, and other damage or deterioration of work.
2. System shall be installed by contractor to be and remain watertight.

D. Coordination
1. Coordinate the installation of flashing and trim specified in this section that must be installed under or with work specified elsewhere including masonry, siding, and plaster.

Part 2: Products

A. Metal (Steel) Roof Flashing & Trim
1. Sheet material: prefinished steel to match roofing panels, unless otherwise indicated.
2. Edge flashing: minimum 24 gauge
3. Ridge, hip, and valley flashing: minimum 24 gauge
4. Gutter expansion joints: minimum 24 gauge.
5. Miscellaneous roof flashing: minimum 24 gauge.

B. Embedded Step Flashing
1. Sheet material: Stainless steel Type 304, dead soft, fully annealed, smooth, flat, #4 finish, 0.015 inches thick

C. Metal Wall Flashing and Trim
1. Metal trim & flashing overlapping aluminum glazing systems: aluminum to match glazing system finish, minimum .025".
2. Metal trim & flashing overlapping fiber-cement siding and trim: Mill phosphatized G-90 hot dip galvanized 26 gauge steel sheet for field painting.

D. Accessories
1. Fasteners, general: exposed fasteners are not allowed unless indicated, use galvanically compatible metals.
2. Paper Slip Sheet: 4 to 6-lb. rosin-sized building paper.
3. Bituminous coating: SSPC - paint 12, solvent type bituminous mastic, nominally free of sulphur, compounded for 15 mil dry film thickness per coat

4. Mastic sealant: polyisobutylene, non-hardening, non-drying, non-migrating sealant
5. Elastomeric sealant: as recommended by sheet material manufacturer
6. Epoxy seam sealer: 2-part non-corrosive metal seam cementing compound
7. Sealing tape for use with steel materials: ASTM C920, pressure sensitive, 100 percent solids, polyisobutylene compound sealing tape w/ release paper backing. Provide permanently elastic, non-sag, nontoxic, nonstaining tape.
8. Roofing cement: ASTM D2822, asphaltic
9. Accessory materials: as required to provide watertight system

E. Fabricated Cricket:
1. Sheet material: Stainless steel Type 304, dead soft, fully annealed, smooth, flat, #4 finish, 0.050 inches thick, but not less than required for continuous welding
2. Size: As indicated in drawings
3. Seams: Continuously welded, watertight
4. Stiffeners: Install internal stainless steel stiffeners to maintain rigidity of cricket
5. Fasteners: Stainless steel
6. Anchorage: Mechanically fastened at 4” on center at perimeter of cricket to solid blocking below roof deck and adjacent masonry.

Part 3: Execution

A. Installation, General
1. Bed flanges in a thick coat of bituminous roofing cement where required for waterproof performance.
2. Fabricate metal in longest practical lengths up to ten feet.
3. All joints to be locked, sealed, or soldered as required.
4. Install work with laps, joints, expansion joints, and seams that will be permanently watertight & accommodate for thermal expansion and contraction.
5. Install flashings with butt and backup plate joints.
6. Joints:
   a) Use sealing tape for butt and backup plate joints.
   b) Rivet non-moving joints for additional strength as required.
   c) Use epoxy seam sealer for non-moving type joints, including riveted joints.
   d) Where lapped or bayonet type expansion joints cannot be used or would not be waterproof, form expansion joints with intermeshing hooked flanges, not less than 1" deep, filled with mastic sealant that is concealed within the joint.
   e) For movable, non-expansion type joints form metal to provide for proper installation of elastomeric sealant.
7. Separate dissimilar metals by painting each metal surface in area of contact with a bituminous coating.
8. Metal counter flashings shall completely cover all fasteners used to hold in place top terminations of membrane roof flashings.
9. Fabricate and install work with lines and corners of exposed units true and accurate.
10. Form exposed faces flat and free of buckles, excessive waves, and avoidable tool marks, considering the temper and reflectivity of the metal.

END OF SECTION 076200

Section 079200 - Sealants

Part 1: General

A. Work, including but not limited to:
   1. Sealants

B. Quality Assurance:
   1. Prior to installation of materials that will form and create joints for sealant, review required widths and preparation of joints with the installing trades.

C. Use of Comparable Product:
   1. Products specifically named shall be considered the basis-of-design, and are intended to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products. Comparable products from other manufacturers not indicated that are demonstrated and approved through the submittal process to be equal or better than the basis-of-design are acceptable. Where multiple manufacturers are indicated, only comparable products from those specific manufacturers shall be considered. Products that are not comparable shall be considered substitutions.

D. Submittals
   1. Samples for color selection.

E. Warranty
   1. 25 year manufacturer's warranty for each specific application.

Part 2: Products

A. Materials
   1. Sealants: as recommended by the applicable product manufacturer for the specific application and condition, subject to approval of Architect.
      a) Colors: Shall be selected by Architect from the manufacturer's full range of colors.
      b) At tile work and areas subject to water provide mildew-resistant sealant.
   2. Sealant Backer Rod: Compressible polyethylene foam rod or other flexible, permanent, durable, non-absorptive material as recommended by joint sealer manufacturer for compatibility with joint sealer.
   3. Bond break tape: as recommended by sealant manufacturer

Part 3: Execution

A. Sealants
   1. Prime surfaces as recommended by sealant manufacturer
   2. Remove excess compound and leave surfaces neat, smooth and clean.
   3. Seal joints around exterior door frames, windows, and other exterior wall penetrations.

B. Sealants Schedule
   1. All References are to Tremco Sealants unless otherwise indicated.
   2. Control and expansion joints in masonry: Spectrem 1 (+100/-50%) in 14 standard colors.
   3. Perimeter sealant at exterior openings: Spectrem 1 (+100/-50%) in 14 standard colors.
   4. Horizontal expansion joints in concrete, brick and stone: Vulkem 45 ($\pm$25%) in 3 colors.
   5. Interior control and expansion joints in hard surface floors: Vulkem 116 ($\pm$25%) in 16 colors.

6. Interior sealant at plumbing fixtures: Tremsil 200 in white and clear.
7. Drywall joints: Acoustical Sealant

END OF SECTION 079200

Section 082010 – Interior Doors

Part 1: General

A. Work, including but not limited to:
   1. Interior door frames
   2. Interior flush wood doors

B. Related Work Specified Elsewhere
   1. Division 08 Section “Exterior Doors”
   2. Division 08 Section “Aluminum Entrances & Storefront”
   3. Division 08 Section “Door Hardware”

C. Use of Comparable Product:
   1. Products specifically named shall be considered the basis-of-design, and are intended to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products. Comparable products from other manufacturers not indicated that are demonstrated and approved through the submittal process to be equal or better than the basis-of-design are acceptable. Where multiple manufacturers are indicated, only comparable products from those specific manufacturers shall be considered. Products that are not comparable shall be considered substitutions.

D. Submittals
   1. Shop drawings including plans, elevations, sections, and details of fabrications.

Part 2: Products

A. Flush Doors and Door Frames
   1. Painted:
      a) Manufacturer: VT Industries, Inc.
      b) Product: Heritage Collection
      c) Finish: Factory primed for field finishing
      d) Frame:
         (1) Substrate: Structural composite lumber
         (2) Veneer: Mill option paintable surface
         (3) Stop: Solid wood, T stop
         (4) Profile: Double rabbet, self-cased, 1/2 inch return, wall width as indicated in drawings
      e) Door:
         (1) Veneer: Birch, custom, A grade, rotary cut
         (2) Core: Five ply, structural composite lumber
   2. Transparent Finish:
      a) Manufacturer: VT Industries, Inc.
      b) Product: Heritage Collection
      c) Stain: Factory stained, color to be selected from manufacturer’s full range
      d) Finish: Factory applied, WDMA TR-8, catalyzed UV cured polyurethane
      e) Frame:
         (1) Substrate: Structural composite lumber
         (2) Veneer: Match door
         (3) Stop: Solid wood, T stop
         (4) Profile: Double rabbet, self-cased, 1/2 inch return, wall width as indicated in drawings

f) Door:
(1) Veneer: Red oak, custom, A grade, rift cut, vertical grain
(2) Veneer matching between adjacent flitches: slip match
(3) Veneer balancing within a door face: running match

B. Fabrication
1. Conform to type and size indicated in the drawings.
2. Shop prepare doors to receive hardware.
3. Coordinate with door hardware, no extra cost will be allowed because of changes or corrections necessary to facilitate installation of hardware.

Part 3: Execution

A. Installation
1. All doors shall fit tightly in frames and operate without sticking.
2. Fill all shim spaces of doors to rooms indicated to receive sound attenuation with batt insulation.
3. Fit door hardware prior to painting, then remove for painting of doors and frames before final installation of hardware.

END OF SECTION 082010

Section 082020 – Exterior Doors

Part 1: General

A. Work, including but not limited to:
   1. Exterior hollow metal doors and frames

B. Related Work Specified Elsewhere
   1. Division 08 Section “Interior Doors”.
   2. Division 08 Section “Aluminum Entrances & Storefront”.
   3. Division 08 Section “Door Hardware”.

C. Submittals
   1. Shop drawings including plans, elevations, sections, and details of fabrications.

Part 2: Products

A. Exterior Hollow Metal Doors and Frames:
   1. Doors: Regular duty hollow metal door: Full Flush;18 gauge faces w/ foamed-in-place polyurethane core, A-60 galvanized and factory primed, close edges with inverted 18 gauge steel channels; R-10 min
   2. Frames: 16 gauge, galvanized and factory primed

B. Fabrication
   1. Conform to type and size indicated in the drawings.
   2. Shop prepare doors to receive hardware.
   3. Coordinate with door hardware, no extra cost will be allowed because of changes or corrections necessary to facilitate installation of hardware.

Part 3: Execution

A. Installation
   1. All doors shall fit tightly in frames and operate without sticking.
   2. Fill all shim spaces with non-expansive foam insulation.
   3. Fit door hardware prior to painting, then remove for painting of doors and frames before final installation of hardware.

END OF SECTION 082020

Section 084000 - Aluminum Entrances & Storefront

Part 1: General

A. Work, including but not limited to:
1. Doors and operable panels in aluminum storefront
2. Aluminum storefront
3. Glazing for items listed above

B. Related Work Specified Elsewhere
1. Division 07 Section “Sealants”
2. Division 08 Door sections.

C. Performance Requirements
1. Provide storefront assemblies which will perform without failure. Modes of failure include:
   a) Thermal stresses transferring to building structure
   b) Excessive deflection
   c) Excessive water leakage
   d) Excessive air infiltration
   e) Failure of perimeter sealant
   f) Failure of glazing
   g) Glass breakage
2. Structural requirements: Provide storefront system, including anchorage, capable of withstanding inward and outward wind load design pressures as calculated in accordance with IBC 2015 and ASCE 7 for exposure, design wind speed, risk factor, and building design indicated in drawings.
   a) Deflection Normal to Wall Plane: Limited to edge of glass in a direction perpendicular to glass plane shall not exceed L/175 of the glass edge length for each individual glazing lite or an amount that restricts edge deflection of individual glazing lites to 3/4 inch, whichever is less.
   b) Deflection Parallel to Glazing Plane: Limited to amount not exceeding that which reduces glazing bite to less than 75 percent of design dimension and that which reduces edge clearance between framing members and glazing or other fixed components directly below them to less than 1/8 inch and clearance between members and operable units directly below them to less than 1/16 inch.
3. Use of Comparable Product:
   a) Products specifically named shall be considered the basis-of-design, and are intended to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products. Comparable products from other manufacturers not indicated that are demonstrated and approved through the submittal process to be equal or better than the basis-of-design are acceptable. Where multiple manufacturers are indicated, only comparable products from those specific manufacturers shall be considered. Products that are not comparable shall be considered substitutions.

D. Submittals
1. Product data for each type of product indicated. Include material descriptions, metal thicknesses, glass thicknesses, and glass types.
2. Product test reports indicating compliance with Performance Requirements.
3. Shop drawings including elevations, and sections. Also provide full size details and attachment to other work when needed for clarity.
4. Samples for metal color verification and glass type verification.

Part 2: Products

A. Glazing
1. General: Safety glass where required by code

B. Storefront
1. Aluminum storefront: Kawneer 451T, thermally broken.
   a) Framing size: 2” x 4-1/2” framing
   b) Finish: bronze anodized
   c) Insulated Glazing Units: 1” thick overall with 1/4” clear tempered panes and a 1/2” air space; low-E coating on the #3 surface; SHGC not greater than 0.29; U-factor not greater than 0.29 BTU/sq. ft. x h x deg F
   d) Subsills: storefront manufacturer’s high performance weeping subsill.
   e) Frame filler: Thermally broken, snap-in filler at all head and jamb framing members, unless otherwise indicated.

C. Entrances
1. Doors: Manufacturer’s standard glazed wide-stile manual swing door with 2” thickness; finish to match framing system.
2. Glass: 1/4” thick clear tempered.

D. Accessories
1. Dissimilar Metal Coating: Cold-applied asphalt mastic
2. Provide steel framing reinforcement as recommended by framing system manufacturer as required for wind loads indicated
3. Shim space insulation: non-expansive foam insulation.

Part 3: Execution

A. Inspection
1. Examine openings.

B. General
1. Install without warp or rack of frames or sash.
2. In no case shall attachment or anchorage bridge the thermal break of the frame or any accessories.
3. Separate aluminum from dissimilar metals and coat dissimilar metals that are in drainage cavity. Stainless steel, zinc, and cadmium are not considered dissimilar metals.
4. Install joint sealers between sill member and surface below.
5. Install joint sealers between framing perimeter and adjacent work.
6. Adequately anchor to maintain positions permanently when subjected to normal thermal movement, specified building movement, and specified wind loads.

C. Storefront
1. Plumb and align storefront faces in a single plane, and erect materials square and true. Adequately anchor to maintain positions permanently when subjected to normal thermal movement, building movement, and specified wind loads.
2. Adjust windows and doors in storefront for proper operation after installation.

D. Storefront Field Testing
1. Water test in accordance with AAMA 501.2-03

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END OF SECTION 084000

Section 085000 –Windows

Part 1: General

A. Work, including but not limited to:
   1. Thermally Improved Aluminum windows

B. Performance Requirements
   1. Provide window that will perform without failure. Modes of failure include:
      a) Excessive deflection
      b) Excessive water leakage
      c) Excessive air infiltration
      d) Failure of perimeter sealant
      e) Failure of glazing

C. Use of Comparable Product:
   1. Products specifically named shall be considered the basis-of-design, and are intended to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products. Comparable products from other manufacturers not indicated that are demonstrated and approved through the submittal process to be equal or better than the basis-of-design are acceptable. Where multiple manufacturers are indicated, only comparable products from those specific manufacturers shall be considered. Products that are not comparable shall be considered substitutions.

Part 2: Products

A. Windows, General
   1. Shim Space Insulation: Non-expansive foam insulation.
   2. Dissimilar Metal Coating: Cold-applied asphalt mastic

B. Aluminum Windows
   1. Thermally Improved Aluminum Picture Window 920 Series, Milgard Manufacturing, Inc.
      a) Insulated Glazing Units: ASTM E 774, Class A, 1" thick overall
         (1) Glazing type: SunCoatMAX, clear, Low-E, insulated panel, SHGC not greater than 0.29; U-factor not greater than 0.29 BTU/sq. ft. x h x deg F
         (2) Spacer Bar: Warm edge steel spacer
      b) Subsills: by window manufacturer, as indicated
      c) Frame filler: Thermally broken by window manufacturer, mitered at corners.
      d) Nailing flanges: 1 5/16” nail fin setback, mitered and sealed at corners.
      e) Frame color: Bronze Anodized Exterior Finish. Provide AA-C22-A32 Class II Bronze, minimum 0.4 mils thick, electrolytically deposited color anodized finish.

C. Fabrication, General
   1. Fabricate frames and sash with mechanically joined corners. Corners are fastened with corrosion resistant screws and sealed with an acrylic sealant.
   2. All fixed glass is exterior glazed and all sashes are marine glazed with flexible PVC glazing. The fixed glazing shall be removed without disassembly of a sash. The vents will need to be disassembled to replace the glazing.

Part 3: Execution

A. Installation
1. Install windows in framed walls in accordance with AAMA 2400 “Mounting Flange Installation”.
2. Install without warp or rack of frames or sash.
3. Fill all shim spaces with non-expansive foam insulation.
4. In no case shall attachment or anchorage bridge the thermal break of the window unit, or any accessories.
5. Separate aluminum from dissimilar metals and coat dissimilar metals that are in drainage cavity. Stainless steel, zinc, and cadmium are not considered dissimilar metals.
6. Install joint sealers between sill member and surface below.
7. Adequately anchor to maintain positions permanently when subjected to normal thermal movement, specified building movement, and specified wind loads.
8. Install joint sealers between framing perimeter and adjacent work.

END OF SECTION 085000

Section 087100 – Door Hardware

Part 1: General

A. Work, including but not limited to:
   1. Interior Door Hardware
   2. Exterior Door Hardware
   3. Entrance Door hardware not specified elsewhere

B. Related Work Specified Elsewhere
   1. Division 08 window, door, storefront, curtainwall and entrances sections for balance of entry door hardware

C. Coordination
   1. Installation Templates: Distribute for doors, frames, and other work specified to be factory prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
   2. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.
   3. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems

D. Use of Comparable Product:
   1. Products specifically named shall be considered the basis-of-design, and are intended to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products. Comparable products from other manufacturers not indicated that are demonstrated and approved through the submittal process to be equal or better than the basis-of-design are acceptable. Where multiple manufacturers are indicated, only comparable products from those specific manufacturers shall be considered. Products that are not comparable shall be considered substitutions.

E. Submittals
   1. Product Data
   2. Door hardware schedule
   3. Keying Schedule
   4. Templates for distribution by Design Builder to door and frame suppliers and hardware installers

F. Preinstallation Meetings
   1. Conduct keying conference at project site with Owner, Owner’s security consultant, and Design Builder present to determine Owner’s keying requirements. Record decisions in a written keying schedule.

G. WARRANTY
   1. Special Warranty: Manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
      a) Failures include, but are not limited to, the following:
         (1) Structural failures including excessive deflection, cracking, or breakage.
         (2) Faulty operation of doors and door hardware.
         (3) Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.

b) Warranty Period: One year from date of Substantial Completion unless otherwise indicated below:
(1) Exit Devices: Three years from date of Substantial Completion.
(2) Manual Closers: 10 years from date of Substantial Completion.

Part 2: Products

A. Materials
1. Provide products scheduled or a comparable product acceptable to Owner and Architect. Provide only products that comply with accessibility and life safety requirements when installed. If scheduled products cannot meet these requirements, notify architect prior to submitting hardware schedule and obtain approval for alternate product.

B. Keying
1. Provide Keys and Keying in accordance with Keying Schedule and decisions reached at Keying conference.

Part 3: Execution

A. Installation
1. Install hardware for optimal performance and compliance with applicable accessibility regulations.
2. Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.
a) Standard Steel Doors and Frames: ANSI/SDI A250.8.
b) Custom Steel Doors and Frames: HMMA 831.
c) Wood Doors: DHI's "Recommended Locations for Architectural Hardware for Wood Flush Doors."
3. Hinges: Install types and in quantities indicated in door hardware schedule, but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.
4. Lock Cylinders: Install construction cores to secure building and areas during construction period.
a) Replace construction cores with permanent cores as directed by Owner.
5. Key Control System:
a) Key Control Cabinet: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
6. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings. Verify location with Architect.
a) Configuration: Provide one power supply for each door opening with electrified door hardware.
7. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 079200 "Joint Sealants."
8. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they will impede traffic.
9. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
a) Do not notch perimeter gasketing to install other surface-applied hardware.
10. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
11. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

B. ADJUSTING

1. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
   a) Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
   b) Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 70 degrees and so that closing time complies with accessibility requirements of authorities having jurisdiction.
2. Occupancy Adjustment: Approximately three months after date of Substantial Completion, Installer's Architectural Hardware Consultant shall examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors, door hardware, and electrified door hardware.

Hardware Schedule

Hardware Group No. 1.1 Double Entry – Exterior

For use on mark/door # (s): 101

Each To Have:

| QTY | | DESCRIPTION | CATALOG NUMBER | FINISH | MFR |
|---|---|---|---|---|---|
| 2 | EA | CONT. HINGE | 112HD | 313AN | IVE |
| 1 | EA | PANIC HARDWARE | CDSI-9947-EO | 626 | VON |
| 1 | EA | PANIC HARDWARE | CDSI-9947-NL-OP | 626 | VON |
| 2 | EA | STRIKE | @ HEAD AND SILL | -- | VON |
| 2 | EA | STRAIGHT PULL | 8103-EZHD 10” | 630 | IVE |
| 2 | EA | CLOSER | P4040XP Rw/PA | DARK BRZ | LCN |
| 3 | EA | SFIC CORE | C607 | 626 | FAL |
| 3 | EA | CYLINDER | AS REQD W/ CONST CORE | 626 | FAL |
| 1 | EA | THRESHOLD | 102 | A | ZER |
| 1 | SET | SEALS | @ HEAD AND JAMBS | -- | -- |
| 2 | EA | SWEEP | 39, LENGTH AS REQD | D | ZER |
| 1 | EA | MEETING STILE | 328D (2PCS – 1 SET), LENGTH AS REQD | D | ZER |

SEALS BY DOOR/FRAME MANUFACTURER. PROVIDE MOUNTING ACCESSORIES FOR CLOSER, COORDINATE WITH DOOR/FRAME SUPPLIER.

Hardware Group No. 1.2 Classroom - Interior

For use on mark/door #(s): 102

Each To Have:

| QTY | | DESCRIPTION | CATALOG NUMBER | FINISH | MFR |
|---|---|---|---|---|---|
| 4 | EA | HINGE | 5BB1 4.5 X 4.5 | 626 | IVE |
| 1 | EA | ENTRY/OFFICE LOCK | T561HD7 BRW | 626 | FAL |
| 1 | EA | SFIC CORE | C607 | 626 | FAL |
| 1 | EA | FLOOR STOP | FS13 | 626 | IVE |
| 3 | EA | SILENCERS | SR64 | GRY | ZER |

Hardware Group No. 1.3 Mechanical Closet – Interior

For use on mark/door #(s): 103, 109

Each To Have

| QTY | | DESCRIPTION | CATALOG NUMBER | FINISH | MFR |
|---|---|---|---|---|---|
| 4 | EA | HINGE | 5BB1 4.5 X 4.5 | 626 | IVE |
| 1 | EA | PASSAGE SET | T101HD7 BRW | 626 | FAL |
| 1 | EA | WALL STOP | WS406/407CCV | 626 | IVE |
| 3 | EA | SILENCERS | SR64 | GRY | ZER |

Hardware Group No. 1.4 Storage – Interior

For use on mark/door #(s): 104

Each To Have:

| QTY | | DESCRIPTION | CATALOG NUMBER | FINISH | MFR |
|---|---|---|---|---|---|
| 8 | EA | HINGE | 5BB1 4.5 X 4.5 | 626 | IVE |
| 2 | EA | MANUAL BOLT | FB358 | 626 | IVE |
| 1 | EA | STOREROOM LOCK | T581HD7 BRW | 626 | FAL |
| 1 | EA | CLOSER | P4040XP Rw/PA | DARK BRZ | LCN |
| 1 | EA | SFIC CORE | C607 | 626 | FAL |
| 1 | EA | DUST PROOF STRIKE | DP1/DP2 AS REQ | 626 | IVE |
| 1 | EA | WALL STOP | WS406/407CCV | 626 | IVE |
| 3 | EA | SILENCERS | SR64 | GRY | ZER |

Hardware Group No. 1.5 Office - Interior

For use on mark/door #(s): 105, 106

Each To Have:

| QTY | | DESCRIPTION | CATALOG NUMBER | FINISH | MFR |
|---|---|---|---|---|---|
| 4 | EA | HINGE | 5BB1 4.5 X 4.5 | 626 | IVE |
| 1 | EA | ENTRY/OFFICE LOCK | T511HD7 BRW | 626 | FAL |
| 1 | EA | SFIC CORE | C607 | 626 | FAL |
| 1 | EA | WALL STOP | WS406/407CCV | 626 | IVE |
| 3 | EA | SILENCERS | SR64 | GRY | ZER |

Hardware Group No. 1.6 Unisex Private Restroom - Exterior

For use on mark/door #(s): 108, 110, 111

Each To Have:

| QTY | | DESCRIPTION | CATALOG NUMBER | FINISH | MFR |
|---|---|---|---|---|---|
| 4 | EA | HINGE | 5BB1 4.5 X 4.5 | 630 | IVE |
| 1 | EA | DORMITORY/EXIT LOCK | MA571HD7 B BRW-N | 630 | FAL |
| 1 | EA | SFIC CORE | C607 | 626 | FAL |
| 1 | EA | CLOSER | 4040XP H | ALUM | LCN |
| 1 | EA | WALL STOP | WS406/407CCV | 626 | IVE |
| 1 | SET | SEALS | 188S @ HEAD AND JAMBS | BLK | ZER |
| 1 | EA | SWEEP | 39, LENGTH AS REQD | A | ZER |

Hardware Group No. 1.7 Single Entry - Exterior

For use on mark/door #(s): 112, 113

Each To Have:

| QTY | | DESCRIPTION | CATALOG NUMBER | FINISH | MFR |
|---|---|---|---|---|---|
| 1 | EA | CONT. HINGE | 112HD | 313AN | IVE |
| 1 | EA | PANIC HARDWARE | CDSI-99-L03 | 626 | VON |
| 1 | EA | CLOSER | P4040XP Rw/PA | DARK BRZ | LCN |
| 2 | EA | SFIC CORE | C607 | 626 | FAL |
| 2 | EA | CYLINDER | AS REQD W/ CONST CORE | 626 | FAL |
| 1 | EA | THRESHOLD | 102 | A | ZER |
| 1 | EA | FLOOR STOP | FS17 | 626 | IVE |
| 1 | SET | SEALS | @ HEAD AND JAMBS | -- | -- |
| 1 | EA | SWEEP | 39, LENGTH AS REQD | D | ZER |

SEALS BY DOOR/FRAME MANUFACTURER. PROVIDE MOUNTING ACCESSORIES FOR CLOSER, COORDINATE WITH DOOR/FRAME SUPPLIER.

END OF SECTION 087100

Section 092900 - Gypsum Board Systems

Part 1: General

A. Work, including but not limited to:
1. Smooth Finished Gypsum Board Walls & Ceilings
2. Tile Backer Board
3. Gypsum Board Accessories

B. Submittals
1. Mock-up of interior gypsum board system, minimum 4'x4', paint top half. Provide two for each individual selection to be made.

Part 2: Products

A. Materials
1. Gypsum Board: supply gypsum board in appropriate lengths for walls and in longest manufactured lengths for ceilings.
   a) Walls: 5/8" tapered edge gypsum board, unless indicated otherwise
   b) Walls in Bath and Wet Areas Not Receiving Tile: 5/8" mold and moisture resistant gypsum board
   c) Ceilings: 5/8" tapered edge gypsum board, unless indicated otherwise
   d) Ceilings in Bath and Wet Areas Not Receiving Tile: 5/8" mold and moisture resistant gypsum board.
2. Tile Backer Board:
   a) Walls and Ceilings receiving tile and where indicated in drawings: 1/2" “Durock”
3. Gypsum Board Accessories:
   a) Corner beads: metal beads
   b) Edge trim: "J" or "U" casing beads
   c) Recessed Picture Rail: Fry Reglet “Reveal/Picture Hanger”. Base Bid shall include 120 linear feet installed. Furnish 120 picture clips.
   d) Reinforcing Tape, Joint Compound, Adhesive, Water, Fasteners and accessories.

Part 3: Execution

A. Installation
1. Install additional wood blocking as required by gypsum board manufacturer for support of each product type.
2. Arrange gypsum board panels to minimize end to end butt joints.
3. Gypsum boards shall be screwed to structure with gypsum board screws at 16" O.C. horizontally and vertically but not less than recommended by manufacturer.
4. Treat cut edges and holes in moisture resistant gypsum board with sealant.
5. Finish: light orange peel, rolled, paint-only

B. Gypsum board and tile backer board finish levels: Finish panels to levels indicated below in accordance with ASTM C840.
1. Level 1: Ceiling plenum areas, concealed areas, and where indicated
2. Level 2: Panels that are substrates for tile.
3. Level 4: At gypsum panel surfaces that will be exposed to view, unless indicated otherwise.
4. Level 5: At tile backer board panels that will be exposed to view, unless indicated otherwise.

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END OF SECTION 092900

Section 093000 - Tiling

Part 1: General

A. Work, including but not limited to:
   1. Wall tile

B. Quality Assurance
   1. Sub-contractor shall be a specialist in tile installation.
   2. Comply with the Tile Council of North America (TCNA) "Handbook for Ceramic, Glass and Stone Tile Installation" most current edition.
   3. Comply with the applicable parts of the ANSI 108 series of tile installation standards included under "American National Standard Specifications for the Installation of Ceramic Tile".

C. Use of Comparable Product:
   1. Products specifically named shall be considered the basis-of-design, and are intended to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products. Comparable products from other manufacturers not indicated that are demonstrated and approved through the submittal process to be equal or better than the basis-of-design are acceptable. Where multiple manufacturers are indicated, only comparable products from those specific manufacturers shall be considered. Products that are not comparable shall be considered substitutions.

Part 2: Products

A. Materials
   1. Tile: As indicated in drawings.
   2. Grout Colors: As selected by Architect.
   3. Setting material:
      a) Portland cement mortar bed: ANSI A108.1A
         (1) Cleavage membrane: 4 mil polyethylene
         (2) Reinforcing wire fabric: galvanized welded wire fabric, 2”x2” – W0.3xW0.3 (.0625” dia)
      b) Latex-portland cement mortar: ANSI A118.4
      c) Epoxy nortar: ANSI A118.3
   4. Grouting material:
      a) Latex-portland cement grout: ANSI A118.6
      b) Epoxy grout: ANSI A118.3
   5. Sealer: Provide products acceptable to tile manufacturer for each tile specified.
   6. Waterproofing: Laticrete; Hydroban.
   7. Synthetic stone transitions: As indicated in drawings.
   8. Accessories: Provide all membranes and accessories required by TCNA installation recommendations.

Part 3: Execution

A. General
   1. Neatly cut tile around fixtures; accurately form corners, trim, intersections and returns.
   2. Jointing pattern: As directed by Architect.
      a) Align joints when adjoining tiles on floor, base, walls, and trim are the same size.
      b) Layout tile work and center tile fields in both directions in each space or on each wall area.
      c) Adjust to minimize tile cutting.

d) Provide uniform joint widths, unless indicated otherwise.

3. At tile shower floors: Install with thickest and slope a minimum of 1/8” per foot and maximum ¼” per foot to shower drain.

B. Walls

1. Installation at tile backing panels: TCNA W244C

END OF SECTION 093000

Section 095113 – Acoustical panel ceilings

Part 1: General

A. Summary
1. Section Includes:
   a) Acoustical panels and suspension systems for interior ceilings
2. Related Requirements:
   a) Division 23 “Heating, Ventilating, and Air-Conditioning” for suspended mechanical fixtures.
   b) Division 26 "Electrical” for suspended lighting fixtures.

B. Use of Comparable Product:
1. Products specifically named shall be considered the basis-of-design, and are intended to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products. Comparable products from other manufacturers not indicated that are demonstrated and approved through the submittal process to be equal or better than the basis-of-design are acceptable. Where multiple manufacturers are indicated, only comparable products from those specific manufacturers shall be considered. Products that are not comparable shall be considered substitutions.

Part 2: Products

A. Performance Requirements
1. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
   a) Flame-Spread Index: 25 or less.
   b) Smoke-Developed Index: 50 or less.

B. Acoustical Panels: Armstrong Ceilings, Dune square lay-in, 24”x24”x5/8”, item no. 1850.

C. Metal Suspension Systems: Prelude XL 15/16”.

D. Accessories
1. Wire Hangers, Braces, and Ties: Provide wires as follows:
   a) Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
   b) Stainless-Steel Wire: ASTM A 580/A 580M, Type 304, nonmagnetic.
   c) Nickel-Copper-Alloy Wire: ASTM B 164, nickel-copper-alloy UNS No. N04400.
   d) Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C 635/C 635M, Table 1, "Direct Hung") will be less than yield stress of wire, but not less than 0.106-inch-diameter wire.
2. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.
3. Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.
4. Angle Hangers: Angles with legs not less than 7/8-inch wide; formed with 0.04-inch-thick, galvanized-steel sheet complying with ASTM A 653/A 653M, G90 coating designation; with bolted connections and 5/16-inch-diameter bolts.

E. Metal Edge Moldings and Trim
1. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design

requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.

a) Edge moldings shall fit acoustical panel edge details and suspension systems indicated and match width and configuration of exposed runners unless otherwise indicated.

b) For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.

F. Acoustical Sealant

1. As specified in Section 079200 "Sealants."

Part 3: Execution

A. Examination

1. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.
2. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.
3. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Installation

1. Install acoustical panel ceilings according to ASTM C 636/C 636M and manufacturer's written instructions.
2. Suspend ceiling hangers from building's structural members and as follows:
   a) Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
   b) Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
6. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
   a) Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
   b) Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends. Miter corners accurately and connect securely.
7. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

8. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide precise fit.
9. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.

END OF SECTION 095113

Section-096513 - Resilient Base

Part 1: General

A. Work, including but not limited to:
   1. Resilient base

Part 2: Products

A. Materials
   1. Resilient base: type TS, group 1
      a) Height: 4 inch.
      b) Thickness: 0.125 inch.
      c) Style: cove.
      d) Lengths: coils in manufacturer's standard length.
      e) Corners: job formed.
      f) Color: as indicated in drawings.
   2. Glues, Spacers, Leveling Compounds and Accessories: as recommended by resilient base manufacturer.

Part 3: Execution

A. Base
   1. Examine substrates, with Installer present, for conditions affecting performance of the Work. Proceed with installation only after unsatisfactory conditions have been corrected.
   2. Prepare substrates according to manufacturer's written instructions to ensure adhesion.

END OF SECTION 096513

Section 099000 - Painting & Coatings

Part 1: General

A. Work, including but not limited to:
   1. Painting

B. Related Work Specified Elsewhere
   1. Division 07 Section “Sealants”.
   2. Division 09 Section “Painting of Exposed Steel” for painting exterior exposed un-galvanized steel

C. Use of Comparable Product:
   1. Products specifically named shall be considered the basis-of-design, and are intended to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products. Comparable products from other manufacturers not indicated that are demonstrated and approved through the submittal process to be equal or better than the basis-of-design are acceptable. Where multiple manufacturers are indicated, only comparable products from those specific manufacturers shall be considered. Products that are not comparable shall be considered substitutions.

D. Submittals
   1. Samples for verification.

E. Delivery, Handling, and Storage
   1. Deliver products to the site in manufacturer's sealed containers.
   2. Containers shall be labeled by the manufacturer, listing brand name, type of paint, components, color and instructions.
   3. Painting materials such as linseed oil, mineral spirits and turpentine shall be pure, of the highest quality and bearing identifying labels on the containers.

Part 2: Products

A. Materials:
   1. Provide the highest quality, washable, painting and coating products offered for each specific application, from one of the following manufacturers. On interiors, use zero VOC products. For specific applications where zero VOC products are not available, provide highest quality product with lowest VOC’s.
      a) Benjamin Moore
      b) Sherwin Williams
      c) Pratt & Lambert
   2. Primers: As recommended by finish coat manufacturer for substrate. For interiors, provide the lowest VOC product so recommended.
   3. Colors and Finishes: as scheduled
   4. Colors and Finishes: Contractor shall provide 20 samples on walls, metals, or wood for review and selection.

Part 3: Execution

A. Painted Surface Preparation:
   1. The painting contractor shall inspect areas and conditions under which painting work is to be applied prior to the application of any paint or finishing material. If any surface to be finished

cannot be put in proper conditions for finishing by customary cleaning, sanding and puttying operations, the painting contractor shall immediately notify the General Contractor and the Architect in writing, or assume responsibility for and rectify any unsatisfactory finish resulting.

2. Perform preparation and cleaning procedures.
3. Painting shall not be done while the surface is damp, or during cold, rainy or frosty weather, or when the temperature is likely to drop to freezing. Also, avoid painting surfaces while they are exposed to hot sun.
4. Wood:
   a) Clean wood surfaces of dirt, oil, or other foreign substances; sand surfaces exposed to view smooth and dust off.
   b) After priming, fill nail holes, cracks and other defects with putty of a color to match that of the finish. Putty shall be flush with the adjoining surface.
5. Ferrous Metals:
   a) Touch-up shop applied prime coats wherever damaged or bare.
   b) Bare surfaces: Clean surfaces which are not galvanized or shop coated, of oil, dirt, loose mill scale and other foreign substances by solvent and/or mechanical cleaning.
   c) Galvanized surfaces: Clean free of oil and surface contaminants using non-petroleum based solvent.

B. Paint Application
1. Apply paint. Use applicator and techniques best suited for substrate and type of material being applied.
2. Sand between coats.
3. Doors to be painted shall receive one coat of sealer or primer immediately upon delivery to the job site if not shop primed, and shall be re-sealed after fitting and hanging, before finishing.

C. Protection and Cleaning
1. Protect work and all adjacent surfaces and materials by covering or other method.
2. Remove all paint, stain and varnish spots from the floors, glass and other surfaces.

D. Finish Schedule
1. Standard: as recommended by paint manufacturer for specific application, unless indicated otherwise
   a) 1st coat: primer
   b) 2nd, 3rd coats: finish
2. Gypsum wallboard:
   a) Interior: interior acrylic latex, eggshell.
3. Fiber-cement siding, wood trim, doors:
   a) Interior: interior acrylic latex, semi-gloss.
   b) Exterior: exterior acrylic latex, flat.
4. Metal, unless indicated otherwise:
   a) Interior: interior acrylic latex, semi-gloss.
5. Stainless steel:
   a) 1st coat: Sherwin Williams, DTM Wash Primer, B71Y1, flat
   b) 2nd, 3rd coats: Sherwin Williams, Acrolon 218 HS Plyurethane, B65Y600, semi-gloss

END OF SECTION 099000

Section 099010 - Painting of Steel

Part 1: General

A. Work, including but not limited to:
1. Furnish all labor, materials, tools, equipment, and supervision necessary for surface preparation, priming and painting of all new structural steel, as indicated in the Drawings and these Specifications.

B. Use of Comparable Product:
1. Products specifically named shall be considered the basis-of-design, and are intended to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products. Comparable products from other manufacturers not indicated that are demonstrated and approved through the submittal process to be equal or better than the basis-of-design are acceptable. Where multiple manufacturers are indicated, only comparable products from those specific manufacturers shall be considered. Products that are not comparable shall be considered substitutions.

C. Submittals
1. Product data for each product indicated. Include a system description, mixing instructions, and application instructions.
2. Mockup for evaluating appearance and quality of painting. Mockup to be 4' long minimum section of a column, to be incorporated into final work.
3. Color and texture samples for selection and verification.
4. List of 3 projects with similar coating systems completed by Applicator within past 5 years.

D. Delivery, Handling, and Storage
1. Materials shall be delivered in original, unopened containers bearing the manufacturer’s name, product identification, expiration date, and batch number.
2. Coatings, thinners, and cleaners shall be stored in tightly closed containers in a covered, well-ventilated area where they will be protected from exposure to extreme cold or heat, sparks, flame, direct sunlight, or weather.
3. All materials shall be stored in an approved location.

E. Quality Assurance
1. Applicator shall have a minimum of 5 years experience in application of similar paint coating systems and projects of similar size.
2. The Owner holds the option to retain an independent testing laboratory to review and evaluate the application process.

F. Regulatory Requirements
1. Adhere to all federal, state, and local ordinances regarding the use of, or exposure to, and disposal of coating, coating solvents, and related materials.

G. Warranty
1. Manufacturer's standard warranty.
2. Applicator to warrant against defects in material and workmanship, for a period of one year.

Part 2: Products

A. Materials
1. High Performance Coating System: Tnemec Company, Inc., Kansas City, Missouri
   a) Spot Primer: Series 530
   b) Primer Coat: Tneme-Zinc Series 90-97
   c) Intermediate Coat: Hi-Build Epoxoline Series 66
   d) Finish Coat: Endura-Shield II Series 1075U

Part 3: Execution

A. General
1. Protect trees, plants, windows, walls, and surfaces as necessary to prevent sandblasting damage and paint overspray.

B. Surface Preparation
1. Commercial blast according to SSPC-SP 6, Commercial Blast Cleaning. Remove surface rust and mill scale from all surfaces prior to application of primer.
2. At inaccessible locations where surface preparation according to SSPC-SP 6 is not possible, prepare surfaces according to SSPC-SP 2, “Hand Tool Cleaning”
3. Surfaces to receive paint shall be dry, clean, and free from dirt, dust, laitance, loose particles, or any other foreign matter that would prevent proper adhesion of the coating.

C. Application
1. Apply specified paint/coating products to maximum recommended dry film thickness for each coat.
2. Apply spot primer using a brush at inaccessible locations where hand tool preparation is used.
3. Apply primer coat at all other locations within 6 hours of the time the surface has been prepared.
4. Apply intermediate and finish coats within the time restrictions recommended by manufacturer.
5. Apply and cure coatings only within manufacturer’s printed temperature and humidity limits.
6. Field surface preparation and painting operations shall be sequenced so that freshly applied coatings will not be contaminated by dust or foreign matter.

D. Clean-up
1. Comply with all applicable laws and regulations regarding disposal of sandblasting dust and debris.
2. Inspect work for defects and perform touch-up work where necessary.
3. On completion of the work, remove equipment, and rubbish and leave site in a clean condition.

END OF SECTION 099010

Section 102800 - Bath & Accessories

Part 1: General

A. Work, including but not limited to:
   1. Bathroom Accessories

B. Related Work Specified Elsewhere
   1. Division 26 Sections - Electrical

Part 2: Products

A. Materials
   1. As scheduled.

Part 3: Execution

A. Installation
   1. Install to solid substrate.
   2. Mirror: Mount with concealed wall hangers as per manufacturer recommendations into solid wood blocking.

END OF SECTION 102800

Section 104416 - Fire Extinguishers

Part 1: General

A. Work, including but not limited to:
1. Fire extinguishers
2. Fire extinguisher cabinets

B. Submittals
1. Shop Drawings: Submit mounting heights to accommodate TAS accessible reach range.
2. Product Data: For each type of product indicated.
a) Fire Extinguishers: Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguishers.
b) Cabinets: Include roughing-in dimensions, details showing mounting methods, construction details, door hardware, cabinet type, trim style, and panel style.
3. Warranty: Sample of special warranty.
4. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.

C. Quality Assurance
1. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
2. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.
a) Provide fire extinguishers approved, listed, and labeled by FMG.

D. Coordination
1. Coordinate type and capacity of fire extinguishers with fire protection cabinets to ensure fit and function.
2. Coordinate size of fire protection cabinets to ensure that type and capacity of fire extinguisher indicated are accommodated.

E. Sequencing
1. Apply vinyl lettering on field painted, fire extinguisher cabinets after painting is complete.

F. Warranty
1. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.
a) Failures include, but are not limited to, the following:
(1) Failure of hydrostatic test according to NFPA 10.
(2) Faulty operation of valves or release levers.
b) Warranty Period: Six years from date of Substantial Completion.

Part 2: Products

A. Portable, Hand-Carried Fire Extinguishers
1. Fire Extinguishers: Type, size, and capacity for each indicated.
a) Valves: Manufacturer's standard.
b) Handles and Levers: Manufacturer's standard.
c) Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B.

2. Multipurpose Dry-Chemical Type in Steel Container : UL-rated 3-A:40-B:C, 6-lb nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

B. Fire Extinguisher Cabinets
1. Material: Aluminum, sating finish, clear polyester coated.
2. Cabinet size: Suitable for housing fire extinguisher.
3. Mounting: Semi-recessed within partition, minimize projection beyond face of partition, and do not project more than 2 inches.
4. Trim: Square-edge.
5. Door: Aluminum with full glass, manufacturer's standard clear safety glass.
6. Hinge: Continuous piano hinge.
7. Lettering: Identify with the words "FIRE EXTINGUISHER", vertical ascending white letters.

C. Mounting Brackets
1. Mounting Brackets: manufacturer's standard steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or red baked-enamel finish.
2. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.
   a) Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.
   b) Orientation: Vertical.

Part 3: Execution

A. Installation:
1. General: Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.
2. Cabinets: Mount at height to accommodate TAS accessible reach ranges for cabinets and fire extinguishers.
3. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated. Mount at height to accommodate TAS accessible reach range.

END OF SECTION 104416

Section-123600 - Specialty Countertops & Surfacing

Part 1: General

A. Work, including but not limited to:
   1. Synthetic stone countertops and splashes

B. Use of Comparable Product:
   1. Products specifically named shall be considered the basis-of-design, and are intended to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products. Comparable products from other manufacturers not indicated that are demonstrated and approved through the submittal process to be equal or better than the basis-of-design are acceptable. Where multiple manufacturers are indicated, only comparable products from those specific manufacturers shall be considered. Products that are not comparable shall be considered substitutions.

Part 2: Products

A. Materials
   1. Synthetic stone:
      a) Color: as indicated in drawings.
      b) Thickness: 3cm
      c) Finish: polished
      d) Exposed edges: slightly eased
   2. Sealant: Product as recommended by synthetic stone manufacturer and approved by installer. Color as selected by Architect.

B. Fabrication
   1. Make clean cutouts as indicated and as required for installation of accessories, devices and fixtures. Coordinate cutouts with other trades
   2. Fabricate in largest pieces practicable. Where seams may be noticeable, locate joints symmetrically within continuous fields

Part 3: Execution

A. Inspection
   1. Installer shall inspect the substrate supporting the specialty surfacing.

B. Installation, General
   1. Specialty surfacing: Dry fit all pieces. Adjust substrate to ensure that the specialty surfacing is in contact over a minimum of 10% of the specialty surfacing face area.
   2. Eliminate gaps greater than .25" in span and depth on the contact perimeter. Adjust surfacing to the as-built conditions.
      a) Clean bond inhibitors from the matched surfaces. Remove loose matter, dust, grease, oil, water, and frost.
      b) Prime and bond in place using adhesive.
      c) Prepare joints so they are unnoticeable to the naked eye at a distance of 36 inches under well-lit conditions and in glancing light

END OF SECTION 123600

Section 313116 – Termite Control

Part 1: General

A. Work, including but not limited to
   1. Soil and wood treatment with termiticide.

B. Submittals
   1. Product Data: For each type of termite control product. Include the EPA-Registered Label for termiticide products.
   2. Warranties: Sample of special warranties.

C. Quality Assurance
   1. Installer Qualifications: A specialist who is licensed according to regulations of authorities having jurisdiction to apply termite control treatment and products in jurisdiction where Project is located, and who employs workers trained and approved by manufacturer to install manufacturer's products.
   2. Regulatory Requirements: Formulate and apply termiticides and termiticide devices according to the EPA-Registered Label.

D. Project Conditions
   1. Environmental Limitations: To ensure penetration, do not treat soil that is water saturated or frozen. Do not treat soil while precipitation is occurring. Comply with requirements of the EPA-Registered Label and requirements of authorities having jurisdiction.
   2. Coordinate soil treatment application with excavating, filling, grading, and concreting operations. Treat soil under footings, grade beams, and ground-supported slabs before construction.
   3. Apply wood treatment after framing, sheathing, and exterior weather protection is completed but before electrical and mechanical systems are installed.

E. Warranty
   1. Soil Treatment Special Warranty: Manufacturer's standard form, signed by Applicator and Contractor, certifying that termite control work, consisting of applied soil termiticide treatment, will prevent infestation of subterranean termites. If subterranean termite activity or damage is discovered during warranty period, re-treat soil and repair or replace damage caused by termite infestation.
      a) Warranty Period: Five years from date of Substantial Completion.
   2. Wood Treatment Special Warranty: Manufacturer's standard form, signed by Applicator and Contractor, certifying that termite control work, consisting of applied wood termiticide treatment, will prevent infestation of subterranean termites. If subterranean termite damage is discovered during warranty period, repair or replace damage caused by termite infestation and treat replacement wood.
      a) Warranty Period: 12 years from date of Substantial Completion.

F. Maintenance Service
   1. Continuing Service: Beginning at Substantial Completion, provide 12 months' continuing service including monitoring, inspection, and re-treatment for occurrences of termite activity. Provide a standard continuing service agreement. State services, obligations, conditions, terms for agreement period, and terms for future renewal options.

Part 2: Products

A. Soil Treatment
1. Termiticide: Provide an EPA-Registered termiticide compatible with wood treatment borate termiticide, complying with requirements of authorities having jurisdiction, in an aqueous solution formulated to prevent termite infestation. Provide quantity required for application at the label volume and rate for the maximum termiticide concentration allowed for each specific use, according to product's EPA-Registered Label.
   a) Service Life of Treatment: Soil treatment termiticide that is effective for not less than five years against infestation of subterranean termites.

B. Wood Treatment
1. Borate: Provide an EPA-Registered borate termiticide compatible with wood treatment borate termiticide, complying with requirements of authorities having jurisdiction, in an aqueous solution for spray application and a gel solution for pressure injection, formulated to prevent termite infestation in wood. Provide quantity required for application at the label volume and rate for the maximum diffusible borate concentration allowed for each specific use, according to product's EPA-Registered Label.

Part 3: Execution

A. Examination
1. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for moisture content of soil per termiticide label requirements, interfaces with earthwork, slab and foundation work, landscaping, utility installation, and other conditions affecting performance of termite control.

B. Preparation
1. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's written instructions for preparation before beginning application of termite control treatment. Remove all extraneous sources of wood cellulose and other edible materials such as wood debris, tree stumps and roots, stakes, formwork, and construction waste wood from soil within and around foundations.
2. Soil Treatment Preparation: Remove foreign matter and impermeable soil materials that could decrease treatment effectiveness on areas to be treated. Loosen, rake, and level soil to be treated except previously compacted areas under slabs and footings. Termiticides may be applied before placing compacted fill under slabs if recommended in writing by termiticide manufacturer.
   a) Fit filling hose connected to water source at the site with a backflow preventer, complying with requirements of authorities having jurisdiction.

C. Application, General
1. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's EPA-Registered Label for products.

D. Applying Soil Treatment
1. Application: Mix soil treatment termiticide solution to a uniform consistency. Provide quantity required for application at the label volume and rate for the maximum specified concentration of termiticide, according to manufacturer's EPA-Registered Label, to the following so that a continuous horizontal and vertical termiticidal barrier or treated zone is established around and under building construction. Distribute treatment evenly.
   a) Slabs on Grade and Basement Slabs: Under ground-supported slab construction, including footings, building slabs, and attached slab, as an overall treatment. Treat soil materials before concrete footings and slabs are placed.

b) Foundations: Adjacent soil, including soil along the entire inside perimeter of foundation walls; along both sides of interior partition walls; around plumbing pipes and electric conduit penetrating the slab; around interior column footers, piers, and chimney bases; and along the entire outside perimeter, from grade to bottom of footing. Avoid soil washout around footings.
c) Crawlspaces: Soil under and adjacent to foundations as previously indicated. Treat adjacent areas including around entrance platform, porches, and equipment bases. Apply overall treatment only where attached concrete platform and porches are on fill or ground.
d) Masonry: Treat voids.

2. Avoid disturbance of treated soil after application. Keep off treated areas until completely dry.
3. Protect termiticide solution, dispersed in treated soils and fills, from being diluted until ground-supported slabs are installed. Use waterproof barrier according to EPA-Registered Label instructions.
4. Post warning signs in areas of application.
5. Reapply soil treatment solution to areas disturbed by subsequent excavation, grading, landscaping, or other construction activities following application.

E. Applying Wood Treatment
1. Application: Mix wood treatment solution to a uniform consistency. Provide quantity required for application at the label volume and rate for the maximum specified concentration of borate, according to manufacturer's EPA-Registered Label, so that wood framing, sheathing, siding, and structural members subject to infestation receive treatment.
a) Framing and Sheathing: Apply termiticide solution by spray to bare wood for complete coverage.

F. Termite Control Schedule
1. Treat the following areas
a) Slab on Grade and Basement Slabs
b) Foundations
c) Crawlspaces
d) Slabs and retaining walls supporting or abutting exterior carpentry
e) Wood framing and sheathing

End of Section 31311

## PROFESSIONAL SEAL PAGE

## THE FOLLOWING SPECIFICATIONS ARE FOR GENERAL CIVIL ENGINEERING ITEMS ONLY (I.E. WATER, PAVING, GRADING, DRAINAGE):

NOTE: ALL SPECIFICATIONS ARE CITY OF AUSTIN UNLESS OTHERWISE NOTED.

| Section No. | Title | Issue Date |
|---|---|---|
| 101S | Preparing Right of Way | 1/4/11 |
| 102S | Clearing and Grubbing | 8/20/07 |
| 110S | Street Excavation | 11/18/04 |
| 111S | Excavation | 9/26/12 |
| 120S | Channel Excavation | 9/26/12 |
| 130S | Borrow | 9/26/12 |
| 132S | Embankment | 8/20/07 |
| 201S | Subgrade Preparation | 8/20/07 |
| 202S | Hydrated Lime and Lime Slurry | 8/18/00 |
| 203S | Lime Treatment for Materials in Place | 9/26/12 |
| 210S | Flexible Base | 2/24/10 |
| 220S | Sprinkling for Dust Control | 2/24/10 |
| 230S | Rolling (Flat Wheel) | 8/20/07 |
| 232S | Rolling (Pneumatic Tire) | 8/20/07 |
| 234S | Rolling (Tamping) | 8/20/07 |
| 236S | Proof Rolling | 8/20/07 |
| 301S | Asphalts, Oils, and Emulsions | 8/20/07 |
| 302S | Aggregated for Surface Treatments | 9/26/12 |
| 306S | Prime Coat | 2/24/10 |
| 307S | Tack Coat | 2/24/10 |
| 312S | Seal Coat | 9/26/12 |
| 313S | Cleaning and/or Sealing Joints and Cracks (Asphaltic Concrete) | 2/24/10 |
| 340S | Hot Mix Asphaltic Concrete Pavement | 9/26/12 |
| 360S | Concrete Pavement | 9/26/12 |
| 401S | Structural Excavation and Backfill | 9/26/12 |
| 402S | Controlled Low Strength Material | 11/13/07 |
| 403S | Concrete for Structures | 9/26/12 |
| 404S | Pneumatically Placed Concrete | 9/26/12 |
| 405S | Concrete Admixtures | 11/13/07 |
| 406S | Reinforcing Steel | 9/26/12 |
| 408S | Concrete Joint Materials | 11/13/07 |
| 409S | Membrane Curing | 11/13/07 |
| 410S | Concrete Structures | 9/26/12 |
| 411S | Surface Finished for Concrete | 11/13/07 |

| Section | Title | Issue Date |
|---|---|---|
| 413S | Cleaning and/or Sealing Joints and Cracks (Portland Cement Concrete) | 11/13/07 |
| 432S | Portland Cement Concrete Sidewalks | 1/4/10 |
| 435S | P.C. Concrete Steps | 11/13/07 |
| 438S | Elastomeric Materials | 9/26/12 |
| 439S | Parking Lot Bumper Curbs | 11/13/07 |
| 504S | Adjusting Structures | 2/24/10 |
| 505S | Concrete Encasement and Encasement Pipe | 2/24/10 |
| 506 | Manholes | 3/15/11 |
| 507S | Bulkheads | 3/26/08 |
| 508S | Miscellaneous Structures and Appurtenances | 2/24/10 |
| 509* | Trench Safety Systems | |
| 510* | Pipe | |
| 511* | Water Valves | |
| 551 | Pipe Underdrains | 5/16/97 |
| 558 | Structural Plate Structures | 9/26/12 |
| 559S | Portland Cement Concrete Box Culverts | 10/3/13 |
| 591S | Riprap for Slope Protection | 1/4/16 |
| 593S | P.C. Concrete Retards | 2/24/10 |
| 594S | Gabions and Revet Mattresses | 9/26/12 |
| 601S | Salvaging and Placing Topsoil | 11/14/16 |
| 605S | Soil Retention Blanket | 6/21/07 |
| 607S | Slope Stabilization Applications for Erosion Control | 5/23/00 |
| 620S | Filter Fabric | 1/4/16 |
| 633S | Landgrading | 11/26/01 |
| 634S | Level Spreader | 6/21/07 |
| 639S | Rock Berm | 8/18/10 |
| 641S | Stabilized Construction Entrance | 6/21/07 |
| 642S | Silt Fence | 9/1/11 |
| 658S | Void and Water Flow Mitigation | 4/4/12 |
| 700S | Mobilization | 9/26/12 |
| 703 | Fencing for Excavations | 9/22/88 |
| 704 | Metal Beam Guard Railing | 9/26/12 |
| 720S | Metal for Structures | 9/26/12 |
| 722S | Protective Coatings | 9/26/12 |
| 723 | Structural Welding | 9/26/12 |
| 725S | Survey Markers | 9/26/12 |

*CITY OF LIBERTY HILL STANDARD SPECIFICATIONS FOR WATER LINE
(CITY OF ROUND ROCK SPECIFICATIONS ADOPTED BY CITY OF LIBERTY HILL)

**BINKLEY & BARFIELD, INC.**

River Ranch County Park Design Development March 29, 2017

| Section | Title | Issue Date |
|---|---|---|

Rey Gonzalez, P.E.

[apply seal or review stamp]

SECTION 01000

GOVERNING SPECIFICATIONS

PART 1: DESCRIPTION

A. All specifications and special provisions, for general civil engineering items only (i.e. water, paving, grading, drainage), applicable to this project are identified as follows:

1) City of Austin Standard Specifications, Except for Water Line Related Items (See Item A(2) below) – Currently adopted by the City of Austin at the date of the agreement. Standard Specifications are incorporated into the contract by reference.

2) City Of Liberty Hill Standard Specifications For Water Line (City Of Round Rock Specifications Adopted By City Of Liberty Hill) – Currently adopted by the City of Liberty Hill at the date of the agreement. Standard Specifications are incorporated into the contract by reference.

3) All other General and Special conditions included elsewhere in the contract documents.

4) All other technical specifications included elsewhere in the contract documents.

B. Where discrepancies occur between the various governing specifications, the special provisions shall govern over both standard specifications and special provisions.

C. City of Austin/Liberty Hill/Round Rock Applicable Sections: Wherever, in the City of Austin/Liberty Hill/Round Rock Standard Specifications, reference is made to the City of Austin/Liberty Hill/Round Rock and its representatives, such reference shall be taken to mean Williamson County and its representatives.

| SECTION NO. | TITLE |
|---|---|
| 101S | PREPARING RIGHT OF WAY |
| 102S | CLEARING AND GRUBBING |
| 110S | STREET EXCAVATION |
| 111S | EXCAVATION |
| 120S | CHANNEL EXCAVATION |
| 130S | BORROW |
| 132S | EMBANKMENT |
| 201S | SUBGRADE PREPARATION |
| 202S | HYDRATED LIME AND LIME SLURRY |
| 203S | LIME TREATMENT FOR MATERIALS IN PLACE |
| 210S | FLEXIBLE BASE |
| 220S | SPRINKLING FOR DUST CONTROL |

| | |
|---|---|
| 230S | ROLLING (FLAT WHEEL) |
| 232S | ROLLING (PNEUMATIC TIRE) |
| 234S | ROLLING (TAMPING) |
| 236S | PROOF ROLLING |
| | |
| 301S | ASPHALTS, OILS, AND EMULSIONS |
| 302S | AGGREGATED FOR SURFACE TREATMENTS |
| 306S | PRIME COAT |
| 307S | TACK COAT |
| 312S | SEAL COAT |
| 313S | CLEANING AND/OR SEALING JOINTS AND CRACKS (ASPHALTIC CONCRETE) |
| 340S | HOT MIX ASPHALTIC CONCRETE PAVEMENT |
| 360S | CONCRETE PAVEMENT |
| | |
| 401S | STRUCTURAL EXCAVATION AND BACKFILL |
| 402S | CONTROLLED LOW STRENGTH MATERIAL |
| 403S | CONCRETE FOR STRUCTURES |
| 404S | PNEUMATICALLY PLACED CONCRETE |
| 405S | CONCRETE ADMIXTURES |
| 406S | REINFORCING STEEL |
| 408S | CONCRETE JOINT MATERIALS |
| 409S | MEMBRANE CURING |
| 410S | CONCRETE STRUCTURES |
| 411S | SURFACE FINISHED FOR CONCRETE |
| | |
| 413S | CLEANING AND/OR SEALING JOINTS AND CRACKS (PORTLAND CEMENT CONCRETE) |
| 432S | PORTLAND CEMENT CONCRETE SIDEWALKS |
| 435S | P.C. CONCRETE STEPS |
| 438S | ELASTOMERIC MATERIALS |
| 439S | PARKING LOT BUMPER CURBS |
| | |
| 504S | ADJUSTING STRUCTURES |
| 505S | CONCRETE ENCASEMENT AND ENCASEMENT PIPE |
| 506 | MANHOLES |
| 507S | BULKHEADS |
| 508S | MISCELLANEOUS STRUCTURES AND APPURTENANCES |
| 509* | TRENCH SAFETY SYSTEMS |
| 510* | PIPE |
| 511* | WATER VALVES |
| 551 | PIPE UNDERDRAINS |
| 558 | STRUCTURAL PLATE STRUCTURES |
| 559S | PORTLAND CEMENT CONCRETE BOX CULVERTS |
| 591S | RIPRAP FOR SLOPE PROTECTION |
| 593S | P.C. CONCRETE RETARDS |
| 594S | GABIONS AND REVET MATTRESSES |
| | |
| 601S | SALVAGING AND PLACING TOPSOIL |
| 605S | SOIL RETENTION BLANKET |
| 607S | SLOPE STABILIZATION APPLICATIONS FOR EROSION CONTROL |

| | |
|---|---|
| 620S | FILTER FABRIC |
| 633S | LANDGRADING |
| 634S | LEVEL SPREADER |
| 639S | ROCK BERM |
| 641S | STABILIZED CONSTRUCTION ENTRANCE |
| 642S | SILT FENCE |
| 658S | VOID AND WATER FLOW MITIGATION |
| | |
| 700S | MOBILIZATION |
| 703 | FENCING FOR EXCAVATIONS |
| 704 | METAL BEAM GUARD RAILING |
| 720S | METAL FOR STRUCTURES |
| 722S | PROTECTIVE COATINGS |
| 723 | STRUCTURAL WELDING |
| 725S | SURVEY MARKERS |

*CITY OF LIBERTY HILL STANDARD SPECIFICATIONS FOR WATER LINE
(CITY OF ROUND ROCK SPECIFICATIONS ADOPTED BY CITY OF LIBERTY HILL)

D. Special Specifications: Wherever, in the City of Austin/Liberty Hill/Round Rock Standard Specifications, reference is made to the City of Austin/Liberty Hill/Round Rock and its representatives, such reference shall be taken to mean Williamson County and its representatives.

E. The above-listed specification items are those under which payment is to be made. These, together with such other pertinent items, if any, as may be referred to in the above-listed specification items, and including the special provisions and special specifications listed above and the other technical specifications included in the project manual, constitute the complete specifications for this project.

F. Where discrepancies occur between the various governing specifications, Section 300 (Bid Form) shall govern over referenced specifications in establishing measurement and payment items.

END OF SECTION 01000

# PART 1 GENERAL

## 1.1 WORK INCLUDED

1. The testing laboratory shall make all inspections and perform all tests in accordance with the 2015 International Building Code (2015 IBC), local authorities, ASTM specifications and the Contract Documents.

2. Materials and workmanship not meeting the required standards are to be removed and replaced. Replacement and subsequent testing shall be at the expense of the Contractor.

3. Testing, inspection, and certifications specified in other sections of these Specifications shall be paid by the Contractor, unless otherwise indicated.

4. Inspection by the laboratory shall not relieve the Contractor or Fabricator of his responsibility to furnish materials and workmanship in accordance with the Contract Documents.

## 1.2 SELECTION AND PAYMENT

1. The Owner will employ and pay for services of an independent testing laboratory to perform inspection and testing services specified in this section.

## 1.3 REFERENCED STANDARDS

1. The latest adopted edition of all standards referenced in this Section shall apply, unless noted otherwise. In case of conflict between these Contract Documents and a referenced standard, the Contract Documents shall govern. In case of conflict between these Contract Documents and the Building Code, the more stringent shall govern.

## 1.4 QUALITY ASSURANCE

1. Testing Laboratory shall meet the requirements of ASTM E329 (Standard Specification for Agencies Engaged in Construction Inspection, Testing or Special Inspection) and ASTM E543 (Standard Specification for Agencies Performing Nondestructive Testing).

2. Testing Laboratory shall be insured against errors and omissions by a professional liability insurance policy having a limit of liability not less than $500,000.

3. Testing Laboratory shall be under the direction of a Registered Engineer licensed in the State of Texas, having at least five years experience in inspection and

testing of construction materials.

4. Laboratory staff monitoring concrete work shall be ACI or NICET Level II inspectors certified for the work they are monitoring.

5. Laboratory staff performing structural steel inspection shall be currently certified AWS Certified Welding Inspectors (CWI), in accordance with the provisions of AWS QCI, "Standard and Guide for Qualification and Certification of Welding Inspectors". The inspector may be supported by assistant inspectors who may perform specific inspection functions under the supervision of the inspector. Assistant inspectors shall be currently certified AWS Certified Associate Welding Inspectors (CAWI). The work of the assistant inspectors shall be regularly monitored by the inspector, generally on a daily basis.

6. Testing Equipment: Calibrated within the last 15 months with devices of an accuracy traceable to either National Bureau of Standards or accepted values of natural physical constants.

## 1.5 LABORATORY RESPONSIBILITIES

1. Attend preconstruction meetings and progress meetings as required to coordinate work with the Contractor and address quality control issues.

2. Test samples of design mixes submitted by Contractor.

3. Provide qualified personnel at site. Cooperate with Architect/Engineer and Contractor in performance of services.

4. Perform specified inspecting, sampling, and testing of Products in accordance with specified standards.

5. Ascertain compliance of materials and mixes with requirements of Contract Documents.

6. Promptly notify Architect/Engineer and Contractor of observed irregularities or non-conformance of Work or Materials. Notification shall be given in a manner that is designed to bring it to a reviewer’s attention. A line item note on the laboratory’s typical material test report is generally not sufficient to guarantee it will be noticed.

7. Perform all inspections and tests in accordance with 2012 International Building Code requirements for "Special Inspection" whether or not such inspections are specified in the Contract Documents.

## 1.6 LABORATORY REPORTS

1. After each inspection and test, promptly submit copies of laboratory reports to Architect, Engineer, Owner and to Contractor.

2. Include:
    1. Date issued
    2. Project title and number
    3. Name of inspector
    4. Date and time of sampling or inspection
    5. Identification of product and specifications section
    6. Location in the Project
    7. Type of inspection or test
    8. Date of test
    9. Results of tests
    10. Conformance with Contract Documents

## 1.7 LIMITS ON TESTING LABORATORY AUTHORITY

1. Laboratory may not release, revoke, alter, or enlarge the requirements of the Contract Documents.

2. Laboratory may not approve or accept any portion of the Work, except where such approval is specifically called for in these specifications.

3. Laboratory may not assume any duties of Contractor.

4. Laboratory has no authority to stop the Work.

## 1.8 CONTRACTOR RESPONSIBILITIES

1. See technical sections of these specifications for specific requirements.

2. Deliver to the laboratory, without cost to the Owner, adequate samples of materials proposed for use which are required to be tested.

3. Advise laboratory sufficiently in advance of construction operations to allow laboratory to complete any required checks or tests and to assign personnel for field inspection and testing as specified.

4. Provide incidental labor and equipment as required to assist laboratory personnel in obtaining and handling samples at the site and in accessing work for inspection.

5. Furnish concrete mix designs, in accordance with ACI 301, section 3.9, made by

an independent testing laboratory or qualified concrete supplier. Where mix designs are required, the laboratory shall be selected and paid by the Contractor.

6. Provide current welder certifications for each welder to be employed.

7. Furnish fabrication and erection inspection of all welds in accordance with AWS D1.1, Chapter 6.

8. Prequalification of all welding procedures to be used in executing the work.

## PART 2 - PRODUCTS

(NOT APPLICABLE)

## PART 3 - EXECUTION

### 3.1 FILLING AND BACKFILLING

1. A qualified representative of Raba Kistner, the project geotechnical engineer shall perform the testing and inspection specified in this section.

2. The Contractor shall make available to the laboratory, adequate samples of each fill and backfill material from the proposed sources of supply not less than 10 days prior to the start of the work.

3. Laboratory shall analyze samples as required to provide a soil description and to determine compliance with quality requirements. Perform the following tests:

    1. Test for liquid limit in accordance with ASTM D423.

    2. Test for plastic limit of soils and plasticity index of soils in accordance with ASTM D424.

    3. Tests for moisture density relations of soil in accordance with ASTM D698 or D1557, as applicable.

4. Furnish a report for each individual test and state whether sample conforms to specified requirements. If a sample does not meet specified requirements, make note of its non-compliance in a manner that will more readily bring it to a reviewer’s attention.

5. Make in-place compaction test for moisture content, moisture-density relationship, and density of fill material after compaction to determine that backfill materials have been compacted to the specified density. Number of tests shall be as follows:

    1. One test for each 2500 square feet of area of each lift placed under floor slabs. Stagger test locations in each lift from those in the previous lift. Perform a minimum of three tests for each lift.

## 3.2 CONCRETE REINFORCING STEEL AND EMBEDDED METAL ASSEMBLIES

1. Inspect all concrete reinforcing steel prior to placing of concrete for compliance with the Contract Documents and approved shop drawings. All instances of noncompliance shall be immediately brought to the attention of the Contractor for correction. If uncorrected by the Contractor, they shall be listed in the report.

2. Observe and report on the following:

    1. Number and size of bars.

    2. Bending and lengths of bars.

    3. Splicing.

    4. Clearance to forms including chair heights.

    5. Clearance between bars or spacing.

    6. Rust, form oil, and other contamination.

    7. Grade of Steel.

    8. Securing, tying and chairing of bars.

    9. Excessive congestion of reinforcing steel.

    10. Installation of anchor bolts and placement of concrete around anchor bolts.

    11. Fabrication and installation of embedded metal assemblies, including visual inspection of all welds.

    12. Visually inspect studs and deformed bar anchors on embedded assemblies for compliance with Contract Documents.

3. Provide a qualified, experienced inspector to inspect reinforcing steel. Inspector shall have a minimum of three years experience inspecting reinforcing steel in projects of similar size.

## 3.3 CONCRETE INSPECTION AND TESTING

1. Secure samples of concrete at the jobsite in accordance with ASTM C172.

2. Mold and cure three specimens from each sample in accordance with ASTM C31. The test cylinders shall be stored in the field 24 hours and then carefully transported to the laboratory and cured in accordance with ASTM C31.

3. Test specimens in accordance with ASTM C39. Two specimens shall be tested at 28 days for acceptance and one shall be tested at seven days for information.

4. Make one strength test (three cylinders) for each 100 cubic yards or fraction thereof, of each mix design placed in one day.

5. Make one slump test for each set of cylinders following the procedural requirements of ASTM C143 and ASTM C172. Make additional slump tests whenever the consistency of the concrete appears to vary. Slump tests corresponding to samples from which strength tests are made shall be reported with the strength test results. Other slump tests need not be reported.

6. Monitor the addition of water at the jobsite and the length of time the concrete is allowed to remain in the truck before placement. Report any significant deviation from the approved mix design to the Architect, the Contractor, and the concrete supplier.

7. Observe the placing of all concrete for proper application techniques. Observe and report on placing method, consolidation, cold joints, length of drop and displacement of reinforcing. Report deficiencies to the Contractor immediately for corrective action. Inspections may be reduced to a periodic basis when all procedures have been deemed satisfactory by the laboratory.

8. The testing laboratory shall certify each delivery ticket indicating class of concrete delivered (or placed), amount of water added and the time at which the cement and aggregate was dispensed into the truck. Laboratory shall also document start and end times at which concrete was discharged from the truck.

9. Evaluation and Acceptance:

    1. The strength level of the concrete will be considered satisfactory if the averages of all sets of three consecutive strength test results are equal to or

exceed the specified strength and no individual test result (average of two cylinders) is below the specified strength by more than 500 psi.

2. Completed concrete work will be accepted when the requirements of "Specifications for Structural Concrete for Buildings," ACI 301, Chapter 18 have been met.

10. Comply with ACI 311, "Guide For Concrete Inspection" and "ACI Manual of Concrete Inspection" (SP-2).

11. Inspect the application of curing compound and monitor all curing conditions to assure compliance with Specification requirements. Report curing deficiencies to the Contractor immediately and submit a report to the Architect.

## 3.4 STRUCTURAL STEEL

1. Inspect all structural steel during and after erection for conformance with Contract Documents and shop drawings. Where fabrication of structural load-bearing assemblies is being performed on the premises of a fabricator's shop, special inspection of the fabricated items shall be performed as required by the 2015 IBC.

   However, special inspections of shop fabricated items are not required on the premises of a fabricator that is registered and approved in compliance with the 2015 IBC to perform such work without special inspection. At completion of fabrication, the approved fabricator shall submit a certificate of compliance to the special inspector (and/or building official) that the work was performed in accordance with the approved construction documents.

2. Field Inspection:

   1. Proper erection of all pieces.

   2. Proper installation of all bolts, including the checking of calibration of impact wrenches used with high strength bolts.

   3. Plumbness of structure and proper bracing.

   4. Field Painting.

   5. Visual examination of all field welding.

3. Qualification of Welders: Fabricator and erector shall provide the testing laboratory with names of welders to be employed in the work, together with

certification that welders have passed qualification tests within the last year using procedures specified in the AWS D1.1. Testing laboratory shall verify all welder's qualifications.

4. Inspection of shop and field welding shall be "verification inspection," in accordance with Section 6 of AWS D1.1 and as follows:

    1. Visually inspect the welding of all shop fabricated members and note the location of all cover plates, connectors, bearing stiffeners, splices, and fillet welds for proper return around ends and check for seams, folds, and delaminations.

    2. Inspect surfaces to be welded. Surface preparations, fit-up and cleanliness of surface shall be noted.

    3. The welding inspector shall be present during alignment and fit-up of members being welded, and shall check for correct surface preparation of root openings, sound weld metal, and proper penetration in the root pass. Where weld has not penetrated completely, the inspector shall order the joint to be chipped down to sound metal, or gouged out and rewelded. Root passes shall be thoroughly inspected for cracks. All cracks shall be gouged out and rewelded to two inches beyond each end of crack.

    4. The inspector shall check that all welds have been marked with the welders symbol. The inspector shall mark the welds requiring repairs and shall make a reinspection. The inspector shall maintain a written record of all welds. Work completed and inspected shall receive an identification mark by the inspector.

    5. The testing laboratory shall advise the Owner and the Architect of any shop and/or field conditions which, in his opinion, may require further tests and examination by means other than those specified. Such further tests and examinations shall be performed as authorized by the Owner and the Architect.

    6. The Owner reserves the right to use ultrasonic or radiographic inspection to verify the adequacy of all welds. Testing procedures and acceptance criteria shall be as specified in AWS D1.1.

5. Inspection of bolted construction shall be in accordance with AISC "Specification for Structural Steel Buildings" and as follows:

    1. All bolts shall be visually inspected to ensure that the plies have been brought into snug contact.

2. High strength bolting shall be inspected in accordance with Section 9 of the AISC "Specifications for Structural Joints Using ASTM A325 or A490 Bolts."

3. For all high strength bolts, unless specifically noted on the Drawings to require only "snug-tight" installation, the inspector shall observe the required jobsite testing and calibration, and shall confirm that the procedure to be used provides the required tension.

6. Inspection of stud welding shall be in accordance with Section 7.8 of AWS D1.1 and as follows:

1. Visually inspect studs for compliance with the Contract Documents. Check number, spacing, and weld quality. If, after welding, visual inspection reveals that a sound weld or a full 360 degree fillet has not been obtained for a particular stud, such stud shall be struck with a hammer and bent 15 degrees off perpendicular. Studs failing this test shall be replaced.

## 3.5 EXPANSION BOLT INSTALLATION

1. Inspect the drilling of each hole and installation of each expansion bolt for compliance with the Contract Documents.

2. Verify the installation torque for each expansion bolt for compliance with manufacturer's installation instructions.

## 3.6 MASONRY

1. Inspection

1. Provide a qualified inspector to inspect all structural masonry work on a periodic basis, but not less than once each day. Inspect the bottom 8 ft. of CMU chimney construction, including the first course of horizontal bond beam construction, as required to ensure that that work is in compliance with the Contract Documents.

2. As masonry construction begins, verify that the proportions of site-prepared mortar, construction of mortar joints and grade, size and location of reinforcing are in compliance with the Contract Documents.

3. Prior to initial grouting, verify preparation of site-prepared grout, grout

space and placement of reinforcement.

4. Inspect the following on a periodic basis:

1. Preparation of masonry prisms for testing.

2. Placement of reinforcing.

3. Cavities to be grouted (prior to grouting and prior to closing cleanouts, if any).

4. Mortar mixing operations.

5. Bedding of mortar for each type of unit and placing of units.

6. Grouting operations.

7. Condition of units before laying for excessive absorption.

2. Provide report of each inspection.

2. Compressive Test for Mortar

1. Secure composite samples of mortar at the jobsite in accordance with ASTM C780.

2. Mold and cure three cube specimens in accordance with ASTM C109 and C780. Supervise the curing protection provided by the contractor for test specimens in the field and the transportation from the field to the laboratory. The specimens shall be stored in the field 24 hours and then be moved to the laboratory and cured in accordance with ASTM C780.

3. Test specimens in accordance with ASTM C780. Two specimens shall be tested at 28 days for acceptance and one shall be tested at seven days for information.

3. Compressive Test for Grout

1. Secure composite samples of grout at the jobsite in accordance with ASTM C172.

2. Mold and cure three, 3" diameter by 6" tall cylinders from each sample in accordance with ASTM C31. Supervise the curing protection provided by the contractor for the test specimens in the field and transportation to the

laboratory. The test cylinders shall be stored in the field 24 hours and then moved to the laboratory and cured in accordance with ASTM C31.

3. Test specimens in accordance with ASTM C39. Two specimens shall be tested at 28 days for acceptance and one shall be tested at seven days for information.

4. Make one strength test (three cylinders) for each 10 cubic yards of grout poured but not less than one strength test for each 5000 square feet of wall area.

END OF SECTION

# PART 1 GENERAL

## 1.1 WORK INCLUDED

1. Design, fabrication, erection, and stripping of formwork for cast-in-place concrete, including shoring, reshoring, falsework, bracing, bulkheads, keys, blockouts, sleeves, pockets, and accessories. Erection shall include installation of items furnished by other trades in formwork.

## 1.2 RELATED SECTIONS

1. Division 2 - Sitework Concrete

## 1.3 REFERENCES

1. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials.
2. ACI 301 - Specifications for Structural Concrete for Buildings.
3. ACI 347 - Guide to Formwork for Concrete.
4. ACI SP-4 - Formwork for Concrete.

## 1.4 QUALITY ASSURANCE

1. Construct and erect concrete formwork in accordance with ACI 117, 301 and 347.

## 1.5 TOLERANCES

1. Construct formwork, deposit and finish concrete as required to provide surfaces complying with the following tolerances (allowable variation):

    1. Lateral alignment:

        1. Face of foundation - 1 inch.

    2. Level alignment:

        1. Elevation of top surfaces of formed slabs - 3/4 inch.

    3. Cross-sectional dimensions: Overall dimensions of beams and thickness of slabs.

        1. 12 inch dimension or less - plus 3/8 inch to minus 1/4 inch.

        2. Greater than 12 inch to 3 foot dimension - plus 1/2 inch to minus 3/8 inch.

3. Greater than 3 foot dimension - plus 1 inch to minus 3/4 inch.

## 1.6 DELIVERY, STORAGE, AND HANDLING

1. Store off ground in ventilated and protected area to prevent deterioration from moisture or damage.

# PART 2 PRODUCTS

## 2.1 FORM MATERIALS

1. Forms for Unexposed Concrete:

    1. Construct formwork of plywood, lumber, metal, or other acceptable material. Lumber shall be dressed on at least two edges and one side for tight fit.

2. Forms for Exposed Concrete:

    1. Construct formwork with plywood, metal, or other panel type materials designed to provide continuous straight and smooth as-cast surfaces with minimum number of joints. Joints shall be made tight and shall be backed so that edges of adjoining formwork shall remain flush and true. Joints shall be vertical or horizontal, unless noted otherwise.

    2. Wood forms shall be constructed of 3/4 inch, APA B-B Plyform, Class 1, Exterior conforming to PS-1. Panels shall be mill oiled and all edges shall be sealed.

## 2.2 FORMWORK ACCESSORIES

1. Form Release Agent: Colorless material which will not stain concrete, absorb moisture, or impair natural bonding or color characteristics of coating intended for use on concrete.

2. Rustications, Bevels and Chamfers: Steel, polyvinyl chloride, or milled and sealed wood of size and shape shown on the Drawings.

# PART 3 EXECUTION

## 3.1 FORM CONSTRUCTION

1. General: Construct forms to the sizes, shapes, lines and dimensions shown on the Drawings. Provide for openings, offsets, keyways, rustications, reglets, chamfers, blockouts, bulkheads, anchorages, inserts, and other features as required.

2. Fabricate formwork for easy removal without hammering or prying against concrete surfaces. Do not damage cast concrete surfaces during formwork removal.

3. Kerf wood inserts for ease of removal.

4. Minimize form joints. Symmetrically align joints and make watertight to prevent leakage of mortar.

5. Form intersecting planes to provide true corners with edge grain of plywood not exposed as form for concrete.

6. Erect, support, brace, and maintain falsework to safely support all applied loads until such loads can be supported by the structure.

## 3.2 APPLICATION OF FORM RELEASE AGENT

1. Apply form release agent on formwork in accordance with manufacturer's instructions. Apply prior to placing reinforcing steel, anchoring devices, and embedded items.

2. Do not apply form release agent where concrete surfaces are scheduled to receive subsequent finishes which may be affected by agent. Soak contact surfaces of untreated forms with clean water. Keep surfaces wet prior to placing concrete.

## 3.3 INSERTS, EMBEDDED PARTS, AND OPENINGS

1. Provide formed openings where required for work embedded in or passing through concrete. In case of conflict with reinforcing steel or structural embeds, consult Architect before placement.

2. Coordinate work of other Sections in forming and setting openings, slots, recesses, chases, sleeves, bolts, anchors, and other inserts.

3. Install accessories in accordance with manufacturer's instructions, level and plumb. Ensure items are not disturbed during concrete placement.

## 3.4 FORM REMOVAL

1. Formwork not supporting concrete, such as side forms for beams, walls, and columns, may be removed after cumulatively curing at not less than 50 degrees Fahrenheit (10 degrees Celsius) for 12 hours after placing concrete, provided

concrete is sufficiently hard to not be damaged by form removal, and provided curing and protection operations are maintained.

2. Wood forms shall be completely removed. Provide temporary openings if required.

3.5 REUSE OF FORMS

1. Clean and repair surfaces of forms to be reused. Damaged forming material shall not be replaced and shall not be used in construction.

2. Apply form release agent to concrete contact surfaces prior to each reuse of the forms.

END OF SECTION

# PART 1 GENERAL

## 1.1 WORK INCLUDED

1. Furnish all labor and materials required to fabricate, deliver and install reinforcement and embedded metal assemblies for cast-in-place concrete, including steel bars, welded steel wire fabric, ties and supports.

## 1.2 RELATED WORK

1. Division 1 - Testing Laboratory Services
2. Division 2 - Sitework
3. Section 03300 - Cast-In-Place Concrete

## 1.3 REFERENCES

1. Comply with the provisions of the following codes and standards, unless noted otherwise:

    1. ACI 301 - Specifications for Structural Concrete for Buildings.
    2. ACI 315 - Details and Detailing of Concrete Reinforcement.
    3. CRSI - Manual of Practice.
    4. CRSI 63 - Recommended Practice for Placing Reinforcing Bars.
    5. CRSI 65 - Recommended Practice for Placing Bar Supports, Specifications and Nomenclature.

## 1.4 QUALITY ASSURANCE

1. Perform concrete reinforcement work in accordance with CRSI Manual of Standard Practice, and Documents 63 and 65.

2. The latest adopted edition of all standards referenced in this Section shall apply unless noted otherwise. In the case of conflict between the Contract Documents and a reference standard, the Contract Documents shall govern. In the case of a conflict between the Contract Documents and the Building Code, the more stringent shall govern.

## 1.5 SUBMITTALS

1. Submit in accordance with Division 1.
2. Submittals for review:

    1. Shop drawings for fabrication, bending, and placement of concrete reinforcement. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement".

2. Indicate sizes, spacings, locations and quantities of reinforcing steel, wire fabric, bending diagrams, splicing, stirrup spacing, supporting and spacing devices and assemblies as required for fabrication and placement of reinforcement.

3. Do not reproduce the structural drawings for use as shop drawings.

4. Embedded metal assemblies: Submit shop drawings for fabrication and placement. Use standard AWS welding symbols.

3. Submittals for Information

1. Mill test certificates of supplied concrete reinforcing, indicating physical and chemical analysis.

PART 2 PRODUCTS

2.1 MATERIALS

1. Reinforcing Steel: ASTM A615, grades as indicated on the drawings.

2. Welded Steel Wire Fabric: ASTM A185, "Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement." Furnish in flat sheets, not rolls.

2.2 ACCESSORIES

1. Tie Wire: Minimum 16 gage, annealed type.

2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during installation and placement of concrete in conformance with CRSI recommendations.

3. For slabs on grade, provide sand plates, horizontal runners, or precast concrete blocks on bottom where base material will not support chair legs or where vapor barrier has been specified.

2.3 EMBEDDED METAL ASSEMBLIES

1. Steel Shapes and Plates: Conform to ASTM A36

2. Deformed Bar Anchors: Welded by full-fusion process, as furnished by TRW Nelson Stud Welding Division.

2.4 FABRICATION OF REINFORCEMENT

1. Fabricate with tolerances complying with CRSI "Manual of Standard Practice."

2.5 FABRICATION OF EMBEDDED METAL ASSEMBLIES

1. Fabricate metal assemblies in the shop. Holes shall be made by drilling or punching. Holes shall not be made by or enlarged by burning. Welding shall be in accordance with AWS D1.1.

2. Welding of deformed bar anchors shall be done by full fusion process equal to that of TRW Nelson Stud Welding Division.

PART 3 EXECUTION

3.1 INSTALLATION

1. Before placing concrete, clean reinforcement to remove soil, loose rust, mill scale, ice, or other materials which reduce bond with concrete.

2. Accurately position reinforcement and secure reinforcement against displacement by construction or concrete placement operations.

3. Place reinforcement to obtain minimum concrete cover specified. Tie bars and bar supports together with tie wire to hold reinforcement in position. Set tie wires so that the twisted ends are directed away from exposed concrete surfaces.

4. Installation tolerances:

    1. Top and bottom bars in slabs, girders, beams and joists:

        1. Members 8" deep or less: ±3/8"
        2. Members more than 8" deep: ±1/2"

    2. Concrete Cover to Formed or Finished Surfaces: ±3/8" for members 8" deep or less; ±1/2" for members over 8" deep, except that tolerance for cover shall not exceed 1/3 of the specified cover.

5. Concrete Cover: refer to the general notes.

6. Splices: Provide standard reinforcement splices by lapping and tying ends. Comply with ACI 318 for minimum lap of spliced bars where not specified on the documents. No. 14 and 18 bars shall not be lap spliced.

END OF SECTION

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PART 1 GENERAL -

All materials and procedures used in cast-in-place concrete construction shall comply with the requirements of the authorities having jurisdiction over this project.

1.1 WORK INCLUDED

1. Furnish all labor and materials required to perform the following:

    1. Cast-in-place concrete.
    2. Concrete mix designs.

1.2 RELATED SECTIONS

1. Division 2 - Concrete Paving
2. Division 2 - Sitework Concrete
3. Section 031000 - Concrete Formwork
4. Section 033460 - Concrete Floor Finishing

1.3 REFERENCES

1. The latest adopted edition of all standards referenced in this section shall apply.

    1. ACI 301 - Specifications for Structural Concrete for Buildings
    2. ACI 304 - Guide for Measuring, Mixing, Transporting and Placing Concrete
    3. ACI 305 - Hot Weather Concreting
    4. ACI 306 - Cold Weather Concreting
    5. ACI 308 - Standard Practice for Curing Concrete
    6. ACI 309 - Recommended Practice for Consolidation of Concrete
    7. ACI 318 - Building Code Requirements for Reinforced Concrete
    8. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete
    9. ACI 212.2 - Guide for Use of Admixtures in Concrete
    10. ACI 214 - Recommended Practice for Evaluation of Strength Test Results of Concrete
    11. ACI 304.2 - Placing Concrete by Pumping Methods
    14. ASTM Standards in Building Codes (as referenced)

1.4 QUALITY ASSURANCE

1. Refer to Division 1 for required laboratory testing and inspection.

2. Trial Batches: Contractor shall provide and pay for qualification of proposed materials and the establishment of mix designs in accordance with ACI 301.

3. Contractor's responsibilities to testing laboratory:

    1. Furnish labor and materials as required to assist testing agency in obtaining, making and handling samples at the jobsite.

    2. Advise the testing agency sufficiently in advance of operations to allow testing agency adequate time for the assignment of testing personnel.

    3. Furnish and maintain adequate facilities for the proper curing of concrete test specimens on the project site in accordance with ASTM C31.

4. Evaluation and Acceptance of Placed Concrete:

    1. The strength level will be considered satisfactory if the averages of all sets of three consecutive strength test results equal or exceed the specified strength and no individual test result (average of two cylinders) is below the specified strength by more than 500 psi.

    2. When the strength level of the concrete for any portion of the structure, as indicated by cylinder tests, falls below the specified requirements, the Contractor shall provide improved curing conditions and/or adjustments to the mix design as required to obtain the required strength. If the average strength of the laboratory control cylinders falls so low as to be deemed unacceptable, the Contractor shall follow the core test procedures set forth in ACI 301. Locations of core tests shall be approved by the Architect. Core sampling and testing shall be at the Contractor's expense.

        1. If the results of the core tests indicate that the strength of the structure is inadequate, any replacement, testing, or strengthening as may be ordered by the Architect shall be provided by the Contractor without cost to the Owner.

## 1.5 CONCRETE MIX DESIGNS

A. General: The Contractor is responsible for ensuring that the concrete is properly placed, finished, cured and meets the quality and performance requirements of this Section. It is understood that adjustments to mix designs may be necessary during the course of the Project. However, adjustments should be anticipated. Therefore, approved mix designs with anticipated adjustments must be submitted for review as normally required for proposed concrete mix design submittals.

B. Selection of Proportions: Unless noted otherwise, proportions of ingredients for concrete mixes shall be determined (designed) by an independent testing laboratory or qualified concrete supplier in accordance with ACI 301. If a testing laboratory

provides concrete mix designs, it shall be selected by the Contractor, approved by the Architect, and paid by the Contractor.

C. Fly ash may be used as a substitute for cement: 20 percent by volume of cement replacement minimum, 30 percent by volume maximum. Confirm fly ash content of existing panels as required to match.

D. Concrete strengths and maximum water/cement rations are specified in the General Notes of the Structural series drawings.

E. Required average strength above specified strength: Determination of required average strength above specified strength shall be based on the standard deviation record of the production facility in accordance with ACI 301. If a suitable record of strength tests is not available, proportions shall be selected on the basis of laboratory trial batches to produce an average strength greater than the specified strength f'c by the amount defined in ACI 301.

F. Maximum size of coarse aggregate shall not be more than 1.5" nor more than one-fifth of the narrowest dimension between sides of forms, one-third of the depth of slabs, nor three-fourths of the minimum clear spacing between reinforcing bars.

G. All proposed concrete mix designs shall include the following information:

1. Proportions of cement, fly ash, fine and coarse aggregates, and water.

2. Maximum water/cement ratio, design strength, maximum slump, and air content.

3. Type of cement along with ASTM C150 cement mill test certificates. Type of fly ash along with ASTM C 618 fly ash test certificates.

4. Fine and coarse aggregate gradation, including maximum size of coarse aggregates.

5. Type and quantities of all admixtures.

## PART 2 PRODUCTS

### 2.1 CONCRETE MATERIALS

1. Cement: ASTM C150, Type II.

2. Normal Weight Aggregates: ASTM C33. Provide aggregates from a single source for all exposed concrete. Do not use any aggregates that may cause spalling of concrete at exposed surfaces.

3. Water: Potable.

2.2 ADMIXTURES

1. General: Do not use admixtures which have not been incorporated and tested in accepted mixes. Set controlling admixtures shall comply with the applicable standards of ASTM C494.

2. Admixtures containing more than 0.05 percent calcium chloride ions shall not be used in the concrete mix.

3. Fly ash and fly ash source shall conform to the State of Texas Department of Highways and Public Transportation (TxDOT) Materials Specification D-9-8900, "Fly Ash".

2.3 CURING MATERIALS

1. General: Volatile organic compound (VOC) rating shall meet the applicable environmental regulations of the authorities having jurisdiction over this project.

2. Material providing water retention not exceeding loss of 0.055 gm/cm2 in 72 hours when used at a coverage of 200 square feet per gallon and tested in accordance with ASTM C156.

    1. Curing compound shall conform to the requirements of ASTM C309. Curing compound used on exposed concrete shall be non-discoloring and shall not darken or yellow with age. Acceptable manufacturers are:

        Master Builders
        W.R. Meadows
        Dayton Superior
        Euclid Chemical
        Sonneborn

    2. See Architectural drawings and specifications for concrete sealing system. Selection of curing compound shall be coordinated with sealing system specified.

2.4 MISCELLANEOUS MATERIALS

1. Bonding Agent: Two component, moisture insensitive, extended pot life epoxy bonding agent equal to "Sikadur 32 Hi-Mod LPL", by the Sika Corporation.

2. Vapor Barrier: Comply with the requirements of the “Building Pad” notes on the Structural series drawings. Polyethylene films shall meet the requirements of ASTM

E154. Type recommended for below grade application. Tape for joints shall be a minimum of 2" wide and shall have the same permeability rating as the vapor barrier.

3. Drilled anchor bolts: Selected for the appropriate use and installed in accordance with manufacturer's recommendations. Shall be from one of the following:

   Wej-It Bolt, Wej-It Corporation
   Kwik Bolt II, Hilti Fastening Systems
   Trubolt, Ramset Fastening Systems

4. Touch up paint for field application to embedded metal assemblies shall be "ZRC" cold galvanizing compound by ZRC Chemical Products.

## PART 3 EXECUTION

### 3.1 PRODUCTION OF CONCRETE

1. Concrete shall not be mixed for placing until the mix designs and corresponding strength tests for each class of concrete have been accepted by the Architect for use on the project. Compressive strength shall be as noted on the drawings.

2. Concrete production facility shall be certified with the National Ready Mixed Concrete Association (NRMCA). Concrete shall be produced and supplied to the jobsite in accordance with ASTM C94.

3. Admixtures: Shall be introduced in quantities and according to methods recommended by the manufacturer of the admixture.

4. Use accelerating admixtures in cold weather only when approved by Architect/Engineer. Use of admixtures will not relax cold weather placement requirements.

5. Use set-retarding admixtures during hot weather only when approved by Architect/Engineer.

6. Fly ash shall not be used in combination with Type IP cement.

7. When approved by the laboratory inspector, water may be added to the truck at the jobsite to adjust the slump, but the water content shall not exceed the maximum specified water/cement ratio for the mix (design).

8. Mixing time: Unless otherwise approved by the laboratory inspector, discharge shall be completed within 90 minutes after the introduction of water to the cement.

## 3.2 PLACING CONCRETE

1. Before placing concrete, Contractor shall ensure that formwork, reinforcing steel and all other embedded items have been properly installed and tied in.

2. Contractor shall schedule and coordinate the delivery of concrete to ensure its continuous placement. Contractor shall submit proposed construction joint locations for review and approval by the Architect where necessary to properly manage concrete placement.

3. Contractor shall coordinate concrete finishing and installation of control joints with concrete placement operations as necessary to meet project requirements.

4. All work shall be in accordance with ACI 304.

5. Sprinkle subgrades sufficiently to control water loss from concrete.

6. Concrete shall not be placed on frozen ground.

7. Deposit concrete in such manner that no concrete is placed on concrete that has hardened sufficiently to cause the formation of seams (or other planes of weakness).

8. Deposit concrete as necessary to avoid segregation.

9. Do not permit concrete to drop freely any distance greater than 5'-0" (10'- 0" for concrete containing a superplasticizer). Provide chute or tremie to place concrete where longer drops are necessary. Do not place concrete into excavations with standing water. If place of deposit cannot be pumped dry, pour concrete through a tremie with its outlet near the bottom of the place of deposit.

10. Deposit concrete in formwork in horizontal layers not deeper than 2 ft. Place each layer while layer below is still plastic to avoid cold joints.

11. Prepare previously placed concrete by cleaning with steel brush and applying water or bonding agent. Apply bonding agent in accordance with manufacturer's instructions.

12. Construction Joints: Construction Joints shall be placed only in positions approved by the Engineer or as indicated on the drawings. Should construction joints prove to be absolutely unavoidable, the joints shall be located at or near midspan of the beams, joists, or slabs.

13. Weather Conditions:

    1. Cold weather: Temperature of concrete delivered at the jobsite shall conform to the following minimum:

| Air Temperature | Concrete Temperature |
|---|---|
| 30 to 45 degrees F. | 55 to 90 degrees F. |
| 0 to 30 degrees F. | 60 to 90 degrees F. |
| Below 0 degrees F. | 65 to 90 degrees F. |

Water heated to 100 degrees Fahrenheit (minimum) shall be combined with the aggregates before the cement is added. Cement shall not be added to water and aggregates having a temperature greater than 100 degrees Fahrenheit.

1. Comply with ACI 306, "Cold Weather Concreting"

2. When the outdoor temperature is less than 40 degrees Fahrenheit, temperature of concrete shall be maintained at not less than 50 degrees Fahrenheit for the required curing time.

    1) Arrangements shall be made before placement to maintain required temperature without injury from excessive heat.

    2) Combustion heaters shall not be used during the first 48 hours without precautions to prevent exposure of concrete and workmen to exhaust gases containing carbon dioxide and carbon monoxide.

2. Hot, Dry and/or Windy Weather: Temperature of concrete delivered to the jobsite shall not exceed 90 degrees Fahrenheit. Ingredients shall be cooled before mixing to prevent concrete temperature in excess of 95 degrees Fahrenheit.

    1. Comply with ACI 305, "Hot Weather Concreting"

    2. Provisions shall be made for windbreaks, shading, fog spraying, sprinkling, or wet cover when necessary.

    3. Use specified evaporation retarder to prevent rapid drying of surface during finishing.

## 3.3 INSTALLATION OF VAPOR BARRIER

1. Install vapor barrier to form a continuous layer under slabs on grade. Provide 6" overlap at joints. Seal with 2" wide pressure sensitive tape. Carefully cut film around pipes and conduits and then apply tape around these protrusions.

## 3.4 FINISHING CONCRETE SLAB SURFACES

1. Refer to section 033460 for finishing requirements for concrete slab surfaces.

## 3.5 FINISHING EXPOSED FORMED CONCRETE SURFACES

1. General: Provide exposed-to-view concrete formed surfaces of such quality as to require a minimum of pointing. Exercise care in the forming, mixing and placing of concrete to assure reasonably uniform surfaces free of blemishes and defects. Repair unsightly voids or honeycombing and tie holes using approved methods. Fins and other projections shall be neatly dressed off. Form offsets greater than the specified tolerances shall be ground down. Holes larger than 1/4" shall be drenched with clean water and properly patched with Portland Cement and sand mortar of color and texture to match surrounding concrete.

2. Rough Form Finish: To be provided on concrete surfaces not exposed to view in the completed Work or concealed by other construction. Fins and other projections exceeding 1/4 inch in height shall be rubbed down or chipped off.

3. Smooth Form Finish: To be provided on surfaces exposed to view or to be covered with a coating or covering material such as paint, waterproofing, plaster, etc. Fins and other projections shall be neatly dressed off. Form offsets greater than the specified tolerances shall be ground down. Holes larger than 1/4" shall be drenched with clean water and properly patched with Portland Cement and sand mortar of color and texture to match concrete.

## 3.6 CONCRETE SURFACE REPAIRS

1. Filling Tie Rod and Bolt Holes: Holes resulting from the removal of bolts or tie rods shall be solidly filled with sand-cement grout. All excess mortar at the faces of filled holes shall be struck off flush.

2. Patching Defective Areas: Repair and patch non-structural defective areas in formed surfaces. Where reinforcing steel is exposed and at severe honeycombs, cracks , voids or other defects which may impair structural capacity, notify the Architect prior to attempting to make repairs.

    1. Chip out any honeycombs down to solid concrete. Make edges of cuts perpendicular to concrete surface. Thoroughly clean and flush with water and brush coat the area to be patched with specified bonding compound. Trowel sand cement mixture into honeycombs, bubbles and voids larger than 1/4". Strike off and finish flush with surrounding surface.

    2. For exposed to view surfaces, blend white and gray or buff Portland cement so that, when dry, the patch will match the color of the surrounding surface. Test blend at inconspicuous locations to verify mixture and color match.

Finish surfaces to match texture of surrounding surface.

3. All patches in architecturally exposed concrete shall be indistinguishable from the surrounding surfaces. The mix formula for patching mortar shall be determined by trial to obtain good color match with the concrete when both patch and concrete are cured and dried. After initial set, surfaces of patches shall be dressed manually to obtain the same texture as surrounding surfaces.

## 3.7 CURING AND SEALING

1. Comply with ACI 308 recommendations. Protect all freshly placed concrete from washing by rain, flowing water, etc. Do not allow the concrete to dry out from the time it is deposited in the forms until the expiration of the curing period specified in this Section.

2. Immediately after finishing operations have been completed, concrete surfaces shall be cured by one of the following methods:

    1. Exposed concrete surfaces in the Natatorium slab-on-grade shall be kept continuously wet with clean water for a period not less than seven days after placing. Each day forms are left in place and exposed concrete surfaces are kept wet will be counted as one day of curing.

    2. In all other building slabs-on-grade, Contractor may use a non-bituminous liquid curing compound as specified. Curing compound must be coordinated and consistent with subsequent flooring application requirements. When under hot weather concreting conditions (Paragraph 3.2), concrete must be kept wet for a period of 24 hours minimum before applying curing compound. Curing liquid shall be applied in 2 coats (at right angles to one another) at the rate and method of application as recommended by the manufacturer. Patches in architectural concrete shall be cured for seven days. Patches shall be protected from drying to the same extent as the mass of the concrete.

3. Control Joint Sealant: Install specified polyurethane sealant in all tooled joints as detailed. Thoroughly clean and prepare joints in accordance with the manufacturer's instructions. Apply primer where recommended by the manufacturer. Protect sealant from traffic until cured.

## 3.8 CLEANUP

1. Imperfect or damaged work, or any material damaged or determined to be defective before final completion and acceptance of the entire job, shall be satisfactorily replaced at the Contractor's expense, and in conformity with all of the requirements of the Drawings and Specifications. Removal and replacement of concrete work shall

be done in such manner as not to impair the appearance or strength of the structure in any way.

2. Cleaning: Upon completion of the work all forms, equipment, protective coverings and any rubbish resulting therefrom shall be removed from the site. After sweeping floors, wash floors with clean water. Finished concrete surfaces shall be left in a clean condition, satisfactory to the Owner.

END OF SECTION

# PART 1 GENERAL

## 1.1 WORK INCLUDED

1. Finishing slabs-on-grade and monolithic floor slabs.

## 1.2 RELATED SECTIONS

1. Section 033000 - Cast-in-Place Concrete

## 1.3 REFERENCES

1. ACI 301 - Specifications for Structural Concrete for Buildings
2. ACI 302 - Guide for Concrete Floor and Slab Construction

## 1.4 QUALITY ASSURANCE

1. Refer to Division 1 for required laboratory testing and inspection.

# PART 2 PRODUCTS – not used

# PART 3 EXECUTION

## 3.1 FLOOR FINISHING

1. Concrete slabs shall be finished as specified below, within the tolerances specified elsewhere in this Section.

2. Highway straightedges are recommended for use in lieu of bullfloats for all slab placement and finishing operations.

3. Screeding: Immediately after placing, slab shall be vibrated and struck off true by double screeding to the required level, at or below the elevation or grade of the finished slabs as indicated on the Drawings. Vibrators shall not be used to spread the concrete.

4. Trowel Finish

    1. Locations: Exposed concrete floors not otherwise specified, concrete surfaces under carpets, vinyl tile and thin set tile.

    2. Finishing: After concrete has stiffened sufficiently to permit operation and after bleed water has disappeared, hand or machine float the surface. Spreading dry cement to absorb bleed water is not acceptable. Follow immediately by steel troweling at least twice with hand or machine trowels.

5. Broom Finish

    1. Locations: Ramps, walks, curbs, islands, parking and drive areas, and other locations noted on the Drawings.

    2. Finishing: Same method as specified for trowel finish, except after initial troweling brush concrete surfaces with soft brush or broom to texture specified by the Architect. Striations shall run in the direction of the drainage slope, if any, unless otherwise specified.

6. Heavy Broom Finish

    1. Locations: Ramps steeper than 7 percent slope and other locations where noted on the Drawings.

    2. Finishing: As soon as the surface of the concrete is sufficiently stiffened, wood float the surface to a true plane with no coarse aggregate visible. Ramp surfaces shall be cross jointed with a Goldblatt Groover (Model #06-314-M7) or equal jointing tool for the entire width of the ramps. Space cross joints at 6" intervals. The concrete surfaces between grooves shall be brushed with a stiff fiber brush to produce uniformly striated surfaces parallel with cross jointing. Grooved joints and brushed finish texture shall be approved by the Architect.

## 3.2 CONCRETE FINISH MEASUREMENT AND TOLERANCES

1. Slabs shall be level within a tolerance of plus or minus 1/4" in 10'-0", not to exceed 3/4" total variation, anywhere on the floor. Levelness shall be checked on a 10'-0" grid using a level after removal of forms.

2. Floor Elevation Tolerance Envelope:

    1. The acceptable tolerance envelope for absolute elevation of any point on the slab surface, with respect to the elevation shown on the Drawings, is as follows:
        1. Slabs: +/- 3/4"

        2. Slabs specified to slope shall have a tolerance from the specified slope of 3/8" in 10'-0" at any point, up to 3/4" from theoretical elevation at any point.

3. Remedial Measures for Slab Finish Construction not Meeting Specified Tolerances:

    1. Application of Remedial Measures. Remedial measures specified herein are required whenever either or both of the following occur:

1. The composite overall values of flatness or levelness of any test section or the entire floor installation measure less than specified values.

2. Any individual test sample (line of measurements) measures less than the specified absolute minimum flatness or levelness value.

2. Modification of Existing Surface:

1. If, in the opinion of the Architect or Owner's representative, all or any portion of the substandard work can be repaired without sacrifice to the appearance or serviceability of the area, the Contractor shall immediately undertake the approved repair method.

2. The Contractor shall submit for review and approval a detailed work plan of the proposed repair showing areas to be repaired, method of repair, and time required to make the repair.

3. Repair method(s), at the sole discretion of the Architect or Owner's Representative, may include grinding (floor stoning), planing, retopping with specified floor leveling compound, or any combination of the above.

4. All repair work shall be performed at no additional cost to the Owner and with no extension to the construction schedule.

3. Removal and Replacement:

1. If, in the opinion of the Architect/Engineer or Owner's Representative, all or any portion of the substandard work cannot be satisfactorily repaired without sacrifice to the appearance or serviceability of the area, the Contractor shall remove and replace the defective work as directed.

2. Replacement sections may be retested for compliance at the discretion of the Architect/Engineer or Owner's Representative.

3. All replacement work shall be performed at no additional cost to the Owner and with no extension to the construction schedule.

END OF SECTION

# PART 1 GENERAL

## 1.1 WORK INCLUDED

1. Structural steel framing members, support members, steel plates, deck support angles, shop welded shear studs, and connections.

2. Shop prime painting and touch up painting in the field.

3. Grouting under base plates.

4. Temporary construction bracing.

5. Fabrication and erection inspection and testing.

## 1.2 RELATED SECTIONS

1. Division 1 - Testing Laboratory Services
2. Division 5 - Metal Fabrications
3. Division 5 - Metal Stairs
4. Division 9 - Finish Painting

## 1.3 REFERENCES

1. AISC "Code of Standard Practice for Steel Buildings and Bridges" except that the following sentence in paragraph 4.2.1 shall not apply: "This approval constitutes the Owner's acceptance of all responsibility for the design adequacy of any detail configuration of connections developed by the fabricator as part of his preparation of these shop drawings."

2. AISC "Specification for Architecturally Exposed Structural Steel."

3. AISC "Specification for Structural Steel Buildings," including the "Commentary" and the Supplements thereto, as issued.

4. ASTM A6 "Specifications for General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling, and Bars for Structural Use."

5. AWS D1.1 "Structural Welding Code"

6. SSPC (Steel Structures Painting Council), Painting Manuals, Volumes 1 and 2.

7. UL "Fire Resistance Directory."

## 1.4 QUALITY ASSURANCE

1. The latest adopted edition of all standards referenced in this Section shall apply unless noted otherwise. In case of conflict between these Contract Documents and a referenced standard, the Contract Documents shall govern. In case of conflict between these Contract Documents and the Building Code, the more stringent shall govern.

2. All materials, fabrication procedures and field erection are subject to verification inspection and testing by the Owner's testing laboratory in both the shop and field. Such inspections and tests will not relieve the Contractor of the responsibility for providing materials and fabrication procedures in compliance with specified requirements.

3. Qualifications for Welding Work: Contractor shall be responsible for qualifying welding operators in accordance with the AWS "Standard Qualification Procedure." Provide certification to Owner's testing laboratory that welders to be employed in the work have satisfactorily passed AWS qualification tests within the previous 12 months. Recertification of welders shall be Contractor's responsibility.

4. Qualification of Welding Procedures: Contractor shall provide the testing laboratory with welding procedures which are to be used. Welding procedures shall be qualified prior to use in accordance with AWS D1.1, Part B.

## 1.5 SUBMITTALS

1. Submit is accordance with Division 1.

2. Submittals for review:

    1. Provide complete details and schedules for fabrication and shop assembly of members, erection plans, details, procedures, and diagrams showing sequence of erection. Include details of cuts, connections, camber, weld profiles and sizes, spacing. Indicate welds by standard AWS symbols. Shop drawings and erection drawings shall not be made by using reproductions of Contract Drawings.

    2. Structural steel members for which shop drawings have not been reviewed shall not be fabricated. Engineer's review shall cover general locations, spacing, and details of design. Omission from shop drawings of any materials required by the Contract Documents shall not relieve the Contractor of the responsibility of furnishing and installing such materials, even though such shop drawings may have been reviewed and returned.

4. Any departures from the structural framing plans or details shall be clearly denoted on the shop drawings to ensure proper engineering review.

3. Submittals for Information

1. Mill Test Reports: Submit indicating compliance with the Specifications.

2. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

## PART 2 PRODUCTS

### 2.1 MATERIALS

1. Steel
   1. Structural Steel Members: ASTM A992, Grade 50.
   2. Cold formed structural Tubing: ASTM A500, Grade B, 46,000 yield.
   3. Pipe: ASTM A53, Type E or S, Grade B.

2. Bolts, Nuts, and Washers:

1. Anchor bolts: ASTM F1554, Grade 36 with ASTM A563A Hex Nuts. Plate washers shall be provided in accordance with Table 14-2 of the AISC Steel Construction Manual, 13th Edition.

2. All other bolts: High strength bolts; ASTM A325 or ASTM A490.

3. Washers: Circular washers shall conform to the requirements of Type A washers in ANSI Standard B23.1. Beveled washers for "S" shapes and channels shall be square or rectangular and tapered in thickness.

3. Welding electrodes: AWS D1.1, E70.

4. Primer Paint:

1. Standard shop coat of red oxide primer meeting the requirements of "SSPC-Paint 13" or Federal specification "TT-P-636."

5. 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 5,000 psi at 28 days. Grout shall conform to ASTM C1107, Grade B when tested at fluid consistency.

6. Galvanizing: Where galvanizing is required, the zinc coating shall conform to ASTM A123. Zinc coating for threaded products shall conform to ASTM A153, class C. Zinc coating for sheet steel shall conform to ASTM A591.

7. Cold galvanizing compound shall be "ZRC" cold galvanizing compound as manufactured by ZRC Chemical Products, Quincy, Massachusetts.

## 2.2 FABRICATION

1. Shop Fabrication:

    1. Fabricate and structural assemblies in the shop to the greatest extent possible. Fabricate items of structural steel in accordance with AISC Specifications and as indicated on accepted shop drawings. Fabrication tolerances shall conform to the AISC Code of Standard Practice.

    2. Camber: Provide camber in members where indicated. Specified camber applies at the jobsite, just prior to erection, lying flat so that the member weight has no effect. Take necessary precautions to prevent or compensate for camber loss during shipment.

    3. Splicing of structural steel members is prohibited without prior approval of the Engineer. Any member having a splice not shown and detailed on the accepted shop drawings shall be rejected.

    4. Plates shall be free of gross discontinuities such as ruptures and delaminations.

    5. Mill tolerances shall conform to ASTM A6.

2. Connections

    1. Bolt field connections, except where welded connections or other connections are indicated. Provide beveled washers where slope of surfaces under the bolt head and nut exceeds 1:20. Bolt holes shall have a diameter not greater than 1/16" larger than the nominal bolt diameter. Do not torch cut holes or enlarge holes by burning. Provide washers over all slotted holes in an outer ply.

    2. High strength Bolted Connections: Install high-strength threaded fasteners in accordance with AISC, "Specifications for Structural Joints using ASTM A325 or A490 Bolts".

    3. Welded Connections: Comply with AWS. Welds not specified shall be

continuous fillet welds designed to develop the full strength of the member. A combination of welds and bolts shall not be used to transmit stress at the same face of any connections. Clean completed welds prior to inspection. Slag shall be removed from all completed welds.

4. Base Plates: Oversize anchor bolt holes in base plates to facilitate erection as follows:

   Bolts 3/4" to 1" diameter: 5/16" oversize
   Bolts 1 1/8” diameter: 3/8” oversize

   Use oversize or plate washers under nut at all oversized holes in baseplates. Washers must be large enough to cover the entire hole. Washer thickness shall be at least 1/8 of bolt diameter.

3. Galvanizing: The following steel shall be hot-dip galvanized (including any associated fasteners):

   1. Masonry shelf angles.
   2. Railing exposed to weather.

## 2.3 SHOP PAINTING

1. Shop paint all steel components except the following:

   1. Surfaces to be welded.
   2. Steel components to be galvanized.

2. Surface Preparation: After inspection, clean steel to be painted. Remove loose rust, loose mill scale, spatter, and slab or flux deposits. Clean steel in accordance with the Steel Structures Painting Council (SSPC) as follows:

   1. SP-2, "Hand Tool Cleaning"
   2. SP-3, "Power Tool Cleaning"

3. Painting: Immediately after surface preparation, apply structural steel primer paint in accordance with the manufacturer's instructions and at a rate to provide a uniform dry film thickness of 2.0 mils.

# PART 3 EXECUTION

## 3.1 INSPECTION

1. Erector shall verify existing conditions prior to beginning work, and notify contractor of conditions detrimental to proper and timely completion of work.

3.2 ERECTION

1. Allow for erection loads, and provide sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing. Design of temporary bracing and shoring shall be the responsibility of the Contractor.

2. Level and plumb individual members of structure within the tolerances defined by the AISC Code for Standard Practice, unless closer tolerances are required for proper fitting of adjoining or enclosing materials, in which case the more stringent shall apply.

3. Members designated as architecturally exposed structural steel shall be plumbed, leveled, and aligned to a tolerance not to exceed one-half the amount permitted for structural steel, unless adjoining materials dictate a tighter tolerance.

4. Do not field cut or alter structural members without approval of Architect/Engineer.

5. Erection Bolts: Erection bolts shall be tightened securely and left in place unless noted otherwise on the Contract Drawings. Remove and fill bolt holes if exposed.

6. Setting base and bearing plates:

    1. Set base and bearing plates on wedges, shims, or other adjustment devices. Tighten anchor bolts after supported members have been positioned and plumbed. If wedges or shims are protruding, cut off flush with edge of base or bearing plate prior to grouting.

    2. Grout under all bearing plates immediately after column or frame has been plumbed.

7. Bolted Connections

    1. High strength bolts shall be installed in conformance with the "Specifications for Structural Joints using ASTM A325 or A490 Bolts."

    2. A307 bolts and high-strength (A325 and A490) bolts noted to be "snug-tight" shall be tightened using a few impacts of an impact wrench or the full effort of a man using an ordinary spud wrench, bringing the plies into contact.

3. Bolts tightened with a calibrated wrench or by torque control shall have a hardened washer under the element (nut or bolt head) turned in tightening.

4. Hardened washers shall be placed over slotted holes in an outer ply. Hardened beveled washers shall be used where the outer face of the bolted parts has a slope greater than 1:20 with respect to the bolt axis.

8. Field Welding: Comply with AWS Structural Welding Code and AISC Specification for Structural Steel Buildings. Where heavy shapes are to be welded, comply with all special requirements contained in the AISC Specification and the AWS Structural Welding Code.

9. Do not enlarge holes in members by torch cutting. Ream holes that must be enlarged to admit bolts.

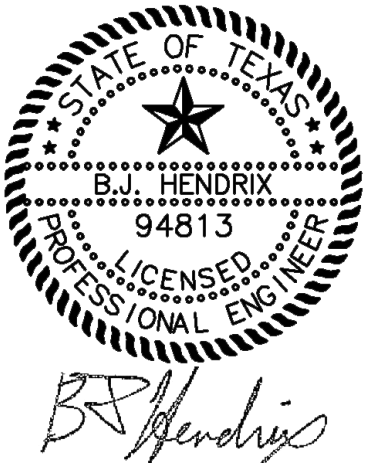
10. Gas Cutting: Do not use gas cutting torches in the field to correct fabrication errors in structural framing.

11. Touch-up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint. Apply paint to exposed areas with same materials as used for shop painting. Apply by brush or spray to provide a minimum dry film thickness of 2.5 mils.

12. Touch-up Cold Galvanizing: Touch up areas of hot dip galvanized members where galvanizing has been abraded during shipping and erection and areas where galvanizing has been removed or damaged due to welding. Apply cold galvanizing compound in accordance with the manufacturer's instructions to a minimum dry film thickness of 2.0 mils.

END OF SECTION

# RIVER RANCH COUNTY PARK
# INTERPRETIVE CENTER
# WILLIAMSON COUNTY
## Mechanical/Electrical Specifications




**03/21/2019**

MEP/ENERGY CONSULTANTS

HCE HENDRIX CONSULTING ENGINEERS

COMMISSIONING • FIELD INVESTIGATIONS

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ROUND ROCK, TX 78664
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# DIVISION 20, 22 & 23
# RIVER RANCH COUNTY PARK
# INTERPRETIVE CENTER
# WILLIAMSON COUNTY
# MECHANICAL SPECIFICATIONS

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20 00 00. . . . . .GENERAL PROVISIONS

20 01 00. . . . . BASIC MATERIALS AND METHODS

20 07 00. . . . . INSULATION

22 01 00. . . . . .INSIDE UTILITY TRENCH EXCAVATION, BACKFILL AND COMPACTION

22 02 00. . . . . OUTSIDE UTILITY TRENCH EXCAVATION, BACKFILL AND COMPACTION

22 11 16. . . . . WATER DISTRIBUTION SYSTEM

22 11 17. . . . . WATER HEATERS

22 13 16. . . . . LIQUID WASTE TRANSFER

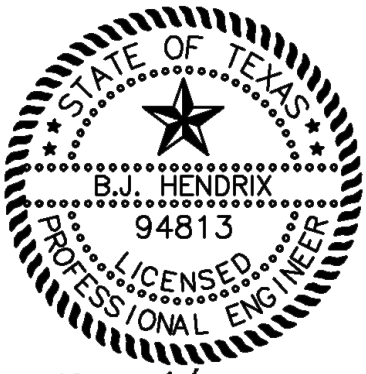
22 30 00. . . . . .PLUMBING FIXTURES AND TRIM

23 05 93. . . . . TEST AND BALANCE

23 08 02. . . . . .CONTRACTOR START-UP

23 30 00. . . . . AIR DISTRIBUTION

23 70 00 . . . . . MECHANICAL EQUIPMENT: D-X SYSTEMS




**03/21/2019**
**F-4095**

# SECTION 20 00 00 - GENERAL PROVISIONS

## PART 1 - GENERAL

1.01 SCOPE OF WORK

A. The work of Division 20-24 consists of providing labor, materials, products, and all operations required for the complete operating installation of all mechanical systems as shown and specified, in strict compliance with applicable drawings, specification, terms and conditions of the contract and all applicable codes and ordinances governing the installation of the various mechanical systems. Contractor shall provide all equipment and materials necessary and usually furnished in connection with such work and systems whether or not specifically mentioned in the specifications or on the drawings. All work shall be fully correlated with the work of other crafts. This section of Division 20-24 is a part of all other sections of Division 20-24.

B. Each Contractor shall study the Contract Documents included under this contract to determine exactly the extent of work provided under this contract, as well as to ascertain the difficulty to be encountered in performing the work on the drawings and outline hereinafter and in making new connections to existing utilities, installing new equipment and systems and coordinating the work with the other Trades.

C. Notwithstanding any approvals or instructions which must be obtained by the Contractor from the Architect in connection with use of premises, the responsibility for the safe working conditions at the site shall remain that of the Contractor's, and the Architect or Owner shall not be deemed to have any responsibility or liability in connection therewith.

D. The Agreement Forms, Uniform General Conditions, Supplementary Conditions, Division 00 and Division 01 of the specifications shall apply to the work specified in Division 20-24.

E. Additional Site Visit Costs: Contractor shall be charged with any cost resulting from uncompleted items that require additional site trips by the Architect/Engineer.

F. The Contractor shall obtain and pay for all permits and fees associated with his work.

G. **NO TOXIC OR HAZARDOUS MATERIALS, INCLUDING BUT NOT LIMITED TO PRODUCTS OR MATERIALS CONTAINING ASBESTOS, PCB AND LEAD SHALL BE PROVIDED OR INSTALLED. ALL ADHESIVES, SEALANTS AND COATINGS MUST MEET OR EXCEED GREEN BUILDING PROGRAM SCAQMD RULE 1168 AND 1113. ALL PAINTS MUST MEET VOC LIMIT OF GREEN SEAL ENVIRONMENTAL STANDARD GS-11. ALL INSULATION IS TO BE FREE OF UREA-FORMALDEHYDE AND/OR BE GREENGUARD CERTIFIED.**

**H. An extra copy of all Field Reports shall be kept in a separate notebook set up in the Construction Manager's Trailer. Contractors shall use these reports to check off that each individual item noted has been completed. Each item shall be initialed and noted when completed. Use this notebook to keep record of all test and results (i.e. wastewater test, water line tests, etc.**

I. **Drawings:**
**Architectural Background Files** – Architectural Revit Models and CAD files to be used for background files, MEP drawings are not background files. Architectural Revit Models and CAD files are used for shop drawings backgrounds. They must be obtained from the architect and cannot be given from the engineer. Reference Architect for cost of Architectural Files.

**MEP Drawings** – These drawings cannot be used for shop drawings, as they are diagrammatic in nature only. Actual shop drawings prepared by sub-contractors must be used for coordination between all trades. If MEP floorplan files are requested they may be obtained with a signed confidentiality release form, only as outlined below. These files may be used in conjunction with this project only. There are no guarantees of compatibility or accuracy; all technical support will be billed hourly at current Engineer's Rates. Engineer does not charge for actual file, but does charge for time required to prepare the files in format as requested by the Contractor. Fees will be based on Engineer's current hourly rates. Deposit of $500 must be paid prior to beginning file preparation and balance must be paid prior to release of any files. Total fee based on actual time required by Contractor's request. See submittal and shop drawing section for additional information.

**MEP CAD Files that will be released.**

- If no Architectural RCP is available for light locations. Lighting Floorplans will be released.
- Mechanical Floorplan will be released to Mechanical Contractor for aid in production of his own shop drawings. HCE mechanical drawings may not be submitted as shop drawings.
- Fire Alarm/Fire Sprinkler/Intercom etc… Contractors must use Architectural Backgrounds and Architectural RCP's (when available or lighting floorplan) and **Mechanical Contractor Shop Drawings** for coordination purposes. Do not request MEP floorplans, this will be cut and paste into an email for you to read.

1.02 PRE CONSTRUCTION MEETING

A. DDC Contractor, Mechanical Contractor, Test and Balance Representative and representatives for each type of HVAC gear that requires interface beyond 'on/off' control will meet in the office of HCE prior to initial control submittal.

B. The purpose of this meeting is to introduce all representatives who will need to coordinate with each other to insure a working project.

C. Each representative is to come prepared with sequences of operation, schematics and written instructions as to which points require what type of signal for each function and how tie-ins and integrations are to occur. If pulsed signals are required to keep a device on, bring it to the attention of the team and provide specific information. Do not assume others understand the inner workings of your gear or controls. Discuss exactly what type signals are acceptable to gear and how to set it up to receive and act on that signal.

D. Newer multistage air volume split systems, RTU's, etc. have different sequences and control tie-ins than older conventional units. Exact requirements for a given type and brand of equipment must be coordinated by the equipment supplier with the Controls Contractor and with the Test and Balance Contractor.

E. Test and Balance Contractor must verify air flow and delta T's at every stage of unit capacity to insure that unit is providing the correct CFM based on the capacity stage it is on so that the unit does not end up with low stage cooling and high stage blower which will not dehumidify. Equipment supplier is to provide Test and Balance Contractor with a quick start up guide to show where and how to set up fan speed selections and outside air dampers so that only minor balancing occurs at dampers serving grilles.

1.03 SITE INSPECTION

A. Prior to bidding the Contractor shall visit and examine the site verifying all existing items and familiarize himself with existing work conditions and understand the conditions which affect performance of the work of this Division before submitting bids for this work. The submission of bids shall be deemed as evidence of such visits and examinations.

B. All bids shall take the existing conditions into consideration and the lack of specific information on the drawings shall not relieve the Contractor of any responsibility. No subsequent allowance for time or money will be allowed for work or change related to failure to examine site conditions.

1.04 RELATED WORK SPECIFIED ELSEWHERE

A. All work covered by this section of these specifications shall be accomplished in accordance with the respective drawings, information or instructions to bidders, and general provisions of these specifications. Any supplementary conditions, special conditions, addenda, or directives which may be issued by the Owner's representative herewith or otherwise shall be complied with in every respect.

1. Electrical Specifications: Division 26-28.

2. Mechanical, Electrical, Plumbing Drawings

B. Unless otherwise indicated on the Electrical Drawings or in Mechanical Specifications, provide all mechanical equipment motors, motor starters, disconnect switches, thermal overload switches, control relays, time clocks, thermostats, motor valves, damper motors, electric switches, electric components, wiring, and any other miscellaneous Division 20-24 controls.

C. Carefully coordinate all work with the electrical work shown and specified elsewhere in these documents.

D. Motors: Furnish electric motors designed for the specific application and duty applied, and to deliver rated horsepower without exceeding temperature ratings when operated on power systems with a combined variation in voltage and frequency not more than plus or minus 10 percent of rated voltage.

E. Verify from the drawings and specifications the available electrical supply characteristics and furnish equipment that will perform satisfactorily under the conditions shown and specified.

F. Size motors for 1.15 service factor, not to exceed 40 degrees temp. Rise above ambient.

G. Provide self-resetting thermal overload switch for fractional horsepower motors.

H. Electrical Contractor to provide conduit and junction boxes for all sensors and exterior conduit for controls to mechanical equipment. Conduit for space sensor to extend from junction box to above accessible ceiling. Conduit for exterior equipment to extend from equipment through wall or roof to above an accessible ceiling. Any control wiring in exposed ceiling areas to be in conduit by Controls Contractor for protection. Controls Contractor to coordinate on all conduit requirements. Coordinate locations with Electrical Contractor.

I. When Mechanical Contractor furnishes motor starter, provide each three phase motor 25 HP and larger with phase failure and phase reversal monitoring relay in all three phases. Relay shall open motor starter contacts at 10% voltage unbalance and shall automatically reset when voltage returns to normal. Provide adjustable time delay set at .2 second on drop-out to prevent nuisance tripping on momentary voltage dips.

J. Duct smoke detector in supply and return air to be provided by Fire Alarm Contractor, installed by Mechanical Contractor, tied into HVAC control circuit by Mechanical Contractor and to fire alarm panel by Fire Alarm Contractor.

K. Duct smoke detector in supply and return air provided and installed by Mechanical Contractor for units over 2000 cfm and/or units serving rated egress pathways. Provide detectors with remote test switches and audible/visual indicators. Locate them beside unit thermostat unless otherwise noted.

**L. The electrical design and electrical drawings are based on the equipment and/or electric motors of the type, size and electrical characteristics shown and specified on the mechanical drawings and any change in equipment and/or motor size or type brought on directly or indirectly by a substitution of mechanical equipment having characteristics requiring a change, shall be the responsibility of the Mechanical Contractor and the entire cost of such change, including conduit, wiring, motor starting equipment, etc., shall be paid for by the Mechanical Contractor at no additional charge, unless the substitution was initiated by the Owner. Submittals must clearly show any deviations. Mechanical Contractor is responsible for coordinating any required changes with the Electrical Contractor, prior to Electrical Contractors ordering of panels and associated equipment.**

**M. Mechanical contractor assumes requirements of Controls Contractor when there is no separate Controls Sub-Contractor.**

1.05 WORK NOT INCLUDED

A. Certain labor, materials, or equipment may be provided under other sections of these specifications, by utility companies, or by the Owner. When such is the case, the extent, source and description of these items will be as indicated on the Drawings or described in the specifications, but the Contractor is responsible for verifying with all parties involved as to the extent of his requirements of work.

1.06 SPECIFICATION TERMINOLOGY (Definitions)

A. Streamlining: In many instances, the products, reference standards, and other itemized specifications have been listed without verbiage. In these cases, it is implied that the Contractor shall provide the products and perform in accordance with the references listed.

B. "Furnish" means to purchase and deliver material as shown and specified, including mark-ups, and cart the material to an approved location at the site or elsewhere, as noted or agreed.

C. "Provide/Install", as used in these specifications, means furnish all material, labor, sub-contracts, and appurtenances, including mark-up required for a complete, operating, finished system.

D. "Rough-in and Connect Only" means provide an appropriate system connection, such as supplies with stops, continuous wastes with traps, shut-off valves required, and all piping connections, testing, etc., for proper operation, and to install equipment furnished. Equipment furnished is received, uncrated, assembled and set in place by supporting crafts unless they make prior arrangements to hire the mechanical installer for this work.

E. "Accessible" means arranged so that an appropriately dressed maintenance man may approach the area in question with tools and products necessary for the work intended, and may then position himself to properly perform the task to be accomplished, without disassembly or damage to the surrounding installation. It shall also be no more than four feet (4') above a ceiling.

F. "Serviceable" means arranged so that the component or product in question may be properly removed, and replaced without disassembly, destruction, or damage to the surrounding installation.

G. "Product" is a generic term which includes materials, equipment, fixtures, and any physical item used on the project.

H. Wherever the term "shown on drawings" is used in the specifications, it shall mean "noted", "indicated", "scheduled", "detailed", or any other diagrammatic or written reference made on the drawings.

I. "Conduit" includes, in addition to conduit, all fittings, hangers and other accessories relative to such conduit. "Piping" includes, in addition to piping, all fittings, valves, hangers and other accessories relative to such piping.

J. "Concealed" means hidden from sight in chases, furred spaces, shafts, hung ceilings, embedded in construction, crawl spaces, etc.

1.07 DIAGRAMMATIC DRAWINGS

A. Drawings and specifications encompass a system that will integrate with the structural, electrical, and Architectural design of the building.

1. Drawings and specifications are complementary, each to the other; what is shown on one is as binding as if called for in both.

2. Where drawing details, plans, and/or specification requirements are in conflict, and where conduit, duct and piping sizes of the same run are shown to be different between plans and specifications or details, the most stringent requirement will be included in the Contract. Systems and equipment called for in the specification and/or shown on the drawings shall be provided under the contract of each Trade as if it were required by both the drawings and the specifications. However, prior to ordering or installation of any portion of work which appears to be in conflict, such work shall be brought to the Architect's attention for direction as to what is to be provided.

B. The drawings are partly diagrammatic in character and do not show exact locations, all offsets or give exact elevation in piping, fittings, duct, conduits, etc. Also, the drawings do not necessarily show in minute detail all features of the installation. Contractor shall physically arrange the systems to fit in the space available and shall carefully investigate structural and finish conditions, arrange work accordingly and provide a complete and satisfactorily working installation. Provide all work shown on the drawings and specified, unless otherwise stated. No subsequent allowance will be made due to failure to coordinate work prior to installation.

C. The Architectural, Structural, Civil and Electrical plans and Specifications and other pertinent documents issued by the Architect are a part of these Specifications and the accompanying Mechanical Drawings and shall be complied and coordinated with in every respect. All drawings and specifications mentioned above shall be examined by all bidders. Failure to examine all drawings for coordination and quantities shall not relieve the Contractor of responsibility and no subsequent allowance for time or money will be allowed.

1.08 MATERIAL AND EQUIPMENT SUBMITTALS

A. Submittals: Provide submittals for all products and systems described in Division 20-24 and shown on the drawings to demonstrate compliance with the requirements of the project. Furnish equipment submittals in the manner described elsewhere in these specifications.

B. Submit to the Engineer, after the award of the contract or as dictated by project schedule, a type written list of those items of equipment and appurtenances which will be furnished. Include the name or description of the item, name of manufacturer, model or type, catalog number and manufacturer's printed information. The information submitted shall include overall dimensions, weights, voltage rating, phase, wiring diagrams, etc., and nameplate data. Assemble cut sheets into separate submittals as defined in this section or by Specification Section. Submit priority items and long lead time first. Then follow with remaining items. This will allow for faster review and response to accommodate project schedule. **Any submittal with all sections under one (1) cover will be returned and required to be broken into separate submittals.** The Engineer's check will be general and does not relieve the Contractor of final responsibility to comply with the Contract Documents in all respects.

C. Submittal review is for general design and arrangement only and does not relieve the Contractor from any of the requirements of the Contract Documents. Submittals will not be checked for quantity, dimension, fit or proper technical design of manufactured equipment. Where deviations of substitute product or system performance have not been specifically noted in the submittal by the Contractor, provision of a complete and satisfactory working installation is the sole responsibility of the Contractor. **Warranties cannot be reduced through the submittal process.**

**D. Contractor shall indicate items being used on cut sheets by highlighting or arrowing to actual part number. Submittals may be returned without checking if submittals not appropriately marked.**

E. **'Individual submittals' means separate submittals with unique submittal numbers for each specification section. Separate PDFs for each Submittal number.**

**F. HARDCOPY SUBMITTAL REQUIREMENT: Hardcopy submittals will not be required by Engineer.**

**G. PDF SUBMITTAL REQUIREMENT:**
For submittal sections listed below as allowed pdf's the following requirements must be met or the submittal will not get through email security and will be auto-deleted and not checked. Each specifications section must be a separate pdf file, **one giant pdf for all sections will be rejected**.

**PDF FILE:** MUST BE NAMED AS FOLLOWS:
JOB NAME – SUBMITTAL No. XX – SUBMITTAL DESCRIPTION

**EMAIL TITLE/SUBJECT**: FOR SUBMITTALS MUST BE AS FOLLOWS:
JOB NAME – SUBMITTAL No. XX – SUBMITTAL DESCRIPTION

Failure to follow these instructions will result in the submittal never reaching the engineer and not being checked. Delays cause by not following these procedures are the sole responsibility of the contractor. Emailed submittals must come from the Architect and must not be emailed directly from the contractor. Do not Carbon Copy the Engineer on Emailed submittals.

H. **Multiple re-reviews required due to Contractor not following instructions, specifications, etc. will be billed to Contractor at Engineer's current hourly rates. This shall be paid prior to submittal approval.**

**I.** **SUBMITTALS WILL BE RETURNED IN ORDER OF CONSTRUCTION OF THE PROJECT, NOT NECESSARILY IN ORDER SUBMITTED**. If all sections are submitted under one binder and transmittal, each section will be returned at the appropriate time for construction phasing. Mechanical Equipment will not be reviewed until "Mechanical/Electrical Coordination Sheet" has been submitted. Mechanical Equipment, Mechanical Controls and Plumbing Fixtures may require extended review time. **IF SUBMITTALS ARE SUBMITTED EARLY RELATIVE TO CONSTRUCTION PHASING, SUBMITTALS MAY BE HELD, REVIEWED AND RETURNED AT THE APPROPRIATE TIME FOR CONSTRUCTION PHASING, NOT NECESSARILY 2 WEEKS.**

**J.** **DO NOT SUBMIT THE FOLLOWING SECTIONS UNLESS DEVIATING FROM THE SCHEDULES/SPECIFICATIONS. Provide directly to General Contractor/CMR for inclusion into O & M Manuals. If deviating from the specifications submittal will be required. (Write summary sheet of deviations and highlight items that are different to allow for proper review.):**

1. 20 01 00 – Basic Materials and Methods – Only items listed
   - Valve Tag / Markers
   - Pipe Identification / Labels
   - Access Panels / Doors
   - Valves
2. 20 07 00 – Insulation – Only items listed
   - Insulation
   - Duct Tape
3. 22 11 17 – Relief Valves
4. 22 13 16 – Liquid Waste Transfer
5. 23 30 00 – Air Distribution – Only items listed
   - Isolators
   - Spin-in Fittings
   - Fire Dampers Installation Detail
   - Fire Damper
   - Flexible Connector
   - Fire Smoke Dampers / Details
   - Flexible Duct
   - Volume Damper
   - Air Extractors

K. **PDF Submittals Allowed** for Product Cut-Sheets for are limited to the following items: **Separate PDF for each Submittal number is required.**

1. 20 00 00 – General Provisions – Only items listed
   - Mechanical/Electrical Coordination Sheet
   - Roof Opening Shop Drawings
2. 20 01 00 – Basic Materials and Methods – Only items listed
   - Fire Proofing/Fire Caulk
   - Piping
3. 20 07 00 – Insulation – Only items listed
   - Metal Jacket & Fittings
   - Internal Lining
4. 22 11 16 – Water Distribution Systems – Only items listed
   - Water Hammer Arrestors
   - Piping
5. 22 11 17 – Water Heaters
6. 22 13 16 – Liquid Waste Transfer – Only items listed
   - Cleanouts
   - Piping

7. 22 30 00 - Plumbing Fixtures and Trim – Only items listed
   - Plumbing Fixtures and Trim
   - Floor Drains
8. 23 09 XX – Controls
9. 23 30 00 – Air Distribution – Only items listed
   - Louvers/Hoods
   - Grilles/Registers/Diffusers
   - Exhaust Fans
   - Supply Fans
   - Unit Heaters
10. 23 70 XX – Mechanical HVAC Equipment - Only items listed
    - Condensers
    - Condensing Units/Heat Pumps
    - Air Handlers
    - Rooftop HVAC Units
    - Makeup Air Units

**L. Data Required for Review: Mark submittal literature and shop drawings clearly by individual sections, and include all equipment and material shown on drawings and specified. ANY DATA NOT CLEARLY MARKED OR NOT APPROPRIATELY SUBMITTED WILL BE RETURNED WITHOUT CHECKING. Indicate the following:**

1. Specification reference and/or drawing reference for which literature is submitted for review with an index, following specification format, and item by item identification.

2. Manufacturer's name and address, and supplier's name, address, and phone number.

3. Catalog designation or model number.

4. Rough-in data and dimensions.

5. Performance curves and rated capacities with performance data marked.

6. Motor characteristics and wiring diagrams.

7. Operation characteristics.

8. Complete customized listing of equipment, characteristics, accessories, etc., specified. Indicate whether item is "As specified." Mark out all non-applicable items. The terminology "As specified" used without this customized listing is not acceptable.

9. Wiring diagrams for the specific system operation. Complete wiring with diagrams showing all connections to each type of actual equipment being installed on project, complete with part numbers of controls for each type of equipment.

10. **Submit written sequence of operation for all modes of operation for each piece of mechanical equipment. Give narrative explaining exactly what control signals are required to activate <u>each</u> mode of a particular unit's operation. Include information about which signals override others internally (when applicable). Submit this information with equipment submittal and provide a copy to the Controls Contractor so it can be integrated into the control scheme and control submittals. Indicate whether 24 VAC, 4-20 MA, 0-10VDC or line voltage is required for controls.**

11. **Provide HVAC equipment with a controls interface that is suitable for connection to a standard conventional thermostat and/or non-proprietary DDC control systems.**

12. **Ductwork Shop Drawings: Engineer requires 1 (one) HARDCOPY, full-size at 1/8" scale, sheets size to match project for engineer review and engineer records. Additional copies per Architect and Owner requirements. PDF's will be required for owner and architect records.**

13. **BREAKOUT SUBMITTALS INTO PRIORITY ITEMS.**

M. **Contractor to submit "Mechanical/Electrical Equipment Coordination Sheet" with equipment submittal for all AHU's, CU's, HP's and MAU's. Reference chart at end of section.**

N. When requested, present samples of all materials proposed for use to the Engineer for his approval.

O. Certify Shop Drawings have been checked for compliance with Contract Documents. Certify that the materials submitted can be delivered and installed according to the construction schedule.

P. Select all other materials, not specifically described on the Drawings or in these specifications but required for a complete and operable facility, and submit to the Engineer for approval.

Q. **Substitutions:** ("Substitution Request" form must be submitted)

1. Equipment listed as equal is indicated to be equal in quality to equipment designed around. It does not mean equal in dimension or fit. It is the Contractor's responsibility to confirm dimensional differences and space requirements.

2. Request for proposed substitution of materials, methods, or processes shall be made to the Architect and if found acceptable, will be confirmed by an addendum to the Construction Documents. Where proposed substitutions are not incorporated into the Construction Documents by addendum **PRIOR** to time of the General Contract bid opening, all bids shall be held to have been made on the basis of the materials, methods and processes required by the Construction Documents.

3. Equal Materials: It is not the intent of the Specifications to limit materials to the product of any particular manufacturer. Where definite materials, equipment and/or fixtures have been specified by name, manufacturer or catalog number, it has been done so as to set a definite standard and a reference for comparison as to quality, application, physical conformity, and other characteristics.

4. Acceptance of substitution by the Engineer does not relieve the Contractor of responsibility for proper operation of the systems, compliance with specifications, necessary changes due to dimensional differences or space requirements, and of work on schedule.

5. Where equipment of the acceptable manufacturers requires different arrangement or connections from those shown, it shall be the responsibility of the Contractor to install the equipment to operate properly and in harmony with the original intent of the drawings and specifications. When directed by the Architect, the Contractor proposing substitutions shall submit drawings showing the proposed installation. If the proposed installation is approved, the Contractor shall make all necessary

changes in all affected related work provided under other Sections, including location of rough-in connections by other Trades, conduit supports, insulation, etc. All changes shall be made at no increase in the Contract amount or additional cost to the other Trades and/or Owner.

6. **Submit fully completed "Substitution Request" form located at end of this section. If this form is not submitted, all substitution request will be automatically rejected.**

**8. For substitutions that require substantial review by engineer to ensure equality, the contractor requesting substitutions shall reimburse the engineer at current hourly rates for all review time. This shall be paid prior to submittal approval. This applies to all equipment not previously approved on construction documents.**

a. Mechanical Equipment

b. Contractor Cost Savings Packages Requiring Substantial Review Time

1.09 SHOP DRAWINGS REQUIRED

**A. Prepare and submit working construction drawings as requested, specified, and otherwise necessary to demonstrate proper planning for installation and arrangement of all work. Layout drawings to scale and show dimensions where accuracy of location is necessary for coordination or communication purposes. Show work of all trades, including Architectural, Structural, Mechanical, and Electrical items which may be pertinent to proper and accurate coordination. Provide shop drawings for all products, ductwork, systems, system components and special supports which are not standard catalog products and which may be fabricated for the Contractor or by the Contractor. Show top and bottom elevation of ductwork and equipment as it will be installed. Show offsets required to miss structural and other items of interference. Identify all shop drawings as to which section and paragraph of the specifications and/or drawing number the item is covered under. Ductwork layout/shop drawings to be done at a minimum 1/8" = 1'-0" scale. AHU's, CU's, HP's, RTU's, etc. are to be shown actual scaled size and configuration of the actual equipment being used.**

B. Architectural Revit Models and CAD files to be used for backgrounds in preparation of ductwork and sprinkler shop drawings and shall be obtained from the Architect. Confirm requirements and stipulations for obtaining floor plan backgrounds with Architect and with other sections of specification. Engineer's drawings and CAD files **may not** be used for Shop Drawings. Reference 1.01-L.

C. ALL SHOP DRAWINGS OF MECHANICAL ROOMS/MEZZANINES SHALL SHOW ALL FLOOR DRAINS, HVAC, PLUMBING, AND ELECTRICAL EQUIPMENT, INCLUDING ELECTRIC PANELS, TRANSFORMERS AND DISCONNECT SWITCH LOCATIONS. COORDINATE WITH ELECTRICAL AND PLUMBING CONTRACTOR.

D. Provide roof shop drawing indicating dimensioned locations and sizes for all roof mounted equipment, supports, openings and plumbing vents in ample time for proper coordination of all trades.

E. Submission of copies of the Engineer's drawings does not constitute shop drawings and is not acceptable.

F. Submittal of complete engineering submittal data for products and equipment shall be made in sufficient copies to provide one (1) hardcopy of all data to be retained by the Engineer, additional copies as required by the Contractor, Architect and Owner. Provide an electronic copy in PDF format and CAD if available for record keeping purposes for Engineer, Architect, and Owner with close out documents described elsewhere in specifications.

**G. General Contractor shall transmit a CAD copy of ductwork shop drawings to sprinkler contractor prior to submission of sprinkler shop drawings.**

H. Ductwork shop drawings shall be submitted and reviewed prior to any ductwork being installed.

**I. MECHANICAL CONTRACTOR MUST SUBMIT "MECHANICAL/ELECTRICAL COORDINATION SHEET" WITH MECHANICAL EQUIPMENT SUBMITTAL FOR PROPER COORDINATION PURPOSES WITH ELECTRICAL CONTRACTOR FOR ACTUAL EQUIPMENT BEING INSTALLED OR SUBMITTAL WILL BE REJECTED.**

1.10 RECORD DRAWINGS

A. Reference requirements stated elsewhere in the Specifications.

B. THE CONTRACTOR SHALL TAPE ALL ADDENDA'S ISSUED DURING BIDDING TO HIS CONSTRUCTION AND RECORD DRAWING SET PRIOR TO COMMENCING CONSTRUCTION. PAY REQUESTS WILL NOT BE PROCESSED UNTIL THE CONTRACTOR HAS COMPLIED WITH THIS REQUIREMENT.

C. In addition to other requirements, a master Record Drawing print set (separate from field sets) shall be kept in the General's site trailer and marked up weekly as the work progresses, to show exact dimensioned location and routing of all mechanical work which will be permanently concealed. Show routing and location of items cast in concrete or buried underground. Work located in spaces with access, or above suspended ceilings, is not considered permanently concealed. Show complete routing and sizing of any significant revisions to the systems shown. Show the location of all valves and their appropriate tag identification. Indicate locations of all existing active and inactive piping uncovered during construction. **Keep marked up set at site for review at site meetings.**

D. The marked-up and colored-up prints will be used as a guide for determining the progress of the work installed for draw requests. They shall be inspected periodically by the Architect and Owner's Representatives, and they shall be corrected immediately if found either inaccurate or incomplete. **This procedure is mandatory.**

E. The Contractor shall be responsible for updating and/or marking all items, including but not limited to floor plan changes, system changes, addendums, change orders, etc. on the prints to "As-Built" conditions. At the completion of the job, marked up As-Built Drawings shall be submitted to the Architect for final review and comment. These corrected prints together with corrected prints indicating all the revisions, additions and deletions of work, shall form the basis for preparing a set of record drawings.

F. Using the "Record Drawing Set", the Contractor shall print two (2) complete sets of prints one for submission to the Owner and one rolled in a 4" PVC pipe in main electric room mounted to wall and labeled. Tape all edges. The contactor shall provide pdf copies/scans for owner record purposes.

G. The Contractor shall bear all the costs of producing the "Record Drawing Set".

H. All equipments **model and serial numbers** must be included on start up forms turned in to the owner. For split systems, this includes all model and serial numbers for all indoor sections or components as well as outdoor units. These are required for owner inventory and for processing of any utility rebate forms. Utility rebates require the model and serial numbers associated with a given unit number to match in case the job is spot checked prior to issuing a rebate

1.11 CODES, REGULATIONS AND ORDINANCES

A. All work shall comply with the current applicable local, state and federal codes and ordinances. Follow recommended practices as set down by ASME, SMACNA, ASHRAE, NFPA, applicable Building Code, applicable Mechanical Code, applicable Plumbing Code, National Electrical Code (NEC), AGA, ADA AND OSHA, as they apply to this project, except in cases where local statutes govern. The contractor shall verify with the latest adopted local codes, ordinances and amendments that apply to this project with the authority having jurisdiction. **PROVIDE LOCKING REFRIGERATION ACCESS PORT CAPS FOR ALL EQUIPMENT WITH REFRIGERANT LOCATED OUTDOORS ON GROUND OR ON ROOF.**

B. In cases of difference between Building Codes, State Laws, Local Ordinances and Industry Standards and the Contract Documents, each Subcontractor shall promptly notify the Architect in writing of any such difference, as applicable to his work.

C. In case of conflict between the Contract Documents and the requirements of any Code or Authorities having jurisdiction, the most stringent requirements of the aforementioned shall govern.

D. Should the Contractor perform any work that does not comply with the requirements of the applicable Building codes, State laws, Local Ordinances and Industry Standards, he shall bear all costs arising in correcting the deficiencies, as approved by the Architect.

1.12 DELIVERY AND STORAGE OF EQUIPMENT AND MATERIAL

**A. All equipment and materials shall be protected from physical, moisture absorption, metallic corrosion and weather damage from the time of delivery until completion of the project. This includes erection of temporary shelters and covering items in the building with protective covering. Store items subject to moisture damage such as controls in dry, heated space. Failure to comply with the above to the satisfaction of the Owner/Architect will be sufficient cause for the rejection of the equipment or material in question. Upon such rejection, the damaged equipment or material will be completely replaced with new by the Contractor at no charge to the Owner.**

**B. Provide covers on all ends and openings of pipes, conduits, ducts, etc. to keep out insects, dirt, dust and debris during entire construction process. This includes properly covering unassembled ductwork, etc. stored on jobsite prior to installation.**

C. The Manufacturer's directions are to be followed from delivery, storage, protection and installation of equipment and materials. Notify the Architect in writing of conflicts between requirements of Contract Documents and manufacturer's direction.

D. Large pieces of equipment which are too large to permit access through doors, stairways or access opening shall be placed in the space before enclosing the structure. After equipment is placed, it shall be thoroughly protected from damage.

1.13 CLEAN-UP

A. Remove debris and waste materials from within the construction areas and transport off-site, daily.

B. Keep the construction area clean, free from hazard, and orderly arranged.

C. Pay all costs of waste removal and disposal. Reference General Conditions for further information.

D. Dispose of waste materials in accordance with all regulations which govern.

E. Take all precautions to protect persons who enter the construction area from hazardous conditions, hazardous waste, toxic waste, or other unsafe conditions.

F. Upon completion of construction, remove all debris, waste materials, unused materials, temporary constructions, vehicles, tools, fencing, etc. to Owner's satisfaction.

G. All equipment and materials shall be protected from physical moisture absorption, metallic corrosion and weather damage from time of delivery to completion of project. Replace any damaged materials.

**PART 2 – PRODUCTS**

2.01 EQUIPMENT AND MATERIALS

A. Unless otherwise indicated, provide only new equipment and materials.

B. On all major equipment components, provide manufacturer's name, address, model number, and serial number permanently attached in a conspicuous location.

C. All materials furnished under these specifications shall be the standard product of manufacturer's regularly engaged in the production of such equipment and shall be the manufacturer's latest approved standard design.

D. GUARANTEE

1. The Contractor and Manufacturers shall provide a ONE (1) YEAR guarantee for all work under the Electrical, HVAC, Plumbing and Fire Protection Trade. However, such guarantees shall be in addition to and not in lieu of all other liabilities which the manufacturer and Contractor may have by law or by other provisions of the Contract Documents. **In any case, such guarantees and warranties shall commence when the Owner accepts the mechanical/electrical system, as determined by the Architect.**

2. All materials, items of equipment and workmanship furnished under each Section shall carry a ONE (1) YEAR warranty against all defects in material and workmanship. Any fault under any Contract, due to defective or improper material, equipment, workmanship or design which may develop shall be made good, forthwith, by and at the expense of the Contractor for the work under his Contract, including all other damage done to areas, materials and other system resulting from this failure.

3. The Contractor shall guarantee that all elements of the system, which are to be provided under his Contract, are of sufficient capacity to meet the specified performance requirements as set forth herein or as indicated.

4. Upon receipt of notice from the Owner of failure of any part of any systems or equipment during the guarantee period, the affected part or parts shall be replaced by the Contractor for his respective work, as applicable.

5. Additional extended guarantees required for work on this project. The additions and/or extensions to the standard one year guarantee previously described are to be provided in writing, by the manufacturer or an approved insurance underwriter. The guarantee is to cover all parts and/or labor as specified below.

Master Extended Guarantee List:

a. Gas heat exchangers in all furnaces, make-up air heaters, “neutral air” make-up air units, high efficiency triple deck (HETD) units, unit heaters and packaged rooftop units to have an additional nine(9) year parts only guarantee. (Non-prorated)

b. All comfort air conditioning and heat pump compressors are to have an additional four (4) year parts only guarantee. (Non-prorated)

c. All computer grade HVAC equipment compressors are to have an additional one (1) year parts only guarantee. (Non-prorated)

d. All “neutral air” make-up air units and high efficiency triple deck (HETD) units are to have the following additional guarantees (Non-prorated):

1) Two (2) year total unit performance.

2) Additional four (4) year parts on compressors.

3) Additional four (4) year parts and performance on total enthalpy and sensible recovery wheels, heat pipes, plate and frame exchangers and run around loops.

4) Provide unit with one (1) spare belt for each fan and wheel to be used at Owner’s discretion after the guarantee period expires.

5) Additional one (1) year parts and labor on entire make-up air unit package against water leaking into the unit and/or into the building through any roof curb mounted unit. Manufacturer’s representative is to certify proper installation on each unit in writing.

e. All chillers to have additional (4) four year manufacturers parts and labor, bumper to bumper guarantee (Non-prorated), including refrigerant.

f. Gas radiant heaters to have additional 1 year parts warranty on controls and additional 14 year parts warranty on the “effect” tile stainless steel burners.

6. Furnish, before the final payment is made, a written guarantee covering the above requirements.

7. Additional/extended guarantees listed above are Non-negotiable, and can’t be amended through the submittal process.

**PART 3 - EXECUTION**

3.01 CUTTING AND PATCHING

A. The Contractor shall notify the General Contractor and other Subcontractors in ample time of the location of all chases, sleeves and openings required in the construction for the proper installation of his work. The Contractor shall do all core drilling of individual holes and all cutting for his work except square or rectangular openings in the structural slabs which shall be cut by the Contractor at locations shown on the drawings. In no case, however, shall a beam or column be cut without the approval of the Project Structural Engineer.

B. On completion of this work or as work progresses the Contractor shall make all repairs and do all patching required as a result of the work under this contract. All patching shall be performed in a manner that will restore the surrounding work to its original conditions and to the satisfaction of the Owner.

C. Any cutting and patching necessary as a result of the Contractor's failure to notify the General Contractor of all the required openings shall be at the expense of the Contractor.

3.02 OBLIGATIONS/RESPONSIBILITIES

A. The Contractor binds himself, his partners, successors, assigns and legal representatives to the Owner in respect to all covenants, agreements and obligations contained in the Contract Documents. The Contractor shall not assign the Contract or sublet it as a whole without the written consent of the Architect/Owner, nor shall the Contractor assign any monies due or to become due to him hereunder, without the previous written consent of the Owner/Architect.

B. The Contractor shall supervise and direct the Work using his best skill and attention. He shall be solely responsible for all construction means, methods, techniques, safety, sequences and procedures, and for coordinating all portions of the work under his Contract.

C. The Contractor shall provide, without extra charge, all incidental items required as a part of the work, even though not particularly specified or indicated, and if he has good reason for objecting to the use of a material, appliance, or type of construction shown or specified, he shall register his objections with the Architect/Engineer, in writing; otherwise, he shall proceed with the work under the stipulation that a satisfactory job is required.

3.03 TESTS AND INSPECTIONS

A. Schedule, obtain, and pay for all fees and/or services required by local authorities and by these specifications, to test the mechanical systems as specified in these specifications.

B. Request for Tests: Notify the Architect a minimum of 24 hours in advance of tests. In the event the Architect does not witness the test, certify in writing that all specified tests have been made in accordance with the specifications.

C. Deficiencies: Immediately correct all deficiencies which are evidenced during the test and repeat test until system is approved. Do not cover or conceal piping, equipment or other portions of the mechanical installations until satisfactory tests are made and approved.

D. Operating Tests: Upon request from the Architect, place the entire mechanical installation and/or any portion thereof, in operation to demonstrate satisfactory operation.

E. Log of Tests: The Contractor shall set up a testing log form to be kept at the job site with the record drawings. All tests shall have pertinent data logged at the time of testing. Pertinent data is to include: date, time, description, personnel, system tested (and extent), test conditions, test results, etc.

F. Completion: Upon completion of the mechanical installation, demonstrate to the Architect's satisfaction that the systems have been installed in a satisfactory manner in accordance with the plans, specifications, and applicable codes. Demonstrate dynamic operation of all systems. Show that all controls are operable and are properly adjusted in accordance with the requirements of the final systems balance, that all systems are properly balanced, that all equipment operates properly, that filters and strainers are clean, and that all components of all systems are installed and adjusted for proper operation.

1. Prior to final inspection, all work under this Division to be completed, insure all equipment is operational and final testing and balance reports have been submitted and approved.

3.04 OPERATING INSTRUCTIONS

A. Prior to final acceptance, instruct an authorized representative of the Owner on the proper operation and maintenance of all mechanical systems, equipment, and controls under this contract. Make available a qualified technician for each component of the installation for this instruction. Give these operation instructions after the operation and maintenance manuals have been furnished to the Owner. Submit written certification, signed by the Contractor, and an authorized representative of the Owner, that this has been completed.

3.05 COORDINATION OF WORK

A. Each Contractor shall compare his Drawings and Specifications with those of other Trades and report any discrepancies between them to the Architect and obtain from the Architect written instructions to make the necessary changes in any of the affected work. All work shall be installed in cooperation with other Trades installing interrelated work. Before installation, all trades shall make proper provisions to avoid interferences in a manner approved by the Architect.

B. Each Contractor shall coordinate the location of his systems so that all outside air intakes are located in such a way as to prevent cross-contamination from plumbing vents, flue pipes, exhaust fans, etc. Such a distance shall be not less than 10 feet.

C. Locations of conduit, ducts, piping, sprinkler heads and equipment shall be adjusted to accommodate the work with interferences anticipated and encountered. Exact routing and location of system shall be determined prior to fabrication or installation. Coordinate routing of major electrical conduits with Electrical Contractor prior to fabrication of ductwork and piping.

D. Offsets and changes of direction in all conduit, ducts and piping systems shall be made as required to maintain proper headroom and pitch of sloping lines whether or not indicated on the drawings.

E. Where discrepancies in scope of work as to what Trade provides items, such as starters, disconnects, flow switches and the like exist, such conflicts shall be reported to the Architect prior to signing of the Contract. If such action is not taken, the various Trades shall furnish such items as part of their work for complete and operable systems and equipment, as determined by the Architect.

**F. The HVAC, Plumbing and Fire Protection Subcontractors shall verify with Electrical Subcontractor the available electrical characteristics for all motors and equipment before ordering and submitting of respective gear. Verify actual connection points prior to installation and roughing-in. Mechanical and Electrical Contractor are responsible for coordination of electrical requirements and final fuse sizes of all A/C equipment. When Mechanical Contractor substitutes equipment that requires additions or upgrades to electrical system, he shall bear all costs arising from such substitutions. Reference "Mechanical/Electrical Coordination Sheet" in specifications.**

G. The Contractors are to avoid routing conduit through fire rated assemblies where practical. Each trade is responsible for proper coordination of required sleeves or block-outs with rated assembly installers. Each trade is responsible for providing sleeves, as required, for his work. Each trade shall verify acceptable tolerances around penetrating item in fire assembly before beginning fire sealing.

H. Mechanical Contractor and Controls Contractor shall coordinate all requirements of equipment and controls to insure a fully operational system.

I. Coordinate all plumbing rough-in through floor(s) with structural concrete TEE's/structural steel. Do not pass through stem of TEE's.

3.06 OPERATION AND MAINTENANCE MANUALS

A. Provide one (1) Operation and Maintenance manual for training of Owner's personnel in operation and maintenance of systems and related equipment in the manner described elsewhere in these specifications. In addition, organize manuals and include data and narrative as noted below (bind each manual in a hard-backed loose-leaf binder. Use 8-1/2" x 11" white paper). Provide PDF copy of O&M for owner records

B. Operating Sequence and Procedures:

1. Contents: In each chapter, describe the procedures necessary for personnel to operate the system and equipment covered in that chapter. Also, include a copy of System Balancing Report.

2. Typewritten Operating procedures: Write procedures for start-up, operation, and shutdown.

a. Start-up: Give complete step-by-step instructions for energizing equipment, making initial setting and adjustments whenever applicable.

b. Shutdown Procedure: Include instructions for stopping and securing the equipment after operation. If a particular sequence is required, give step-by-step instruction in that order.

C. Maintenance Instructions:

1. Provide a schedule of preventive maintenance for each product. Recommend frequency of performance for each preventive maintenance task: i.e., cleaning, inspection, etc.

D. Manufacturer's Brochures: Include manufacturers' descriptive literature covering all appurtenances used in each system, together with illustrations, exploded views and renewal parts lists. Provide nearest manufacturers' representatives name, address and phone number.

E. Shop Drawings: Provide a copy of all corrected, approved submittals and shop drawings covering equipment for the project either with the manufacturers' brochures or properly identified in a separate subsection.

F. Spare Parts Lists: Include a list of all equipment furnished for project, with a tabulation of descriptive data of all the spare parts proposed for each type of equipment or system. Properly identify each part by part number and manufacturer.

G. All major Owner training sessions to be videotaped in non-pixelated video in Windows file format,

3.07 OPERATION PRIOR TO COMPLETION

A. When any piece of mechanical or electrical equipment is operable and it is the advantage of the Contractor to operate the equipment, he may do so providing that he properly supervises the operation. **All HVAC equipment shall be shut down when painting, sanding and similar construction operations detrimental to the equipment are being done.** The warranty period shall, however, not commence until such time as the equipment is operated solely for the benefit of the Owner at his request or as listed in 'C'. Contractor shall clean any ductwork and equipment that is dirty due to equipment operation or improper protection.

**B. Any units that are operated during construction shall have filter media (Fiberbond Dual-Ply DustLok Media) placed over the exterior of return air grilles. Media shall be changed as frequently as required to keep ductwork clean.**

C. Regardless of whether or not the equipment has been operated, the Contractor shall properly clean the equipment, install clean filter media, properly adjust the equipment and complete all punch list items before final acceptance by the Owner. The day following final acceptance by the Owner will be the start date of the warranty period.

3.08 RECORD FOR OWNER

A. Each Contractor shall accumulate and bind in an "Operating and Maintenance" manual the following data to be presented to the Owner at the completion of the Project.

1. All warranties and guarantees and manufacturer's instruction on equipment and material covered by the contract.

2. Approved equipment brochures, wiring diagrams and control diagrams.

3. Copies of approved shop diagrams.

4. Operating instructions for heating and cooling and other mechanical systems. Operating instructions shall also include recommended maintenance and seasonal changeover procedures.

5. Repair parts lists of all major items and equipment including name, address and telephone number of local supplier or agent.

6. Valve tag charts and diagrams herein before specified.

7. HVAC balance and test results.

8. HVAC equipment start-up forms that include model and serial numbers of each piece of mechanical equipment installed, by unit mark number. For split units provide this information for all components.

9. "As-Built" Drawings as specified under "Construction Drawings" (these are not to be bound in the O&M Manual).

B. Provide reduced set of record drawing (11 x 17) indicating location and mark number of all mechanical equipment.

3.09 SITE OBSERVATION

A. Periodically, the Engineer will visit the site and review the construction progress. Field Reports will be issued noting any discrepancies or items that do not meet the intent of the contract documents found during said site visit. The contractor must answer each item listed on each field report, item by item.

**B. It shall be the duty of the Contractor to personally make a careful inspection trip of the entire project, assuring himself that the work on the project is ready for final acceptance before calling upon the Owner, Architect or Engineer to make final acceptance of the work. Subsequent trips required because of Contractor's failure to do so, will be made at Contractor's expense.**

C. The final acceptance of the work will be made jointly by the Architect and the Owner.

3.10 MECHANICAL/ELECTRICAL

A. **THIS IS TO BE DONE PRIOR TO SUBMITTING HVAC EQUIPMENT. Contractor to submit Mechanical/Electrical equipment coordination sheet with equipment submittal for actual equipment (AHU's, CU's, HP's, MAU's, etc) being installed. Reference chart at end of section. This is for Contractor coordination purposes.**

MEP/ENERGY CONSULTANTS

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COMMISSIONING • FIELD INVESTIGATIONS

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## PRE-CONSTRUCTION INSTRUCTION SHEET

**Submittal/RFI Requirements**

**A. 'Individual submittals' means separate submittals with unique submittal numbers. One single giant PDF will be rejected.**

**B. 2 Submittal CATEGORIES (Reference Specifications)**

**a. Not required unless deviating from specification**

**b. PDF allowed.**

**PDF SUBMITTAL/RFI FILE TITLE REQUIREMENT:**
For submittal sections listed below as allowed pdf's the following requirements must be met or the submittal will not get through email security and will be auto-deleted and not checked. Each pdf submittal must be a separate pdf file.

**PDF FILE:** MUST BE NAMED AS FOLLOWS:
JOB NAME – SUBMITTAL No. XX – SUBMITTAL DESCRIPTION
JOB NAME – RFI No. XX – RFI DESCRIPTION

Example: Texas ISD ES No. 2 – Submittal 8 – Plumbing Fixtures
Example: Texas ISD ES No. 2 – RFI 3 – Library Light Fixture Mounting Height

**EMAIL TITLE/SUBJECT REQUIREMENTS:**
Emails without Job Name and proper format will not get through email security and will be auto-deleted and not checked.

JOB NAME – SUBMITTAL No. XX – SUBMITTAL DESCRIPTION
JOB NAME – RFI No. XX – RFI DESCRIPTION

**C. If submittals are submitted early relative to construction phasing, submittals may be held, reviewed and returned at the appropriate time for construction phasing, not necessarily 2 weeks. In some cases, if submittals are received vastly out of order of construction, submittal may be rejected.**

**D.** Time Critical Submittal Coordination Items

**Mechanical to provide to General Contractor for Structural Roof Coordination**

a. Mechanical to provide roof opening shop drawing as early as possible for structural coordination. Per specifications.

**Mechanical to provide to General and Electrical Contractors for Gear Coordination**

b. Mechanical to complete "MECHANICAL/ELECTRICAL COORDINATION SHEET" prior to electrical gear submittals for coordination with electrical contractor. Per specifications.

**E.** **Do not submit non pre-approved substitutions during submittal time. These submittals will be automatically REJECTED. Substitution Pre-approval was at bid time.**

**F.** **Review time for multiple resubmittals of non-approved equipment will result in Contractor being billed for review time that is not part of Engineer's Scope. Engineer will bill Contractor at Engineer's Current hourly rates.**

**G.** **Email of all Submittals/RFI's must go directly to Architect. Do not Copy Engineer.**

**H.** **Engineer is not the Contractors plan reference resource. Do not submit an RFI until drawings and specifications have been reviewed first. If the answer is clearly on the drawings the response will be "The answer is clearly on the drawings, Engineer is not the Contractors plan reference resource."**

**I.** **Call before submitting a written RFI.**

**J.** **All formal Job emails must come from Architect.**

**K.** **Do not email send recurring jobsite meeting requests to Engineer. Engineer does not attend all weekly meetings. Architect will coordinate when Engineer is to be required at job site for specific meetings.**

**Shop Drawings and Cad Files**

A. Contractor Shop Drawings must use Architectural Backgrounds and Architectural RCP's (when available or lighting floorplan) and **Mechanical Contractor Shop Drawings** for coordination purposes. Do not request MEP floorplans, this will be cut and paste into an email for you to read. Engineer cannot send architectural backgrounds.

B. If no Architectural RCP is available for light locations. Lighting Floorplans will be released.

C. Mechanical Floorplan will be released to Mechanical Contractor for aid in production of his own shop drawings. HCE mechanical drawings may not be submitted as shop drawings.

D. Fire Alarm, Sprinkler, Intercom etc. all to use Architectural Backgrounds, must be obtained from Architect.

E. Schedule and Details sheets will not be released.

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# SUBSTITUTION REQUEST

FROM: _____ DATE: _____

PROJECT: _____

RE: _____

*The following has been submitted for consideration on the aforementioned project:*

Specification Title, Section, Page and Article/Paragraph:

Drawings and Details Affected:

Proposed Substitution/Description:

Installer's Name:

Manufacturer's name:

☐ Point by Point Comparative Data attached - REQUIRED BY A/E (_____# of pages including cover)

## *Why is Substitution Being Submitted?*

☐Pre-Bid Substitution (Prior Appoval): Include detailed analysis comparing proposed substitution against specified product, including redlined Specifications showing differences or deviations.
☐Specified product is not available. Explain in detail as attachment.
☐Cost Savings to Owner. Indicate comparative cost analysis as attachment.
☐Other. Explain.

## *Effects of Proposed Substitution?*

(Attach complete explanations and technical data, including laboratory test, if applicable.) Include complete information changes to Drawings and/or Specification that proposed substitution would require for its proper installation. Fill in blanks below:

A. Does substitution affect dimensions shown on drawings? ☐No ☐Yes
B. Will undersigned pay for changes to building design, including engineering and detailing costs caused by requested substitution? ☐No ☐Yes
C. What affect does substitution have on other trades?

_____

D. Differences between proposed substitution and specified item?

_____

E. Indicate how proposed substitution meets LEED requirements. (if applicable)
F. Manufacturer's guarantees of proposed and specified items are:
☐Same ☐Different (explain on attachment)

The Contractor and Subcontractor certifies:
- Proposed substitution has been fully investigated and determined to be equal or superior in all respectes to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Similar maintenance service and source of replacement parts, as applicable is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.

**Submitted By:** (name, address, telephone and contact person of manufacturer and installer of proposed substitution)

_____

_____

_____

_____

_____

**For A/E Use: SR#** _____

☐Accepted ☐Accepted as Noted
☐Not Accepted ☐Received Too Late
☐Incomplete Information
☐No Substitutions Accepted
Reviewed by/date: _____
Comments: _____

**Subcontractor's signature and date:** _____

**Contractor's signature and date:** _____

**COPY TO:**
☐FILE ☐OWNER ☐CONTRACTOR
☐ENGINEER ☐_____

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# MECH / ELEC EQUIPMENT COORDINATION SHEET

## (THIS IS REQUIRED – NOT OPTIONAL)

| MARK # | UNIT TYPE | MANUFACTURER'S RECOMMENDED MOCP | VOLTAGE | PHASE | MARK # | UNIT TYPE | MANUFACTURER'S RECOMMENDED MOCP | VOLTAGE | PHASE |
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**END OF SECTION**

## SECTION 20 01 00 - BASIC MATERIALS AND METHODS

### PART 1 - GENERAL

1.01 DESCRIPTION

A. This section describes specific requirements, products, and methods of execution which are typical throughout the mechanical work of this project. Additional requirements for the specific systems will be found in the sections specifying those systems, and supersede these requirements.

B. SPECIAL NOTE: All provisions and divisions of these specifications are a part of this section of these specifications. The Contractor shall consult these divisions and provisions in detail for instructions and include all items pertaining to this work. The Contractor shall consult all other divisions of these specifications, determine the extent of impact on the work required to complete the work required by this section of the specifications or portion thereof and related work shown on the drawings.

1.02 JOB CONDITIONS

A. Obtain approval from Architect prior to cutting any structural elements or furring members.

B. Structural Interferences: Should structural members prevent the installation of piping, ducting or equipment, notify the Architect before proceeding.

C. Consider minor changes in position of equipment, piping, or ducting, as part of the contract at no additional cost to the Owner.

D. Coordinate with Structural and Architectural work to determine acceptable locations for sleeves and supports which are required but may not be specifically shown on the plans. SCHEDULE INSTALLATION OF SLEEVES AND SPECIAL SUPPORTS IN MANNER TIMELY TO THE WORK OF OTHER CRAFT. Anticipate minor offsets necessary for proper coordination with other work, and reroute systems appropriately.

E. It is the Contractor's responsibility to properly use all information found on the Architectural, Structural, Civil and Electrical Drawings where such drawings affect his work.

1.03 DIMENSION AND FIT

A. Cut materials accurately from measurements taken on the JOB SITE.

B. Do not spring or bend pipe to fit conditions or make up joints.

1.04 INTERFERENCES

A. Interferences between piping and other trades shall be handled by giving precedence to pipe lines requiring grade for proper operation. Where space requirements conflict, the following order of precedence shall generally be observed.

1. Building Lines

2. Structural Members

3. Soil and Drain Piping

4. Vent Piping

5. Refrigerant Piping

6. Supply, Return, O/A Ductwork

7. Exhaust Ductwork

8. Chilled and Hot Water Piping

9. Domestic Hot and Cold Water Piping

10. Natural Gas Piping

11. Electrical Conduit

12. Fire Protection Piping

1.05 SERVICEABILITY OF PRODUCTS

A. Furnish all products to provide the proper orientation of serviceable components to access space provided.

B. Coordinate installation of piping, ductwork, equipment, coils, system components, and other products to allow proper service of all items requiring periodic maintenance or replacement.

C. **Replace or relocate all products incorrectly ordered or installed to provide proper serviceability.**

1.06 ACCESSIBILITY OF PRODUCTS

A. Arrange all work to provide permanent, convenient, and safe access to all serviceable and/or operable products. Layout work to optimize net usable access space within confines of space available. Advise Architect, in a timely manner, of areas where proper access cannot be maintained. Furnish layout drawings to verify this claim, if requested.

B. Provide access doors in ceilings, walls, floors, etc., for access to traps, valves, dampers, automatic devices, and all serviceable or operable equipment in concealed spaces. Location of panels shall be submitted for approval in sufficient time to be installed in the normal course of work.

1.07 ROUTING

A. Route all pipelines and ductwork parallel with building lines, and as high as possible, except where under ground or shown otherwise on the plan.

B. Route piping and ducts to clear all doors, windows, and other openings and to avoid all other pipes and ducts, light fixtures, and similar products.

C. Conceal all pipes and ducts where routed through finished areas, unless authorized by Architect or otherwise indicated on plans.

**PART 2 - PRODUCTS**

2.01 MATERIAL PRODUCTS

A. Provide all products new, unused, and undamaged, of standard manufacture, and of latest design and best quality. **ALL ADHESIVES, SEALANTS AND COATINGS MUST MEET OR EXCEED GREEN BUILDING PROGRAM SCAQMD RULE 1168 AND 1113. ALL PAINTS MUST MEET VOC LIMIT OF GREEN SEAL ENVIRONMENTAL STANDARD GS-11. ALL INSULATION IS TO BE FREE OF UREA-FORMALDEHYDE AND/OR BE GREENGUARD CERTIFIED.**

B. When a manufacturer's name appears in these specifications or schedule, it is not to be construed that the manufacturer's material does not have to meet the full requirements of the specifications or that his standard catalogue item will be acceptable.

C. All equipment installed on this project shall have local representation, local factory authorized service and local stock of repair parts.

D. All materials exposed within a plenum shall be noncombustible or shall have a flame spread index of not more than 25 and a smoke developed index of not more than 50 when tested in accordance with ASTM E 84.

2.02 Where more than one type of material (i.e., cast iron or PVC) is specified, the Contractor may choose one type; however, he must state which type of material he proposes to use in his submittal. ONLY ONE TYPE OF MATERIAL MAY BE USED IN A SPECIFIC PIPING SYSTEM, UNLESS SPECIFICALLY NOTED OTHERWISE. (I.E. WHEN DIFFERENT SIZES OF THE SAME TYPE SYSTEM REQUIRE DIFFERENT MATERIALS PER SPECIFICATIONS.)

2.03 PIPE AND FITTINGS

A. Steel Pipe: **All steel piping and fittings are to be domestically manufactured (USA).**

**1. PROVIDE DOCUMENTATION IN SUBMITTAL STATING LOCATION OF MANUFACTURING.**

2. Threaded: Schedule 40, ASTM A53 grade B or ASTM A120, American Standard pipe thread. Pipe 2" and under to be made up with threaded fittings.

3. Welded: Schedule 40 black, ASTM A53 grade B or ASTM A120, ANSI B16 butt weld fittings of type and wall thickness to suit pipe. Weld-O-Lets and Thread-O-Lets may be used on pipe 2-1/2" and larger where branch is a minimum of two pipe sizes smaller than main. Pipe 2-1/2" and over to be made up with welded fittings. Pipe 2” and under to be made up with threaded fittings.

4. Grooved Pipe: Schedule 40 ASTM A120 or ASTM A53 grade. Standard cut or rolled groove to coupling manufacturer's specifications. Do not use in systems exceeding 200$^{O}$ F. operating temperature.

a. Couplings: Standard weight with gasket selected by manufacturer for service intended.

b. Fittings: Full flow malleable iron, ductile iron or steel.

c. Submit calculations of expansion allowance of joints and obtain approval prior to eliminating any special expansion compensators, swing joints, flexible connections, or vibration isolators.

d. Manufacturers: Victaulic, Gruvlok or Apollo.

5. Press fit: Use Viega Mega Press or equal by Apollo.

B. Copper pipe:

1. Type "K" or "L" hard drawn copper with wrought copper fittings with openings machined to accurate capillary fit for the pipe. Pipe to conform to Standard Specifications for copper water tube. Type 'M' may only be used for A/C condensate drain lines.

2. Use "lead free" (0.00% lead content) solder for all domestic water piping. Submittal on the product to be used must include this information. Lead free solder to conform to ASTM B 32 and flux to conform to ASTM B 813. Soldered joints must be done in accordance with ASTM B 828. Lead free shall mean a chemical composition equal to or less than 0.2 percent lead.

3. Solder joints using 50/50 lead tin solder for systems operating below 180$^{O}$ F.

4. Solder joints using 430 silver solder for systems operating at 180$^{O}$ F. or above.

5. Press fit joints using Viega, Apollo or equal press fit fittings.

C. Domestic Copper Pipe (2" and larger): (Contractor Option)

1. Copper tubing systems from two inches (2") through six inches (6") shall be installed using mechanical pipe couplings of a bolted type with a central cavity design pressure-responsive gasket along with grooved end copper fittings.

2. All copper tubing shall be prepared in accordance with the manufacturer's published specifications.

3. Couplings - Coupling for copper shall consist of cast ductile iron housing, a synthetic rubber gasket of a central cavity pressure-responsive design, with nuts and bolts to secure unit together.

a. Housings - Shall be cast of ductile iron conforming to ASTM A-536 (Grade 65-45-12) with a copper alkyd enamel paint coating.

b. Gasket - Gaskets shall be molded of synthetic rubber in a central cavity, pressure-responsive configuration conforming to the copper tube size (CTS) outside diameter and coupling housing, of elastomers having properties as designated in ASTM D-2000.

c. Water Service - Gaskets supplied for water services from -30$^{O}$ F to +230$^{O}$ F shall be a Grade "E" EPDM compound, with copper color code, molded of materials conforming to ASTM D-2000, designation 2CA615A15B44F17Z, recommended for hot water service within the specified temperature range.

4. Flanged Connections: Shall be, engaging directly into roll grooved copper tube and fittings and bolting directly to ANSI Class 125 cast iron and Class 150 steel flanged components; installer to supply standard flange bolts. Flange casting shall be as in 3, a. above with a corresponding gasket as in 3, b.

5. Fittings - Fittings shall be full flow copper fittings with grooves designed to accept grooved end couplings.

a. Standard fittings shall be two inch (2") through four inch (4") copper per ASTM B-75 alloy C12200; five inch (5") through six inch (6") bronze sand castings per ASTM B-584-87 copper alloy CDA 844 (81-3-7-9).

6. Butterfly Valves – Lug style, grooved end butterfly valves are to be rated for bi-directional dead end service to the full working pressure of the valve with the down stream flange removed.

a. 2 ½-6" valves shall have either lever lock handles or gear operators. Valves in 2 ½" or 3" sizes may have two-position handle as per service requirements and manufacturer's recommendations.

1) Valve housing shall be bronze per CDA-836 (85-5-5-5).

2) Disc shall be aluminum bronze or ductile iron.

3) Operator bracket shall be steel-black enamel coated.

4) Operator - Two (2) position detent or manual lever lock shall be steel-black enamel coated.

5) Seat to be molded to the body of the valve for bi-directional dead end service

7. Tube Preparation: Copper tube shall be to ASTM B-88 (drawn tubing) and prepared in accordance with the latest published manufacturer's specifications, as applicable. Pressure ratings and end loads for roll grooved copper tubing are based upon test on copper tube prepared in accordance with manufacturer's specifications using manufacturer's approved rolled grooving tool for grooving copper tube.

8. Assembly: Couplings, fittings, adapters and tubing shall be assembled in accordance with the latest published instructions from the manufacturer for the particular product installed.

9. Reference hanger spacing in specification. In addition, use the following recommendations for support installation:

a. Copper tubing joined with grooved type couplings requires support to carry the weight of tubing and equipment. The support or hanging method must be such as to eliminate undue stresses on joints, tubing and other components.

b. The support system for mechanical grooved type tubing couplings must consider some of the special requirements of these couplings.

D. Compressed Air Piping:

1. Piping to be Schedule 40 black steel pipe. All piping 2" and smaller may be TYPE "K" hard drawn copper pipe, at contractors' option.

2. Use capped tees at each joint facing up to allow for future connections. All connections to be made with tees facing up.

3. Slope all piping to drain. Provide drain leg at each low point with ball valve at bottom of drain leg for draining system. Drain leg to be approximately 7'-6" A.F.F. (verify in field).

4. Install Metal-Flex flexible connector near compressor outlet equal to Amber/Booth type SS-PM.

2.04 VALVES

A. Select valves of the best quality and type suited for the specific service and piping system used. Minimum working pressure rating 125 psig steam or 150 psig W.O.G. All valves on insulated lines to have extended handles to allow operation without disturbing insulation seal.

B. Manufacturer: Nibco, KITZ, Jenkins, Milwaukee, Stockham, Apollo or other recognized manufacturer of equal reliability.

C. Globe Valve 2" and Smaller: Teflon disc, bronze body, bronze trim.

D. Ball Valves 3" and Smaller: Brass or bronze body, virgin TFE seat rings, blow-out proof stem, reinforced thrust washer, ¼ turn full open/full close, FULL PORT, CSA-ULFM approval.

E. Swing Check Valves 2" and Smaller: Bronze body, horizontal swing, Y-pattern, renewable disc.

F. **Butterfly Valves: Reference Section 2.03, C. above.**

G. Drain Valves: Hose end gate valve or gate valves with hose connection. Do not use sillcocks in lieu of drain valves.

H. Valves Specified Elsewhere: Provide special valves such as motor operated valves, relief valves, temperature regulating valves, etc., as specified under the individual system or as indicated on the drawings.

I. USE FULL PORT BALL VALVES RATED FOR SERVICE INTENDED FOR ALL ISOLATION VALVES THREE INCHES (3") AND SMALLER.

2.05 UNIONS

A. Provide unions adjacent to all tanks and equipment and where required for disconnect and maintenance of equipment.

B. Union for Steel Pipe: Ground joint malleable iron.

C. Union for Copper Pipe: All brass.

D. Union Between Dissimilar Metals: Dielectric Union designed and advertised to be unaffected by heat, cold or fluid in pipe. EPCO or approved equal.

2.06 MISCELLANEOUS

A. Escutcheons: Nickel or chrome plate with screws or springs for holding plate in position.

B. Automatic Air Vents: Hoffman #79, Marsh or equal.

C. Gaskets: Gaskets 1/16 inch thick for all pipe sizes 10 inches and smaller and 1/8 inch thick for all pipe sizes 12 inches and larger. Gaskets to be ring type between raised face flanges and full face type between flat face flanges with punched bolt holes and pipe opening. Gasket material shall be suitable for the service intended and shall be installed as recommended by the manufacturer. Manufacturer: Crane, John-Manville, or equal.

D. Strainers: Cast iron or bronze body basket or wye type strainers provided with ½" valved drain and a ¼" air vent cock, unless the strainer design is devoid of air pockets. Strainers shall have removable cylindrical or conical screens of nickel, copper, or brass and suitable flanges or tappings to connect with the piping they serve. Strainers 2½" and larger shall be provided with flanged covers. The free area of each screen shall not be less than three (3) times the area of the strainer inlet and shall be suitable for the service intended. Manufacturers: Crane, McAlear, Sarco or Armstrong.

2.07 MECHANICAL SUPPORTING DEVICES

A. General:

1. Securely fasten all mechanical work to the structure to prevent hazard to human life and limb, and to prevent damage to products of construction under all conditions of operation.

B. Pipe Supports:

1. Single Pipes:

a. Support all horizontal runs of steel, copper pipe under 2" and all cast-iron soil pipe on suitable hangers spaced not more than 5 feet on centers. Support all steel, and copper piping 2" and larger not more than 10 feet on centers. Support all PVC piping not more than 4 feet on center. Support piping in a manner to prevent binding, undue swing, and the transmission of vibration to the structure.

b. Support single pipes from clevis hangers equal to Anvil fig. 260. Install hangers for insulated piping outside the insulation using high density section of insulation and sheet metal shield or saddle. Provide copper plated hangers in contact with copper pipe.

2. Trapeze Hangers: Where pipes are clustered, parallel, and in same plane, they may be supported by trapeze hangers. Provide rods and angle-irons sized to suit load imposed. Minimum channel length to be six inches (6"), maximum rod spacing to be twenty-four inches (24") on center. Piping to be securely attached to trapeze hangers. Provide sheetmetal shield or saddle for all insulated piping running horizontally.

3. Piping on Walls: Secure with hook-plates, clips or fabricated steel brackets.

4. Supports from Steel Beams and Similar Construction: Use appropriate beam clamps.

5. Provide inserts for poured concrete and expansion bolts for pre-cast slabs.

6. Guide and anchor piping where necessary to control expansion and contraction. Provide supports and hangers with non-corrosive and rust-resistant finish. Galvanize or plate hanger rods after threading. Hangers other than those specified not permitted. **USE ONLY GALVANIZED HANGERS AND HANGER RODS FOR ALL PIPING IN CRAWL SPACE.**

7. Provide inserts for poured concrete and expansion bolts for pre-cast slabs. Use HiltiDrop-in Anchor or Kwik Bolt II Stud Anchor System. Verify allowable place of anchors with Structural Engineer.

8. Provide pipe supports according to the following schedule:

| PIPE SIZE - INCHES | ROD SIZE - INCHES |
|---|---|
| ½" through 2" | 3/8" |
| 2½" through 3" | 1/2" |
| 4" through 6" | 5/8" |
| 8" through 12" | 3/4" |

9. Manufacturers: Anvil International, C&P, Fee and Mason, Elcen or SuperStrut.

C. Support all piping on roof with pipe stands/roller equal to MIRO Industries Model 4-RAH-PC or Portable Pipe Hangers, Inc., Type PP10 with roller for piping 2-1/2" and smaller. For piping over 2-1/2", up to and including 8" use MIRO Industries Model 6-RAH-PC or Portable Pipe Hangers, Inc. (PPH) Type PS-1-2. All pipe stands to sit on walk board (coordinate type and methods of support with Roofing Contractor). Walk board to be a minimum of 3" larger on each side than support. Provide minimum pipe height above roof deck as required by jurisdiction having authority (at least 6"). Provide supports for piping under 2" at six feet on center. Provide supports for piping 2" and over at eight feet on center. **PIPE PROP will not be acceptable.**

D. Ductwork Support: Refer to Section 23 30 00-Air Distribution.

E. Inserts: Provide all inserts required for installation of horizontal piping. In poured concrete provide wrought steel or malleable iron and adjustable type. Where expansion bolts are necessary to secure piping or equipment, use malleable iron type with expansion case, to be inserted by drilling concrete. Power driven inserts not permitted for supporting piping to ceiling.

F. Miscellaneous Iron and Steel:

1. Provide all steel supports and hangers to support all equipment or materials unless noted otherwise.

2. All work shall be cut, assembled, welded and finished by skilled mechanics. Welds shall be ground smooth. Stands, brackets and framework shall be properly sized and rigidly constructed in a manner to withstand anticipated loads.

3. Measurements shall be taken on the job and worked out to suit adjoining and connecting work. All work shall be performed by experienced metal-working mechanics. Members shall be straight and true and accurately fitted.

4. Welded joints shall be ground smooth where exposed. Drilling, cutting and fitting shall be done as required to properly install the work and accommodate the work of other Trades.

5. Members shall be generally welded except that bolting may be used for field assembly where welding would be impractical. Welders shall be skilled and certified.

6. All shop fabricated iron and steel work shall be cleaned and dried and given two (2) coats of weatherproof primer paint on all surfaces and in all openings and crevices.

2.08 ACCESS DOORS

A. Doors shall be Karp, Inland Steel Products, Milcor, Miami or Walsh-Hannon, constructed of steel with primer coat of rust inhibitive paint, and continuous piano hinge. Doors shall be key operated with flush operated cylinders, keyed alike. Key lock system shall be coordinated with the Owner and shall be approved by the Architect. Provide six (6) keys of type used for access panels for Owner's use. Obtain receipt of key delivery and submit to Architect for record.

1. Suspended Lath and Plaster Ceilings - Style: "M" with 16 gauge frame, 14 gauge panel.

2. Masonry Non-Rated Walls - Style: "M" with 16 gauge frame, 14 gauge panel.

3. Masonry Fire Rated Walls - Fire rated with UL, ½ hour "B" rating, 16 gauge frame, 20 gauge sandwich type insulated panel.

4. For access doors larger than 16" in either direction, provide two (2) locksets.

2.09 CHIMNEY SYSTEMS

A. Type B Vent:

1. Factory-built; labeled and tested for use with building heating equipment.

2. Double wall pipe; galvanized steel outer pipe, heavy gauge aluminum inner pipe.

3. Supply with support pieces, adapters, fittings, ventilating thimble and Type MC wind cap.

4. Provide vent and cap for all gas consuming equipment. Verify all sizes with actual equipment purchased. In no case shall the pipe be smaller than the equipment connection size.

B. Type “B” Vent Pipe Manufacturers: Metalfab, Metalabestos or equal.

C. PVC/CPVC Vent/inlet:

1. Provide minimum schedule 40 solid core PVC/CPVC combustion air intake and/or flue exhaust vent as required for all condensing type water heater(s)/furnace(s) installed and sized as required by manufacturers written instructions. Wrap all piping exposed to plenum spaces with products to meet 25/50 smoke/flame requirements. Terminate with products per manufacturers written instructions.

**PART 3 - EXECUTION**

3.01 EQUIPMENT MOUNTING

A. Provide equipment concrete pads, treated support runners, roof curb supports, mounting accessories, supports, hanger expansion joints, adapters and any other appurtenances to adapt fixtures and equipment supplied to the conditions of use.

B. Provide vibration eliminators as specified (if not specified elsewhere use vibration eliminators recommended by equipment manufacturer) at all pieces of equipment subject to vibration. (Exception; curb mounted equipment does not require vibration isolator rails except when specifically scheduled).

C. Independently support piping and ductwork at equipment so that no weight is supported by the equipment.

D. Securely fasten fixtures and equipment to the building structure in accordance with manufacturer's recommendation.

E. Provide steel base plates for floor mounted fixtures and equipment to distribute the weight so that the floor load is not more than 100 lbs. psf, unless special structural reinforcement is submitted for approval.

F. At wall attached fixtures and equipment weighing less than 50 pounds, provide backing plates of at least 1/8 x 10 inch sheet metal or 2 x 10 inch fire retardant treated wood securely built into the structural walls. Submit attachment details of heavier equipment for approval.

G. Electrical conduit shall not be hung from equipment or plumbing piping.

3.02 SLEEVES

A. Provide sleeves as required where pipes pass through walls, floors, or ceilings. Make sleeves as follows:

1. In non-fire rated bearing walls, foundations, masonry or concrete walls and floors, use schedule 40 black steel pipe.

2. In non-rated construction, use minimum 20 gauge galvanized sheetmetal.

3. In fire rated walls, floors and assemblies, install sleeves as required by UL System Number.

B. In non fire rated areas install sleeves flush with surfaces. In mechanical rooms or any wet floor where seepage may occur, install sleeve 1 inch above floor and caulk. Caulk both sides of penetration using UL listed one part firestop synthetic elastomer sealant, flexible at normal working temperatures, having smoke developed 50, fuel contributed 50, and flame spread 25 rating. Install thickness per manufacturer's recommendation. Manufacturer: Dow Corning FireStop 2000 Sealant, Flame Stop V, 3M: CP-25.

C. Waterproof all piping and sleeves through building exterior skin, including walls, roofs and interior floor penetrations to prevent leakage. Coordinate with the Architect on caulk material to use at exterior.

D. Size sleeves for cold piping to allow for continuous insulation through sleeve.

3.03 SEALING AND FIREPROOFING

**A. SEALING OF PENETRATIONS THROUGH RATED WALLS, FLOORS, CEILING AND ROOF ASSEMBLIES SHALL BE INSTALLED PER UL "FIRE RESISTANCE DIRECTORY." UL SYSTEM NUMBERS INDICATED ARE FOR A PARTICULAR LISTED INSTALLATION AND ARE FOR GENERAL INFORMATION AND INTENT. OTHER LISTED UL SYSTEM DESIGNS MAY BE USED. IN ALL CASES, SUBMIT MATERIALS, UL SYSTEM DESIGN NUMBERS AND UL DETAILS TO BE USED THROUGHOUT THE PROJECT AND IDENTIFY WHICH DETAIL IS TO BE USED FOR EACH SPECIFIC CONDITION. POST REVIEWED DETAIL AT JOB SITE FOR REFERENCE.**

1. Only materials tested in the specific UL System Number may be used.

a. Wrap Strip (UL System No. WL 5001): Nominal 1/4" thick by 2" wide intumescent elastomeric material. Manufacturer: 3M Type FS-195.

1) Use one (1) wrap strip for up to one inch (1") thickness insulation.

2) Use two (2) wrap strips for 1-1/2" inch and larger thickness insulation.

b. Caulk Manufacturer:

1) 3M Type CP-25 WB+ for all assemblies requiring 3M caulk.

2) For WL3045 and 3046 use Hilti FS611A Sealant.

c. Steel Sleeve (Stud Wall) (UL System 1003): Cylindrical sleeve shall be fabricated from minimum 0.019" thick (no. 28 gauge) galvanized sheet steel and having a minimum 2" lap along the longitudinal seam. Length of steel sleeve to be equal to thickness of wall plus 1" such that, when installed, the ends of the sleeve will project approximately ½" beyond the surface of the wall on both sides of the wall assembly. The diameter of the openings cut on each side of the wall assembly (concentric with pipe) to be 2 to 2-1/2" larger than the outside diameter of pipe such that, when the steel sleeve is installed, a 1 to 1-1/4" annular space will be present between the steel sleeve and the pipe around the entire circumference of the pipe. Install sleeve by coiling the sheet steel to a diameter smaller than the through opening, inserting the coil through the openings and releasing the coil to let it uncoil against the circular cutouts in the gypsum wallboard layers.

d. Steel Sleeve (Concrete or Block Wall): For cables, provide sleeve cast in floor/wall or mortared into CMU wall; optional sleeve for UL System No. CAJ1175.

e. Forming Material: Minimum one inch (1") thickness mineral-wool batt insulation material. Tightly pack into sleeve with minimum 1/2" recess on ends. Manufacturer: Thermafiber Safing Insulation.

2. Wire/Cables:

a. For Gypsum Frame Wall (Single Cable): Fireproof per UL System No. WL3001. Opening for cable to be hole-sawed through gypsum wall board layers. Diameter of opening to be 3/8" to 5/8" inch larger than outside diameter of cable. Cable to be rigidly supported on both sides of wall assembly. Caulk to fill annular space throughout thickness of gypsum wall board layers and apply 1/4" bead of caulk to perimeter of cable at its egress from wall (both sides).

b. For Gypsum Frame Wall (Multiple Cables): Use UL System No. WL3021, WL3045, WL3046 or equivalent to maintain rating of wall.

c. For Concrete Walls/Floors or CMU Walls (Single or Multiple Cables): Fireproof per UL System No. CAJ3030. Cables to be a minimum ten percent (10%), maximum thirty-three percent (33%) of cross-sectional area of opening. Recess minimum one inch (1") thickness of mineral wool material into opening around cables. Caulk openings around cable to minimum depth of one inch (1"). Optional sleeve may be used per UL detail requirements.

3. Firestop system shall be installed at top surface of floor and symmetrically on both sides of wall assemblies.

4. Materials used in firestop systems shall be installed in accordance with the manufacturer's instructions, provided with materials for specific UL System Number.

5. Reference Architectural for the exact location of all rated walls, floors, ceilings and ceiling/roof assemblies.

B. Manufacturers: 3M, Metacaulk, Hilti, BioFireshield, STI or equal.

C. In non-rated walls identified for sound insulation, provide 1/2" space between pipe and sleeve packed with multiple layers of forming material. Allow 5/8" minimum space on each side and caulk with acoustical sealant.

D. **Final condition to prevent passage of fire, smoke, noxious gas and water.**

E. For non-rated mechanical/electrical room walls: Seal all piping and ductwork passing through walls, floors and ceilings with 3M caulk, Type CP-25+.

F. Submit UL numbers and details for type of penetrations and materials to be used. All penetrations in fire rated walls, floors and ceilings must be installed per a UL listed detail specified for the application.

G. **Seal both sides of all floor penetrations into crawl space on both sides to prevent air and water migration.**

3.04 WATERPROOFING AND COUNTERFLASHING

A. Provide and install all counterflashing of all conduit, pipe or duct and equipment which penetrates roofs, walls and other weather barrier surfaces. Metal Roofing Contractor shall provide and install all curbs and counter flashing for all metal roof penetrations. Verify detail with Architect before installation.

B. All work shall be performed in a workmanlike manner to assure weatherproof installation. Any leaks developed shall be repaired at contractor’s expense, to Architect's satisfaction.

C. Conduits, pipes or ducts passing through slabs shall have the sleeve extended above floors to retain any water and the space between the conduit, pipe or duct and sleeve caulked with lead wool. The top shall be sealed with lead and the bottom shall be sealed with monolastic caulking compound.

D. All waterproofing, flashing and counterflashing shall be provided and installed by the Roofing Contractor and shall be compatible with roofing system so as not to void any roof warranties. Confirm installation with Architect.

E. Slope all ducts to wall louvers to drain toward louvers. Provide continuous sleeve thru wall and seal all joints.

**F. All piping and conduit penetrations through exterior walls shall be sealed on both side of drain plane and at exterior finished wall surface to prevent moisture intrusion.**

3.05 LABELING AND TAGGING

A. Tag all valves with minimum 1/16" thick heat resistant laminated dark plastic labels engraved with readily legible white lettering 1/4" high indicating fluid in pipe and a “V” (valve) number (e.g. V-22). Securely fasten to the valve stem or bonnet with beaded chain. Provide an aluminum valve chart and frame with glass cover for typewritten valve chart. Install where directed. Coordinate valve numbers with mechanical contractor to avoid duplication. Refer to Section 20 00 00, and Manuals.

B. Label all equipment with minimum 1/16" thick heat resistant laminated plastic labels having engraved lettering 1/2" high and fastened in place with rivets, screws or adhesive backing. Example "WH-1, AHU-1, etc." If items are not specifically listed on the schedules, consult the Architect concerning designation to use. Refer to Section 20 00 00. Label all equipment served by emergency electrical panels with red labels.

C. Label all thermostats/sensors with minimum 1/16" thick heat resistant laminated plastic labels having engraved lettering 1/4" high and fastened in place with rivets, screws or adhesive backing. Label is to correspond to rooftop and/or air-handling units.

D. Provide access panel markers (minimum 1/16" thick laminated plastic type with engraved lettering) to indicate ceiling tile to be used for access for all A/C equipment, terminal units and plumbing shut-off valves. Use light green for plumbing and light blue for A/C equipment. Label to be attached to ceiling grid with rivets, screws or adhesive backing. Example, “AHU-3A” access.

E. Manufacturer: Seton Pipe Marking Products, MSI (Marketing Services, Inc.) or equal.

3.06 TYPICAL PIPING

A. Provide insulating couplings or unions to prevent electrolysis between dissimilar metals when use of dissimilar metals cannot be avoided in one system.

B. Close all openings in pipes with appropriate caps, plugs, or covers during storage and progress of the work to preclude introduction of contaminants.

C. Arrange systems and locate valves so that either entire system or separate sections thereof may be drained for service. All service valves located no more than 24 inches above the ceiling and normally accessible from an 8 foot ladder.

D. Provide valves and unions adjacent to all tanks, batteries of plumbing fixtures and equipment, for disconnect purposes. Install all valves with stems vertical wherever possible, and in no case with stems below the horizontal.

E. Ream ends of all pipe to full diameter.

F. Provide pipe anchors, swing joints, and expansion compensators as required to control the expansion of pipelines.

G. Reduce pipe sizes using reducing tees or reducing fittings. Bushings not permitted except on tanks and similar equipment.

H. Provide escutcheons on all pipes passing through walls, floors, and ceilings in finished areas where piping is in counters, closets or cabinets, and subject to view when doors are open. Cover the pipe sleeve and secure plate in position.

I. Install hangers at each change in direction and within 2 feet at each elbow or tee. This requirement is mandatory.

J. Pipe hooks, wire, chains or perforated metal shall not be used for pipe supports.

K. Insulate hangers for copper pipe from piping with at least two layers of 12 mil Polyken 826 corrosion control tape.

L. Install piping not to interfere with removal of equipment, ducts, and devices or block access to door or access openings.

M. Piping serving plumbing fixtures and equipment shall be securely supported near the point where pipes penetrate the finished wall.

N. Test all piping in accordance with accepted trade standards if not specified elsewhere.

3.07 THREADED PIPE

A. Cut all threads true and of depth to make up properly without leaks.

B. Make connections to show at least two threads and not more than four threads when tight.

C. Make up joints with Teflon tape only as recommended by tape manufacturer, or as specified in specific piping sections.

3.08 AUTOMATIC (MANUAL) AIR VENTS

A. Install at highest point of chilled and hot water system, at chilled and hot water coils and at points necessary to relieve air in piping. Provide shut-off valve to facilitate maintenance of air vent.

B. Route 1/4" copper line from discharge of air vent to floor drain in mechanical room. Slope to drain.

3.09 PAINTING AND CODING

A. Ductwork and Piping: Prime and paint all exposed angle braces, hanger rods or straps, damper rods, and quadrants with one coat aluminum paint after removing scale and rust. Prime and paint ductwork and piping exposed in finished rooms to match room finish. Prime and paint all black iron piping located outdoors or otherwise exposed to weather. Coordinate painting and color with Architectural paint specified elsewhere. All painting done by persons regularly employed at and skilled in that trade.

B. Grilles, Registers, Etc.: Furnish all grilles, registers, etc., other than extruded aluminum or plastic with prime coat paint by manufacturer. Furnish all ceiling grilles, registers and diffusers with factory applied baked enamel to match ceiling tile. Paint all ductwork and/or conduit visible through registers, grilles and other openings with one coat of flat black paint to a point four feet (4') from opening on straight duct or around bend, whichever applies.

C. Pipe Coding:

1. Identify piping with pressure-sensitive coded pipe marker at piping adjacent to equipment, at intervals along all piping not to exceed 20' and at points where piping disappears into or emerges from floors, walls or ceiling. Secure both ends of marker with pressure sensitive tape with flow arrow on roll to indicate flow direction. Color code pipe markers and arrows indicating the liquid and/or use of the pipe.

2. Code piping to the following schedule: (SUBMIT ALTERNATE CODING)

| | |
|---|---|
| Cold Water | CW |
| Hot Water | HW |
| Hot Water Circulating | HWC |
| Gas | FUEL GAS |
| Sprinkler | SPKR |
| Condensate | Condensate |
| Tempered Water | T |

3. Manufacturers: Seton Pipe Marking Products, MSI or equal.

**END OF SECTION**

## SECTION 20 07 00 - INSULATION

### PART 1 - GENERAL

1.01 DESCRIPTION

A. Description:

1. This section describes specific requirements, products and methods of execution which relate to the insulation of ducts, pipes and other surfaces of the mechanical installation.

2. Insulation is provided for the following purposes:

a. Energy conservation

b. Control of condensation

c. Safety of operating personnel

B. SPECIAL NOTE: All provisions and divisions of these specifications are a part of this section of these specifications. The Contractor shall consult these divisions and provisions in detail for instructions and include all items pertaining to this work. The Contractor shall consult all other divisions of these specifications, determine the extent of impact on the work required to complete the work required by this section of the specifications or portion thereof and related work shown on the drawings.

C. Acoustical Lining Insulation Summary

1. The work covered by this specification consists of furnishing all labor, equipment, materials and accessories, and performing all operations required, for correct fabrication and installation of air duct systems of sheet metal lined with fibrous glass duct liner, in accordance with applicable project drawings and specifications, subject to terms and conditions of the contract:

2. All air duct systems operating at internal air velocities not exceeding rated duct liner limitations as listed below and internal air temperature not exceeding 250°F (121°C).

3. Duct liner products shall conform to the requirements of ASTM C1071. **ALL INSULATION IS TO BE FREE OF UREA-FORMALDEHYDE AND/OR BE GREENGUARD CERTIFIED.**

4. The manufacturer’s product identification shall appear on the air stream surface.

5. Duct liner adhesive shall conform to the requirements of ASTM C 916. **ALL ADHESIVES, SEALANTS AND COATINGS MUST MEET OR EXCEED GREEN BUILDING PROGRAM SCAQMD RULE 1168 AND 1113.**

6. The finished duct system shall meet the requirements of NFPA 90A and 90B.

7. Duct dimensions shown on the plans are finished inside dimensions.

8. Fabrication and installation shall conform to the requirements of the latest edition of the North American Insulation Manufacturers Association's *Fibrous Glass Duct Liner Standard* (hereinafter referred to as NAIMA FGDLS) or the Sheet Metal and Air Conditioning Contractors National Association *HVAC Duct Construction Standards - Metal and Flexible* (hereinafter referred to as SMACNA HVAC DCS) or the manufacturer's recommendations.

D. References

1. American Society of Testing and Materials( ASTM)
    a. ASTM C1071
    b. ASTM C916
    c. ASTM G21
    d. ASTM G22
    e. ASTM C423
    f. ASTM C518
2. National Fire Protection Association (NFPA)
    a. NFPA 90A
    b. NFPA 90B
    c. NFPA 259
3. Sheet Metal and Air Conditioning Contractor's National Association (SMACNA)
    a. HVAC Duct Construction Standards Metal and Flexible (HVAC DCS)
4. North American Insulation Manufacturers Association (NAIMA)
    a. Fibrous Glass Duct Liner Standard (FGDLS)
5. International Nonwovens & Disposables Association (INDA)
    a. IST 80.6

E. Delivery, Storage and Handling

1. Deliver all materials and/or fabricated, insulated duct sections and fittings to the job site and store in a safe, dry place.
2. Protect materials from dust, dirt, moisture, and physical abuse before and during installation, startup and commissioning. Wet or contaminated duct liner shall be replaced.

**PART 2 - PRODUCTS**

2.01 FIRE RATING OF MATERIALS

A. Provide all insulation products used above ground in buildings with burning characteristics not to exceed the following ratings according to NFPA 255-1972 “Method of Test of Surface Burning Characteristics of Building Materials”: Flame Spread 25, Fuel Contributed 50, Smoke Developed 50.

B. Insulation specified for use underground and above ground away from the building, might have other burning characteristics. Use such products only where specifically required.

2.02 INSULATION

A. TYPE "A": Pre-molded Fiberglass Piping Insulation:

1. Jacket Type:

a. Thermal conductivity K = 0.24 at 100$^{O}$ F. mean temperature.

b. Factory applied kraft-reinforced vapor barrier flame retardant all service jacket and tape, with permeability rating - 0.02 perms.

c. Provide insulation sections with self-sealing pressure sensitive adhesive on both overlap seam and mating jacket surface.

d. Fitting insulated with pre-cut insulation inserts covered with PVC fitting cover.

e. Manufacturer: Owens-Corning Fiberglass, Certainteed, Knauf, Schuller/Manville AP-TPLUS.

B. TYPE "B": Cellular Piping Insulation:

1. Thermal conductivity K = .27 @ 75$^{O}$ F. mean temperature.

2. Elastomeric thermal insulation with permeability rating of .17 perms.

3. Temperature range from -40$^{O}$ F to 220$^{O}$ F.

4. Insulation to meet 25/50 requirements for use in return air plenums

5. Wall thickness as listed in Part 3 of this Section for size and use of piping.

6. Install without slit when possible. All slits in insulation to be smooth. Insulation installed with jagged edges will be removed and replaced at no cost to Owner.

7. **ALL INSULATION IS TO BE FREE OF UREA-FORMALDEHYDE AND/OR BE GREENGUARD CERTIFIED.**

8. Manufacturers: Armacell Armaflex Type AP Pipe Insulation, Rubatex, Halstead, IMCOA.

C. TYPE "C": Blanket Type Duct Wrap Fiberglass Insulation:

1. **The Contractor may use a 3/4, 1 or 1-1/2 pound density product with a minimum installed R-value of 6.0 if ductwork is within building insulation envelope or minimum R-value of 8.0 if installed outside of building insulation envelope.** Density, thickness and installed R-value to be clearly indicated on submittal.

2. Fiberglass duct wrap insulation is to have a factory FSK or FRK facing which acts as the vapor barrier. Maximum permeability rating is 0.02 perms.

3. Use only labeled Type UL181AP Aluminum Foil Tape a minimum of 3" wide and 7.4 mils thick "Venture Tape #1525CW" or "Shurtape #AF-982"). Maintain a complete vapor barrier throughout all ductwork insulation applications. Use spreader to completely seal tape to all joints or tears in vapor barrier, surface must be clean prior to installation.

4. Certainteed SoftTouch Duct Wrap with FSK facing or equal. **ALL INSULATION IS TO BE FREE OF UREA-FORMALDEHYDE AND/OR BE GREENGUARD CERTIFIED.**

5. Manufacturers: Knauf, Schuller/Manville, Certainteed or Owens-Corning.

2.03 SOUND CONTROL

A. Lined Duct:

**1. Provide acoustically lined duct to attenuate and control the transfer of airborne sound and as duct insulation only when specifically indicated.**

2. Lining: Flexible fiberglass blanket type mat faced insulation with durable surface coating, bonded with thermosetting resin. Maximum flame spread index; 25. Maximum smoke developed index; 50. **Lining to have anti-microbial coating.** Minimum R-value of 6.0 for one and one-half (1-1/2") thickness. Installed R-value to be a minimum of 6.0. **1.5" thick, R-6 lining equal to CertainTeed ToughGard R-EP or ToughGard2 Textile Duct Liner.** R-8 for ducts located outside the building insulation envelope. **ALL INSULATION IS TO BE FREE OF UREA-FORMALDEHYDE AND/OR BE GREENGUARD CERTIFIED.**

3. Air Friction Correction Factor 1.12 at 500 fpm or less.

4. Minimum sound absorption co-efficients as follows:

| Thickness | Frequency | | | | | |
|---|---|---|---|---|---|---|
| | 125 | 250 | 500 | 1000 | 2000 | 4000 |
| 1-1/2" | .17 | .53 | .87 | .99 | 1.00 | .95 |

5. All duct dimensions shown on drawings are net clear inside dimensions with duct liner. Install liner in compliance with requirements of NFPA 90A.

6. Manufacturers: Shuller, CertainTeed, Knauf or Owens-Corning.

7. All duct liner to be provided with tough abrasion resistant interior air side finish and antimicrobial coating.

2.04 INSULATED FITTING COVERS AND JACKETING

A. High-impact, UV-resistant polyvinyl chloride jacketing with gloss white finish.

B. Pre-cut curled jacketing, 30 mil. thickness. Sized to snugly fit pipe diameter with thickness of insulation specified.

C. Joints and seams sealed with Perma-Weld Adhesive to form a complete vapor barrier for chilled water and domestic cold water systems. Use tack and tape for heating water and domestic hot water systems. Installation of adhesives, tacks and tape shall be per manufacturer's recommendations. Submit installation instructions with submittal of materials.

D. Fitting Covers: Covers shall be pre-formed for fitting shape.

E. Manufacturer: Schuller/Manville Zeston 2000, Owens-Corning Fiberglass, Certainteed, Knauf or Proto.

2.05 CANVAS JACKETING

A. Insulating Lagging Canvas: 8oz./sq. ft. minimum, 28 threads per inch minimum, Osnaberg or equal.

B. Lagging Adhesive: Plastic synthetic resin emulsion adhesive; watertight, mildew resistant, fire retardant; Miracle LA69, Borden Aerosol or equal. **ALL ADHESIVES, SEALANTS AND COATINGS MUST MEET OR EXCEED GREEN BUILDING PROGRAM SCAQMD RULE 1168 AND 1113.**

2.06 METAL OR VINALUM JACKETING

A. Material shall be minimum .016" thick aluminum jacket or vinalum .020" thick aluminum faced PVC jacket with integral factory applied vapor barrier.

B. Elbows, fitting and valves shall be metal preformed fitting covers (no gores acceptable). Valves made from .020 metal. All valves ends and where insulation reduces shall have Pittsburgh seams.

1. All straight line metal to be Z-locked jacket held in place with 3/4" wide aluminum bands at nine inches (9") on center with wing seals.

C. All joints and seams shall be watertight with Childers CP-76 OR Foster 95-44.

D. Manufacturer: "Strap-On" Childer Cawed Systems or equal.

2.07 COATINGS

A. All coating to bear the UL label. **ALL ADHESIVES, SEALANTS AND COATINGS MUST MEET OR EXCEED GREEN BUILDING PROGRAM SCAQMD RULE 1168 AND 1113.**

B. On cold or dual service lines, use vapor barrier type coatings.

2.08 METAL SHIELDS (SADDLES)

A. Metal Shields curved to fit up to midpoint of the insulated pipe.

B. Metal shields shall be 16 gauge, twelve inches (12") long for pipes up to two inches (2") and 14 gauge, sixteen inches (16") long for piping 2-1/2" and larger.

**PART 3 - EXECUTION**

3.01 SURFACE PREPARATION AND WORKING CONDITIONS

A. Apply all insulation, fitting covers, mastics and sealants per manufacturer's recommendations.

B. Do not apply insulation materials until all surfaces to be covered are clean and dry and all foreign materials such as rust, dirt, etc., are removed.

C. Keep insulation clean and dry during installation and during the application of any finish.

D. Do not install the insulation on pipe fittings, and pipe joints until the piping is tested and approved.

E. Do not apply under conditions of excessive humidity or at temperatures below $50^{O}$ F or above $100^{O}$ F.

3.02 TECHNIQUE FOR APPLICATION TO PIPES

A. Close longitudinal joints of pipe insulation firmly and butt insulation sections firmly together.

B. Neatly and smoothly adhere all laps and butt strips. Adhere three inch (3") wide self-sealing butt joint strips over end joints.

C. Replace all insulation having loose joints or laps. Sloppy work will not be acceptable and such work shall be removed and re-applied.

D. Provide ½" over the thickness of insulation specified at all insulated piping in outside walls.

E. Where insulation with a vapor barrier terminates, it shall be sealed with “Ductmate Protack”. Ends shall not be left raw.

F. On water piping use sheet metal shields outside the insulation at hanger locations. In addition, provide:

1. A molded vegetable cork or foam glass insert not less than twelve inches (12") long of same thickness and contour as insulation between support shield and piping and under the finish jacket.

2. Heavy density insulation minimum six (6) pounds per cubic foot under entire length of metal shield.

G. Where piping and fittings are installed out of doors, provide [two-layer glass cloth and four-layer weatherproof vapor barrier adhesive coating, in addition to jacket specified] vapor barrier jacket, cover with metal or vinalum jacket with seams located on bottom side of horizontal piping.

3.03 TECHNIQUE FOR APPLICATION TO PIPE FITTINGS, UNIONS AND VALVES

A. On insulated piping with vapor barrier, insulate fittings, unions, valves and flanges including Victaulic and Gustin-Bacon to the same thickness as the pipe insulation.

B. Any of the following methods of insulation is acceptable:

1. PVC Snap Form Fitting Covers: Wrap all valves and fittings with precut fiberglass insulation wraparound inserts. Brush vapor barrier mastic on adjoining section of pipe insulation and on overlapping edges of jacket and throat seam before applying preformed fitting. Secure cover with stainless steel tacks. Tape joints with pressure sensitive vapor barrier tape.

3.04 TECHNIQUE FOR APPLICATION TO DUCTWORK

A. Impaling Over Pins: Install all insulation with edges tightly butted. Impale insulation on pins welded to the duct and secure with speed clips. Trim off pins close to speed clip. Space pins as required to hold insulation firmly against duct surface, but not less than one pin per square foot. Seal all joints and speed clips with glass fabric set in adhesive. Provide metal angle at corners to protect edges of insulation.

B. Other Method of Securement: If the welded pin method is impossible, secure the insulation to the duct with “Ductmate Protack” or Childers CP-127 or Foster 85-60 adhesive. Cover the entire surface of the metal with adhesive when applying to the underside of horizontal ducts. Application to top and sides may be in strips with a minimum of 50% coverage. Additionally, secure insulation with No. 16 galvanized wire on not more than twelve inch (12") centers. Provide metal angle at corners to protect edges of insulation. Seal joints as above. **ALL ADHESIVES, SEALANTS AND COATINGS MUST MEET OR EXCEED GREEN BUILDING PROGRAM SCAQMD RULE 1168 AND 1113.**

C. Where external insulations terminate, seal insulation to ductwork with Childers CP-35 or Foster 30-65 with 3" glass fiber reinforcing mesh.

D. Impale rigid insulation board over pins. Provide two layers of glass cloth and four layers of weatherproof vapor barrier adhesive coating. Install .040 thick lock-formable aluminum jacket over sealed insulation. All joints are to be 1” standing seams. The top of the aluminum jacket is to slope a minimum of 1” in 12” to sides to prevent collection of water. Install tapered insulation under sloped top for support of aluminum jacket. Provide a minimum of 1” flange out at connection point to mechanical equipment and building to ensure that water does not get under jacket. Provide counterflashing that is appropriate for building material type. Coordinate with Architect to ensure a watertight connection to building.

3.05 EXAMINATION (LINED DUCTWORK)

A. Verify that the duct liner products is installed in accordance with project drawings, duct liner operating performance parameters and limitations, and provisions of NAIMA FGDLS or SMACNA HVAC DCS or manufactures recommendations.

3.06 INSTALLATION (LINED DUCTWORK)

A. All portions of duct designated to receive duct liner shall be completely covered with duct liner. All joints shall be neatly butted and there shall be no interruptions or gaps. Duct liner shall be installed with the Printed air stream surface treatment exposed to the air stream.

B. Duct liner shall be adhered to the sheet metal with 90% (minimum) coverage of adhesive complying with the requirements of ASTM C 916. **ALL ADHESIVES, SEALANTS AND COATINGS MUST MEET OR EXCEED GREEN BUILDING PROGRAM SCAQMD RULE 1168 AND 1113.**

C. All transverse edges that are not to receive sheet metal nosing shall be coated. Longitudinal joints shall occur at the corners of ducts. If duct size and standard duct liner product dimensions make exposed longitudinal joints necessary, such joints shall be coated with adhesive designated for duct liner application and which meets the requirements of ASTM C 916. Such joints shall be additionally secured with mechanical fasteners in accordance with NAIMA FGDLS, or SMACNA HVAC DCS as if they were transverse joints.

D. Duct liner shall be additionally secured with mechanical fasteners complying with the requirements NAIMA FGDLS or SMACNA HVAC DCS and of the correct type for the duct liner being installed. Fasteners may be either weld-secured or impact-driven, and shall be installed perpendicular to the duct surface. Mechanical fasteners shall not compress the insulation more than 1/8" (3 mm) based on nominal insulation thickness. Fastener spacing with respect to interior duct dimensions shall be in accordance with NAIMA FGDLS or SMACNA HVAC DCS. Fastener heads or washers shall have a minimum area of 0.75 $in^2$ (484 $mm^2$), with beveled or cupped edges to prevent their cutting into the duct liner.

E. Where air velocities exceed 4000 fpm (20.3 m/sec), metal nosing (either channel or "zee" profile) shall be installed on upstream edges of liner duct sections.

F. Metal nosing shall be securely installed over transverse liner edges facing the airstream at fan discharge and at any point where lined duct is preceded by unlined duct.

G. Duct liner in roll form shall be folded and compressed in the corners of rectangular duct sections, or shall be cut and fit to assure a lapped, compressed corner joint

H. Duct liner in sheet form shall be cut and fit to assure tight, over-lapped corner joints. Top pieces of liner shall be supported at the edges by the side pieces

I. Any damage to the air stream surface must be repaired by coating the damaged area with adhesive or coating designed for duct liner application. Adhesive or coating shall meet requirements of ASTMC916.

3.07 FIELD QUALITY CONTROL (LINED DUCTWORK)

A. Upon completion of installation of lined duct and before HVAC system start-up, visually inspect the ductwork and verify that duct liner has been correctly installed. Confirm that the duct system is free from construction debris.

B. After the lined duct system is completely installed and ready for service, conduct a final inspection of the entire system. This inspection should include, at minimum, the following steps:

1. Check all registers, grilles, and diffusers to ensure that they are clean and free from construction debris.

2. Check all filters in accordance with their manufacturer's instructions. Use specified grade of filters at all times that system is operating.

3. Cover supply openings with filter media prior to system start-up to catch any loose material that may remain inside the ductwork.

4. Turn the HVAC system on and allow it to run until steady state operation is reached.

5. Remove the temporary filter media from supply openings and, along with it, any loose material blown downstream and caught by the filter media.

6. Check to ensure that air delivery performance meets all requirements and complies with SMACNA leakage specifications.

3.08 PROTECTION (LINED DUCTWORK)

A. Contractor's employees shall be properly protected during installation of all insulation. Protection shall include proper attire when handling and applying insulation materials, and shall include (but not be limited to) disposable dust respirators, gloves, hard hats and eye protection.

B. The contractor shall conduct all job site operations in compliance with applicable provisions of the Occupational Safety and Health Act, as well as with all state and/or local safety and health codes and regulations that may apply to the work.

3.09 COLD PIPING INSULATION

A. Insulate piping for domestic cold water, using one inch (1") Type "A" or Type "B" Insulation.

B. Provide a complete vapor barrier throughout the entire system. Use only vapor barrier adhesives and coatings. Stapling of jacket not permitted. Penetrations in vapor barrier jacket, joints, and seams sealed vapor proof with Childers CP-35 or Foster 30-65 (white) mastic. **ALL ADHESIVES, SEALANTS AND COATINGS MUST MEET OR EXCEED GREEN BUILDING PROGRAM SCAQMD RULE 1168 AND 1113.**

C. Cover ends of insulation sections with an adhesive coating at intervals of not more than twenty feet (20'). Insulate accessories, valves, flanges, etc.

D. Cover insulation on fittings with spiral-wrapped glass mesh tape. Finish with a vapor barrier coating applied approximately 1/16" thick.

E. Insulate all horizontal runs at primary and overflow roof drain rain leader piping from bottom of roof deck to include roof drain body, to one foot (1') past turn down fitting in vertical direction. Vertical rain leaders need not be insulated when concealed, routed inside wall cavity.

F. Insulate all cold water piping above ceiling to point where piping turns down into chase. When piping turns down into exterior walls, piping in exterior walls must be insulated.

3.10 HOT & TEMPERED PIPING INSULATION

A. Insulate domestic hot and tempered water and circulating lines using one inch (1") Type "A" insulation one inch (1") thickness for ½" to one inch (1") piping, 1-1/2" thickness for 1-1/4" to two inch (2") piping and two inch (2") thickness for 2-1/2" to six inch (6") piping. Domestic hot water lines may be insulated with one inch (1") Type "B" insulation.

B. Staples may be used to seal jacket.

C. Insulate unions, valves and flanges in boiler room only for piping over 140$^{O}$ F. Insulate with same method used for cold pipe fittings, except vapor barrier mastic is not required.

D. Do not insulate valves, flanges, and unions for domestic hot water piping systems below 140$^{O}$ F., but bevel and seal ends of insulation at such locations.

E. Insulate hot water expansion tank and air separators with one inch (1") sheet type “B” insulation.

3.11 SPECIAL PIPING INSULATION REQUIREMENTS

A. Insulate buried domestic hot and cold water lines under building with one inch (1”) Type "B" Insulation. Bond joints using an adhesive; apply surface treatment as recommended by insulation manufacturer, taping not permitted. Set in sand bed and cover with minimum five inches (5") sand. **ALL ADHESIVES, SEALANTS AND COATINGS MUST MEET OR EXCEED GREEN BUILDING PROGRAM SCAQMD RULE 1168 AND 1113.**

B. **Insulate all refrigerant piping for heat pump systems and suction lines only for all other systems with Type "B" Insulation:** ½" thickness for piping up to 1" and 3/4" thickness for piping larger than one inch (1"), apply per manufacturer's recommendations. Glue all joints and seams with Armaflex 520 Adhesive BLV LOW VOC. Protect all insulation on piping outside with two (2) coats of “WH” Armaflex Finish Coating for weather protection. No tape is allowed. **ALL ADHESIVES, SEALANTS AND COATINGS MUST MEET OR EXCEED GREEN BUILDING PROGRAM SCAQMD RULE 1168 AND 1113.**

C. Insulate all exposed p-traps and water connections for handicapped lavatories with White "Truebro Handi Lav-Guard" Insulation Kit Model #102W (Use Model #105W when 5" offset strainer is used). (Phone: 203-875-2868), or equal products as manufactured by Brocar Products Inc., (Phone: 512-847-1524).

D. Insulate p-trap of all floor drains above the first floor and deep seal traps that receive condensate. Insulate with 3/4" thick Type “B” Insulation.

3.12 DUCT INSULATION REQUIREMENTS

A. Insulate Ducts as Follows:

1. Thickness and Type:

a. Exhaust Air and Outside Air Exhaust Ducts: Externally wrap with Type “C” Insulation; insulate from roof deck/wall exterior back three feet (3') into space. (R-6)

b. Supply Air: Externally wrapped with Type “C” Insulation, unless specifically noted otherwise. R-8 for ductwork located outside or in attic spaces and R-6 for all other ducts inside the building insulation envelope.

c. Return Air: Externally wrapped with Type “C” Insulation, unless specifically noted otherwise. R-8 for ductwork located outside or in attic spaces and R-6 for all other ducts inside the building envelope.

d. Outside Air: Supply ducts externally wrapped with Type “C” Insulation. R-8 for ductwork located outside or in attic spaces and R-6 for all other ducts inside the building insulation envelope.

e. Relief Air: Externally wrap with Type “C” insulation when run through unconditioned spaced, unless specifically noted otherwise. R-8 for ductwork located outside or in attic spaces and R-6 for all other ducts inside the building insulation envelope.

f. Air Devices: Externally wrap backs of all supply, return and exhaust air devices including square to round adapters and boots with Type “C” Insulation. Properly seal all edges. Use R-8 insulation for air devices with backs outside of building insulation envelope and R-6 insulation when backs of air devices are located inside building insulation envelope.

g. Exterior Ductwork: R-8 Type “E” and/or duct liner insulation.

h. Special circumstance as noted: R-6 or R-8 Type “G” duct liner insulation.

3.13 CONDENSATE PIPING INSULATION

A. Condensate piping to be insulated with Type “B” Insulation 1/2" thick. Entire condensate system to be insulated when copper pipe is used.

1. Apply per manufacturer's recommendations. Glue all joints and seams with Armaflex 520 BLV LOW VOC Adhesive. No tape will be allowed. Auxiliary condensate not required to be insulated. Protect all insulation on piping outside with two (2) coats of “WH” Armaflex Finish Coating for weather protection. **ALL ADHESIVES, SEALANTS AND COATINGS MUST MEET OR EXCEED GREEN BUILDING PROGRAM SCAQMD RULE 1168 AND 1113.**

**END OF SECTION**

# SECTION 22 01 00 - INSIDE UTILITY TRENCH EXCAVATION, BACKFILL AND COMPACTION

## PART 1 - GENERAL

1.01 DESCRIPTION

A. This section describes general requirements, products, and methods of execution relating to excavation, backfill and compaction of inside trenches for mechanical work. Inside trenches are those which occur within an arbitrary, imaginary boundary five feet beyond the outside perimeter of the structure.

B. Scope: Provide all trench work for mechanical work of every description and of whatever substance encountered to the depth indicated, or to provide pipe slopes and elevations shown on the drawings. Excavate and backfill utility trenches. Place and compact bedding material. Compact backfill material.

C. SPECIAL NOTE: All provisions and divisions of these specifications are a part of this section of these specifications. The Contractor shall consult these divisions and provisions in detail for instructions and include all items pertaining to this work. The Contractor shall consult all other divisions of these specifications, determine the extent of impact on the work required to complete the work required by this section of the specifications or portion thereof and related work shown on the drawings.

1.02 APPLICABLE CODES

A. Local Codes and Ordinances

B. Texas Safety Standards

C. OSHA - Section 1926.650

1.03 SAFETY PRECAUTIONS AND PROGRAMS

A. It shall be the duty and responsibility of the Contractor and all of its subcontractors to be familiar and comply with all requirements of Public Law 91-696, 29 U.S.C. Secs. 651 et. seq., the Occupational Safety and Health Act of 1970, (OSHA) and all amendments thereto, and to enforce and comply with all of the provisions of this Act. IN ADDITION, ON PROJECTS IN WHICH TRENCH EXCAVATION WILL EXCEED A DEPTH OF FIVE FEET, THE CONTRACTOR AND ALL OF ITS SUBCONTRACTORS SHALL COMPLY WITH ALL REQUIREMENTS OF 29 C.F.R. SECS. 1926.652 AND 1926.653, OSHA SAFETY AND HEALTH STANDARDS.

## PART 2 - BEDDING MATERIAL

2.01 BEDDING MATERIAL

A. Select bedding material from trench excavation using care to separate it from unsuitable material. If suitable bedding material is not available from trench excavation, import it from sources approved by the Architect.

B. Use clean sand. Maintain moisture content within a range that will allow specified compaction.

2.02 TRENCH BACKFILL

A. Obtain trench backfill material from trench excavation. If sufficient suitable trench backfill material compatible with structural backfill is not available from trench excavation, import it from sources approved by the Architect.

B. Use granular material, free from large stones, boulders and debris. Maintain moisture content within a range that will allow specified compaction. Maximum aggregate size four inches (4").

**PART 3 - EXECUTION**

3.01 EXCAVATION

A. Place all excavated material suitable for backfill in an orderly manner, and in conformance with safety codes.

B. Dispose of all material not suitable for backfilling.

C. Form bell holes so pipelines rest on continuous undisturbed soil. If larger rocks or boulders are encountered, remove them. If trenches are below specified grade, backfill to required depth with select granular materials free from debris and rock, and compact to proper grade before installing piping.

D. Follow manufacturer's recommendations for minimum trench width, material type and cover requirements.

3.02 LOCATION

A. Locate trenches to accommodate utilities shown on the drawings.

B. Construct trench with adequate width to allow compaction equipment to be used at the sides of pipes.

C. Make trench side slopes conform to prevailing safety code requirements.

3.03 DEWATERING

A. Perform whatever work is necessary to prevent the flow and accumulation of surface or ground water in the excavation.

3.04 TIMING

A. Do not backfill until underground mechanical system has been properly tested, inspected and approved.

B. Coordinate with the work of others, and complete all trench work in a timely manner.

3.05 BEDDING

A. Place bedding material under, around, and over the pipe in lifts not exceeding 8" in depth.

B. Work material around pipe by hand methods, taking care to keep any oversize or sharp stones out of contact with the pipe, and to provide uniform support for the pipe.

C. Cover pipe with bedding material to building subgrade or to a minimum 12" depth before adding other backfill.

3.06 BACKFILLING

A. Continue placing backfill material until trench is completely filled to building subgrade, or as shown on the drawings.

B. Place backfill material in lifts not to exceed 12" in depth.

3.07 COMPACTION

A. Compact all bedding material to at least 95% of maximum density, taking care not to damage the pipe.

B. Compact all backfill under footings, slabs, and other structures to 95% of maximum density or more, if required by the Architect.

C. Compact other areas to preclude future settlement, or at least 85% of maximum density.

3.08 FINISHING

A. After completion of backfilling, dispose of excess material and smooth the surface to grade.

B. Do not allow heavy equipment to be used over backfilled work that does not have sufficient cover to prevent pipe damage.

3.09 SPECIAL PRECAUTIONS

A. Avoid unauthorized and unnecessary excavations.

B. Minimize number and size of excavations under footings or bearing walls.

C. Support footings, foundations, and walls with timbers and jacks if there appears to be any possible chance of damage, and keep such precautions in place to eliminate possible damage.

D. Backfill under footings and bearing walls, using maximum compaction or concrete of proportions as specified for footings.

E. Avoid damage to all existing underground services, foundations, cables, conduit lines or foundations. Repair any existing underground work accidentally damaged at no additional cost to the Owner.

3.10 UNDER EXISTING SLAB INSTALLATION

A. When breaking out an existing floor slab, make a saw cut and remove concrete. When repouring concrete, compact the fill to the same specifications as the building fill. Re: Architectural/Structural. General Contractor to make necessary saw cuts and patching as required. **Coordinate penetrations of existing grade beams with structural engineer.**

**END OF SECTION**

# SECTION 22 02 00 - OUTSIDE UTILITY TRENCH EXCAVATION, BACKFILL AND COMPACTION

## PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Related Work Specified Elsewhere:

1. Section 20 00 00 - General Provisions

2. Section 20 01 00 - Basic Materials and Methods

3. Division 2 - Site Work

B. Description: This section described general requirements, products, and methods of execution relating to excavation, backfill, and compaction of utility trenches outside of buildings. The arbitrary line of demarcation between inside and outside of buildings occurs 5' outside the building perimeter.

C. It shall be the duty and responsibility of the Contractor and all of its subcontractors to be familiar and comply with all requirements of Public Law 91-696, 29 U.S.C. Secs. 651 et. seq., the Occupational Safety and Health Act of 1970, (OSHA) and all amendments thereto, and to WHICH TRENCH EXCAVATION WILL EXCEED A DEPTH OF FIVE FEET, THE CONTRACTOR AND ALL OF ITS SUBCONTRACTORS SHALL COMPLY WITH ALL REQUIREMENTS OF 29 C.F.R. SECS. 1926.652 AND 1926.653, OSHA SAFETY AND HEALTH STANDARDS.

D. SPECIAL NOTE: All provisions and divisions of these specifications are a part of this section of these specifications. The Contractor shall consult these divisions and provisions in detail for instructions and include all items pertaining to this work. The Contractor shall consult all other divisions of these specifications, determine the extent of impact on the work required to complete the work required by this section of the specifications or portion thereof and related work shown on the drawings.

## PART 2 - PRODUCTS

2.01 BEDDING MATERIAL

A. Select bedding material from trench excavation using care to separate it from unsuitable material. If suitable bedding material is not available from trench excavation, import it from sources approved by the Architect.

B. Use granular material, free from large stones, boulders and debris. Maximum aggregate size passing a 2" sieve opening. Maintain moisture content within a range that will allow specified compaction.

2.02 TRENCH BACKFILL

A. Obtain trench backfill material from trench excavation. If sufficient suitable trench backfill material is not available from trench excavation, import it from sources approved by the Architect.

B. Use granular material, free from large stones, boulders and debris. Maintain moisture content within a range that will allow specified compaction. Maximum aggregate size 4 inches.

**PART 3 - EXECUTION**

3.01 EXCAVATION

A. Excavate trenches to depth and grades as shown on drawings.

B. Place all excavated material suitable for backfill in an orderly manner and in conformance with safety codes.

C. Dispose of all material not suitable for backfilling.

D. Form bell holes so pipelines rest on continuous undisturbed soil. If larger rocks or boulders are encountered, remove them. If ground surface is below specified pipe grade, fill to required depth with granular materials free from debris and rock, and compact to proper grade before installing piping.

3.02 LOCATION

A. Locate trenches to accommodate utilities shown on the drawings.

B. Construct trench with adequate width to allow compaction equipment to be used at the side of pipes.

C. Make trench side slopes conform to prevailing safety code requirements.

3.03 DE-WATERING

A. Perform whatever work is necessary to prevent flow and accumulation of surface or ground water in the excavation.

3.04 TIMING

A. Do not complete backfill until utility system has been properly tested, inspected, and approved.

B. Coordinate with the work of others and complete all trench work in a timely manner.

3.05 BEDDING

A. Place bedding material under, around, and over pipe in lifts not exceeding 8" in depth.

B. Work material around pipe by hand methods, taking care to keep any oversize or sharp stones out of contact with the pipe, and to provide uniform support for the pipe.

C. Cover pipe with bedding material to a minimum 6" depth before adding other backfill.

D. Cover water line with 18" bedding material before backfilling.

3.06 BACKFILLING

A. Continue placing backfill material until trench is completely filled to finished grade, or as shown on the drawing.

B. Place backfill material in lifts not to exceed 12" in depth.

3.07 COMPACTION

A. Compact all bedding material to at least 95% of maximum density, taking care not to damage the pipe.

B. Compact backfill material to preclude future settlement or at least to 90% of maximum density.

3.08 FINISHING

A. After completion of backfilling, dispose of excess material and smooth the surface to grade.

B. Restore all surface areas to original conditions, or improve as shown on the drawings. Replace all paving, base course, gravel surfacing, sub-base, topsoil or other existing finished surface as shown on drawings.

C. Clean up and finish all construction areas to original condition or better.

**END OF SECTION**

## SECTION 22 11 16 - WATER DISTRIBUTION SYSTEM

### PART 1 - GENERAL

1.01 DESCRIPTION

A. This section describes specific requirements, products and methods of execution relating to the domestic water distribution system for the project.

B. The work of this section includes: All water distribution work inside the structure, and all outside distribution work up to and including connection to the water source, including provision of the outside water source, or water using apparatus, although the work of this section does include the interface connections at all of these related items.

C. SPECIAL NOTE: All provisions and divisions of these specifications are a part of this section of these specifications. The Contractor shall consult these divisions and provisions in detail for instructions and include all items pertaining to this work. The Contractor shall consult all other divisions of these specifications, determine the extent of impact on the work required to complete the work required by this section of the specifications or portion thereof and related work shown on the drawings.

1.02 CONNECTION TO UTILITY WATER SYSTEM

A. Coordinate with site utilities to properly locate and interface with the water supply. Stub water 5'-0" outside the building and make connection to water supply. See Civil Drawing for site utility locations.

### PART 2 - PRODUCTS

2.01 PIPE AND FITTINGS ABOVE GROUND (INSIDE STRUCTURE)

A. Type "K" or "L" hard drawn copper tubing, wrought solder type fittings, lead free (0.00% lead content) solder or brazed or press fit joints by Viega or Apollo.

2.02 PIPING AND FITTINGS BELOW GROUND

A. 2" and Smaller:

1. Type “K” soft copper, wrought bronze solder type fittings, lead free (0.00% lead content) solder.

2. Use heavy duty Water-Tite-Sleeve as manufactured by IPS Corporation for all piping underslab. Sleeves for 1" and under shall be 25 mil., blue for cold water and red for hot water. Sleeves for 1 1/4" to 2" shall be 6 mil., black in color.

B. 2-1/2" and Larger:

1. Type “K” hard drawn copper, wrought bronze solder type fittings, lead free (0.00% lead content) solder.

C. No joint to be installed under building slab.

2.03 WATER METER

Reference Civil Drawings

**PART 3 - EXECUTION**

3.01 GENERAL METHODS

A. Make all joints in accordance with manufacturer's recommendations. The tools used shall be the tools adapted to that specific purpose.

B. At all fixtures, install and connect hot water on left and cold water on right, as viewed when facing the fixture.

C. Where required for connections to fixtures, equipment items, etc., employ lengths of red brass pipe with threaded ends of copper to IPS adapters, brass couplings, etc., to the end that there shall be no ferrous pipe in any water piping system.

D. Provide valves on each branch line at the point of connection into the supply and circulating mains serving all batteries of plumbing fixtures. Provide stop valves in each water supply for every plumbing fixture. Each hose bibb is to have an individual shut off valve, separate from valves that would shut down a battery of fixtures. Valves for piping two inches (2") and smaller shall be ball valves.

E. Provide water hammer arrestors with accessible isolation valve equal to Wade Shok-stops, JR Smith Hydrotrol 5000 Series, or Zurn Shocktrols A-1700 Series on cold water and hot water supplies to plumbing fixtures. Provide access door for all concealed arrestors. Shok-stops shall not be installed in the pendant position. **O-ring type arrestors are not considered equivalent. Arrestors are to be installed in locations and sized per Manufacturer's installation instructions.**

F. Install vacuum breakers on all plumbing lines where contamination of domestic water may occur and on boiler make-up lines and hose bibbs.

G. Insulate all exposed water connections for handicapped lavatories and sinks with "Handi Lav-Guard" Insulation Kit (Phone: 203-875-2868).

3.02 TESTING

A. Test all water piping hydrostatically at 150 psig or 150% of working pressure, whichever is greater, for a period of 24 hours. Observe piping during this period and repair all leaks. Test for lead, certify that lead residual in piping system does not exceed local code requirements.

3.03 STERILIZATION OF DOMESTIC WATER SYSTEMS

A. Sterilize each unit of completed supply line and distribution system with chlorine solution before acceptance for domestic operation.

B. Accomplish sterilization as described below or by the system prescribed by the American Water Works Association Standard C-601. Apply the amount of chlorine to provide a dosage of not less than 50 parts per million. Provide chlorine manufactured in conformance to the following standards:

1. Liquid Chlorine: Federal Specification BB-C-120.

2. Hypochlorite: Federal Specification 0-C-114a, Type 11, Grade B or Federal Specification 0-X-602.

C. Introduce the chlorinating material to the water lines and distribution system after piping system has been thoroughly flushed. After a contract period of not less than 24 hours, flush the system with clean water until the residual chlorine content is not greater than .2 parts per million.

D. Open and close all valves in the lines being sterilized several times during above chlorination.

E. The sterilization process shall be done by persons whose major business is water treatment and sterilization. The Plumbing Contractor shall pay all costs and charges associated to this test and certification.

F. Certify in writing that sterilization has been completed in accordance with these requirements.

**END OF SECTION**

## SECTION 22 11 17 –WATER HEATERS

### PART 1 - GENERAL

1.01 DESCRIPTION

A. This section describes specific requirements, products and methods of execution relating to the domestic water distribution system for the project.

B. The work of this section includes: All water distribution work inside the structure, and all outside distribution work up to and including connection to the water source, including provision of the outside water source, or water using apparatus, although the work of this section does include the interface connections at all of these related items.

C. SPECIAL NOTE: All provisions and divisions of these specifications are a part of this section of these specifications. The Contractor shall consult these divisions and provisions in detail for instructions and include all items pertaining to this work. The Contractor shall consult all other divisions of these specifications, determine the extent of impact on the work required to complete the work required by this section of the specifications or portion thereof and related work shown on the drawings.

### PART 2 – PRODUCTS

2.01 WATER HEATER

A. Electric Water Heater:

1. Pre-wired, factory tested, NSF certified and with UL seal of approval.

2. Tank: Glass lined and ASME approved for 150 psi working pressure with a minimum of 2" of high density foam insulation; Anode rods for electrolytic protection and hand hole inspection port.

3. Thermostats are to be of the immersion type; one thermostat per each set of 3 elements.

4. The complete system to be protected by energy cut off switch in the event of an over temperature situation.

5. Manufacturer: State, PVI, A.O. Smith, Rheem or approved equal.

2.02 Provide an ASME rated temperature and pressure relief valve with drain piping to the nearest drain receptor for all water heaters. The temperature and pressure relief valve shall be labeled and shall be tested in accordance with ANSI Z21.22.

2.03 Provide heat traps on incoming and discharge lines from water heaters that do not come with factory installed heat traps or are not connected to a recirculation system.

**END OF SECTION**

## SECTION 22 13 16 - LIQUID WASTE TRANSFER

### PART 1 - GENERAL

1.01 DESCRIPTION

A. Description:

1. This section describes specific requirements, products, and methods of execution relating to the transfer of liquid waste for the project. The work of this section includes providing the following:

a. All liquid waste piping and fittings:

1) Soil

2) Rain leaders

3) Building sewer

b. All plumbing vents, including their termination.

c. All connections at points of collection of handling:

1) At plumbing fixtures and trims

2) At equipment by others.

B. SPECIAL NOTE: All provisions and divisions of these specifications are a part of this section of these specifications. The Contractor shall consult these divisions and provisions in detail for instructions and include all items pertaining to this work. The Contractor shall consult all other divisions of these specifications, determine the extent of impact on the work required to complete the work required by this section of the specifications or portion thereof and related work shown on the drawings.

C. All materials exposed within a plenum shall be noncombustible or shall have a flame spread index of not more than 25 and a smoke developed index of not more than 50 when tested in accordance with ASTM E 84.

**IF PVC OR CPVC IS USED IN PLENUM SPACES IN LIEU OF CAST IRON, THEN PIPING MUST BE WRAPPED WITH CODE APPROVED INSULATION TO PROTECT PIPING AND MEET 25/50 REQUIREMENTS.**

D. All waste, vent, sewer and storm lines shall be of cast iron soil pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute (CISPI) and be listed by NSF International as well as conform to the requirements of CISPI Standard 301, ASTM A-888 or ASTM A-74 for all pipe and fittings, and be manufactured by Charlotte, Tyler, or AB&I .

E. All pipe and fittings shall be manufactured in the United States.

F. A complete waste and vent system will be provided to collect sanitary waste from all plumbing fixtures, floor drains, and any other equipment, in accordance with the Plumbing Code, unless indicated otherwise.

G. The drainage piping system will be designed with a minimum slope of 1/4-inch per foot for pipe sizes less than 3-inch and 1/8-inch per foot for sizes 3-inch and larger.

H. The building will have sanitary sewer lines discharging to the site sanitary sewer system.

I. Floor and wall cleanouts will be strategically placed to avoid being located in sensitive areas.

J. Floor drains will be provided for each air handling device, equipment requiring drains, toilet rooms with water closets, and mechanical equipment rooms. A floor drain will be provided at each emergency shower unit.

K. Each floor drain will be provided with a p-trap and a trap primer.

1.02 CONNECTION TO UTILITY SEWER AND STORM DRAIN SYSTEMS (storm drain piping is considered to be piping beyond 5'-0" outside the building)

A. Final wastewater connection point to extend approximately five feet (5') outside the building, as indicated on the drawings. Coordinate with Civil Drawings for wastewater service point to within five feet (5') of the building. **Coordinate with site utilities to insure proper inverts for all lines and connection point prior to installation**. Contact Architect immediately if any conflict is discovered. Make final connection to service line. Obtain all permits, pay fees and provide all services incidental to this work.

**PART 2 – PRODUCTS**

2.01 SEWER PIPE UNDERGROUND INSIDE STRUCTURE (INCLUDES TO FIVE FEET FROM BUILDING PERIMETER)

A. Service weight cast iron soil pipe with Tyseal neoprene gaskets.

B. Schedule 40 PVC (SOLID WALL DWV pipe and fittings) as allowed by code. Material Data: Type 1, Grade 1 PVC 12454-B, ASTM D-1784.

C. Pipe 1-1/2" and Smaller: Schedule 40 galvanized steel pipe with cast iron drainage fittings.

2.02 RAINLEADERS BELOW SLAB AND ABOVE GROUND INSIDE STRUCTURE

A. Cast iron soil pipe with heavy weight no-hub fittings.

**B. Underground RAINLEADER piping: Use stainless steel couplings (28-gauge, Type 304SS) with neoprene gasket meeting ASTM Standard C-564 meeting FM 1680, Class 1. Husky SD 4000, Clamp-All 80 lb. or equal.**

2.03 SEWER ABOVE GROUND INSIDE STRUCTURE

A. Service weight cast iron soil pipe with tyseal neoprene gaskets or cast iron soil pipe with no-hub fittings. Reference 2.06 below.

B. Schedule 40 PVC (DWV) as allowed by code. Material Data: Type 1, Grade PVC 1120, ASTM D-1784. **Verify if area is used as plenum which requires 25/50 rating.**

C. Pipe 1-1/2" and Smaller: Schedule 40 galvanized steel pipe with cast iron drainage fittings.

2.04 VENTS

A. All vent piping above slab to be cast iron soil pipe with tyseal neoprene gaskets or no-hub fittings.

B. All vent piping under slab to be heavy weight no-hub fittings.

C. Vents 1-1/2" and Smaller: Schedule 40 galvanized steel pipe with cast iron fittings.

D. DWV copper with wrought or cast solder fittings.

E. Schedule 40 PVC (DWV) as allowed by code. Material Data: Type 1, Grade PVC 1120, ASTM D-1784. **Verify if area is used as plenum which requires 25/50 rating.**

2.05 CAST IRON PIPE/FITTINGS

A. Tyseal Gaskets or MG Couplings.

B. Hubless couplings shall be composed of a stainless steel shield, clamp assembly and an elastromeric sealing sleeve conforming to the most current edition of CISPI 310, listed by NSF International, manufactured in the United States of America, and manufactured by Anaco, Mission, Tyler or Ideal.

2.06 CONDENSATE PIPING

A. Type L or M: Hard drawn copper.

**PART 3 – EXECUTION**

3.01 INSTALLATION OF UNDERGROUND PIPING

A. Install pipe and fittings to required grade with hubs and bottom half section in undisturbed soil. Follow manufacturer’s installation requirements.

3.02 INSTALLATION OF ABOVE GROUND PIPING

A. Refer to Section 20 01 00.

3.03 GRADING

A. Grade all horizontal runs of pipe in building and under floor slab at 1/4" per foot downward in direction of flow. If it is absolutely impossible to maintain a grade of 1/4" per foot, piping four (4) inches in diameter and larger may slope to a minimum grade of not less than 1/8" per foot.

3.04 SUPPORTING

A. Support all horizontal runs of pipe in building at intervals not to exceed 5'-0" and at each change of direction. Provide a support at the base of vertical risers with intermediate supports as required. Brace all adequately to prevent motion, per manufacturer's recommendation. Reference Section 20 01 00, 2.08, B., Mechanical Support Devices and Pipe Supports for further requirements.

3.05 CLEANOUTS

A. Provide cleanouts as shown on plans and in an accessible location at base of all risers in soil, waste and drain piping and at each change in direction in horizontal runs of pipe. In long straight runs, provide a cleanout located at intervals of not more than 75 feet for piping four inches (4") and larger and located at intervals of not more than 50 feet for piping less than four inches (4").

B. Cleanouts shall be located no closer than 24” to a wall.

3.06 VENTING

A. Provide a vent for each trap or as shown on the drawings.

B. Extend each vent vertically to a point not less than six inches (6") above the extreme overflow level of the fixture served before offsetting horizontally. Whenever two or more vent pipes converge, extend each such pipe at least six inches (6") in height above the flood rim level of the plumbing fixture it serves before being connected to any other vent and utilize only approved drainage fittings and materials to connect piping.

C. Provide a building main relief vent for waste piping not provided venting by fixture branch connections. Vent size shall be per code requirement, based upon fixture unit loading in the pipe vented.

3.07 VENTS THROUGH ROOF

A. Extend vents through the roof a minimum distance of 6" and terminate at least 15 ft. horizontally from operable windows, doors, or air intakes, and at least 3 feet above such opening. Do not terminate vents through roof at edge or valley of roof.

B. Flash and counterflash vents through roof. Provide flashings not less than 18" square, with prefabricated 4-pound lead counterflashing. Extend vertical portion of flashing up entire length of pipe and turn down inside the pipe at least 1 inch with turned edge hammered against pipe. Coordinate with type roof and Architectural details and flash them into roof according to the roofing products manufacturer's recommendations.

C. Protect the roof from tools and equipment. Remove all scraps on roof to prevent damage to roof.

3.08 GENERAL

A. No piping shall be permanently concealed before the examination is completed by the authorities having jurisdiction.

B. All fixtures used in conjunction with the conveying of waste substance shall be connected by means of a trap.

C. All connections for floor mounted water closets and waste piping shall be made with appropriate closet flange and wax gaskets.

D. Insulate all exposed p-traps for handicapped lavatories and handicap sinks with "Handi Lav-Guard" Insulation Kit (Phone: 203-875-2868) as required.

E. Provide specialty shielded transition coupling as required at connections between PVC and cast iron fitting.

**F. Horizontal to horizontal connections cannot use double combo, double wye and one eighth or sanitary cross fittings.**

3.09 TESTING

A. Test all piping in accordance with the requirements of the local codes.

B. Repair leaks and retest system, repeating this process until piping system is free of leaks.

C. Test shall be conducted and completed before any joints are concealed or made inaccessible.

D. Maintain a log of tests indicating date, time, result of test and person doing test.

E. Under floor.

1. Test pipe under floors before connecting to sewers.

2. Maintain not less than 15 feet of hydrostatic head.

3. Repair all leaks and repeat until system holds for 2-hours without a drop in water level.

3.10 CONDENSATE PIPING

A. Route insulated copper condensate drain line from each unit to nearest floor drain, deep seal traps, sink p-traps, janitor sink, dry well (exterior units), or roof drain if piped to storm sewer (cannot use roof drain if day lites at surface) code approved or disposal point unless otherwise noted. Condensate shall not drain on to roof. Mechanical Contractor and Plumbing Contractor to coordinate locations. Slope all piping to drain at minimum 1/8" per foot. Drains shall be sized in accordance with equipment capacities as follows:

| EQUIPMENT CAPACITY | *MINIMUM PIPE SIZE |
|---|---|
| Up to 3 tons of refrigeration | 3/4" |
| 3 to 20 tons of refrigeration | 1" |

*Minimum size of drain shall not be smaller than drain outlet size for unit.

B. Coordinate mounting heights of units to allow adequate slope for condensate piping to disposal point.

C. Provide cleanout plug at end of each main run.

D. Drywell (French Drain): The drywell shall consist of a pit not less than 24" in diameter (or 24" x 24") and 24" in depth. The pit shall be filled to within 3" of the finished grade with course gravel. Top 3 inches to be filled with topsoil and sodded. Gravel to be wrapped completely (top, sides and bottom) with heavy duty weed block fabric. Install a 3" perforated PVC drain pipe (centered in drywell) with cap at bottom extending to bottom of pit. 3" perforated pipe to extend 3" - 5" above finished grade. Provide appropriately sized bushing or fittings to rigidly tie to condensate drain line from unit. Perforated pipe above grade will act as air break connection. Twenty-four inch (24") diameter or 24" x 24" x 24" deep can be used for up to 5 ton capacity. Thirty-six inch (36") diameter or 36" x 36" x 24" deep can be used for up to 13 ton capacity. Forty-eight (48") inch diameter or 48" x 48" x 24" deep can be used for up to 30 ton capacity. Confirm final requirements with code authority having jurisdiction.

**END OF SECTION**

## SECTION 22 30 00 - PLUMBING FIXTURES AND TRIM

### PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Included:

1. This section describes certain components of domestic plumbing systems, including related specific requirements, products and methods of execution. Plumbing water, waste, vent piping and other primary distribution components of the plumbing system are included with related work specified elsewhere.

B. SPECIAL NOTE: All provisions and divisions of these specifications are a part of this section of these specifications. The Contractor shall consult these divisions and provisions in detail for instructions and include all items pertaining to this work. The Contractor shall consult all other divisions of these specifications, determine the extent of impact on the work required to complete the work required by this section of the specifications or portion thereof and related work shown on the drawings.

### PART 2 - PRODUCTS

2.01 FLOOR DRAINS

A. All floor drains, including floor sinks, are to be the same size as the waste line size indicated on plans. If size is not indicated, drain size shall be 3". Floor drains that tie in to acid waste piping are to have acid resistant coating or be stainless steel. Floor Drains and Floor Sinks in kitchen areas are to have Acid Resistant Enamel coating or be constructed from stainless steel.

B. **PROVIDE TRAP PRIMING APPARATUS FOR EACH FLOOR DRAIN AND FLOOR SINK UNLESS NOTED OTHERWISE.** Whenever possible, use an inverted tee connection from sink tailpiece or device similar to Jay R Smith Prime-EZE for trap priming with gray water. Any other method must be approved by Owner. Second choice is to use flush valve trap primer connection. As last resort, provide mechanical trap primer (Manufacturer: Precision Plumbing Products, “Oregon #1 or equal as required) connected to supply lines as small as possible, but never over 1-1/2” diameter. Provide minimum 12 x 12 access door or larger as required. When local jurisdiction (such as the City of Pflugerville, Tx.) does not approve the use of a standard mechanical trap primer (similar to Oregon #1) that activates from pressure differential and other methods are not practical, provide an electronic trap primer as last resort. Coordinate electrical requirements with electrical contractor. Proset “TRAP GUARD” device may be used in lieu of trap primers when allowed by local code authority having jurisdiction and building Owner. Before using Proset “TRAP GUARD” contractor must obtain written approval from Owner and local code authority having jurisdiction and provide copies to Architect and Engineer.

C. Trap primers must conform to ASSE 1018 or ASSE 1044.

D. Trap Primer Manufacturers: MIFAB, Precision Plumbing Products, Jay R Smith, Sloan, Zurn, Wade or Watts.

E. Floor Drain/Floor Sink Manufacturers: StainlessDrains, Kessel, MIFAB, Josam, Wade, Zurn or Jay.R. Smith, Watts.

2.02 ROOF DRAINS

A. Provide 30" square four pound lead flashing for all roof drains, centered around drain. Coordinate with type roof and Architectural Roof Plan and Architectural details. Roof drains to be installed in low point of roof. Verify low point in roof before installation. Roof drains to be moved at no additional cost to owner if not coordinated and installed in low point of roof to allow for proper drainage.

B. Where horizontal offset is not possible directly below drain connection, install an expansion joint directly under the drain. MIFAB R1900 Series.

C. All roof drains shall be same size as the rainleader piping size serving roof drain as indicated on the drawings.

D. Roof Drains:

RD1 Primary roof drain, cast iron body, flashing collar, gravel stop, ductile iron dome, under deck clamp, extension and sump receiver. MIFAB R1200-M-E-U Series.

RD2 Overflow roof drain same as RD-1, set inlet 2 inches higher than inlet of RD-1. MIFAB R1200-M-E-U-W. Coordinate and confirm final location with roofing consultant prior to rough-in.

E. Manufacturers: StainlessDrains ,MIFAB, J.R. Smith, Zurn, Josam, Wade, Watts or approved equal.

2.03 CLEANOUTS

A. Cleanouts shall be same nominal size of pipe lines up to four inches (4") and not less than four inches (4") for larger lines.

B. Floor Cleanouts: Gas and watertight seal, internal taper ABS cleanout plug, stainless steel or nickel bronze finish scoriated round top with countersunk screw for installation flush with finish floor. MIFAB C1100R-3 Series. If floor has a waterproof membrane, then add C clamp ring flange.

C. Wall Cleanouts: MIFAB C1400-RD Series. Countersunk plugs, with smooth round access cover and polished stainless steel or nickel bronze finish.

D. Manufacturers: StainlessDrains, MIFAB, Josam, Zurn, Wade, Watts or approved equal.

E. Cleanouts that tie in to acid waste piping to be acid resistant.

2.04 FIXTURES

A. Manufacturers:

1. The fixtures are chosen from standard manufacturers.

2. Provide all similar fixtures and trim from one (1) manufacturer, except where specified otherwise.

3. Equality: The following manufacturers are considered equal, specified item(s) sets minimum standard for acceptability.

a. **Fixtures:** American Standard, Eljer, Kohler, Elkay, Fiat, Sloan, Toto, Zurn, Caroma.

1) All water closet bowls shall have fully glazed trap.

2) All water closet bowls must meet MAP Testing (Maxim Performance Testing) at 1000 grams.

b. **Faucets:** American Standard, Bradley, Elkay, Chicago, Sloan, Zurn, T & S Brass, Moen Commercial. **Must have five (5) year Commercial Warranty**. **PROVIDE CONFIRMATION OF WARRANTY IN SUBMITTAL.**

c. **Stainless Steel Sinks:** Elkay, Bradley, Moen or Just.

d. **Carriers:** MIFAB, J.R. Smith, Josam, Watts or Zurn.

e. **Flush Valves:** Sloan Royal or equal by Zurn

f. **Point of Use ASSE 1070 Lead Free Mixing Valves:** Watts, Powers, Bradley, Leonard, Lawler, Symmons or Moen.

g. **Drinking Fountains/Electric Water Coolers:** Elkay, Acorn Aqua Surf, Oasis or Halsey Taylor, must meet NSF Section 9 in its entirety and meet TCEQ Certification Requirements. Provide letter with submittal data.

h. **Wash Fountains**: Bradley, Wiloughby or Sloan Stone.

i. **Wall Pipe Supports**: HoldRite or Equal

j. **Acrylic Showers**: Lasco, Aquabath

k. **Circulating Pumps**: TACO, Grundfos, Armstrong, Wilo

**l. Stainless Steel Skullery Sinks:** Elkay, Bradley, Just, Advance Tabco, Griffin.

m. Provide wall carriers for ALL wall-mounted fixtures, including wash fountains.

B. Traps, Stops and Supplies:

1. Provide traps, stops and supplies for all fixtures.

2. P-Traps: 17 gauge chrome-plated cast brass. Provide offset type as required to meet ADA space requirements.

3. Supplies: Flexible, chrome-plated, 7538 Series.

4. Stops: Removable key type, 2302 Series.

5. Supplies and stops are to meet current requirements of NSF61.

6. Manufacturers: American Standard, Brass Craft, McGuire or equal.

C. Fixtures Specified Elsewhere, or Otherwise Furnished. Provide appropriate strainer, tailpiece, trap, waste and supplies. Rough-in and connect only.

D. Faucets:

1. All faucets except commercial kitchen and bar sinks are to meet ANSI/NSF Standard 61 and be listed by NSF as residential drinking water faucets.

2. All faucets not NSF 61 listed, (as described in paragraph 1) must have tin lined waterways or other such material so water flowing through the faucet is not in contact with any material that could allow “Leaching” of lead into the waterway.

3. Commercial kitchen and bar sinks are to meet ANSI/NSF Standard 61 and be listed as commercial faucets. Faucets meeting the stricter residential standards can be used at contractor’s option.

4. Faucets are not allowed to have more than the maximum total lead content as listed by NSF, TCEQ (Health and Safety Code) and EPA.

5. Any faucets which exceed lead concentration “Leaching” into water stream after a minimum of 45 days usage and proper flushing prior to testing shall be replaced by the manufacturer with an acceptable product. All costs of change out incurred will be sole responsibility of the manufacturer.

6. Lavatory faucets to have .5 GPM vandal resistant aerator.

E. Waterways and tanks for all drinking fountains and water coolers shall be constructed of 3. lead-free ( 0.00% lead ) materials. All waterways to be totally free of lead. No lead solder is permitted. All drinking fountains and water coolers to meet latest criteria of TCEQ, EPA and be listed by NSF.

F. All water line, fittings and fixtures in contact with potable water to be “lead free” AB1953 compliant. (.25% or less average lead content). All submittals to state items comply in submittal package.

2.05 FIXTURE FLOW RATES

A. The maximum flow rates for plumbing fixtures are to be no greater than quantities listed below:

1. Toilets – 1.28 gallons per flush GPF) on all projects.

2. Urinals – 0.125 gallons per flush (GPF) on all projects

3. Lavatory (hand sink) – 0.5 gallons per minute (GPM) on all projects

4. Shower – 2.0 gallons per minute (GPM) on all projects

**PART 3 - EXECUTION**

3.01 Store all fixtures and trim above ground in a covered location not subject to accidental damage by traffic or other construction activities. Handle fixtures and trim carefully to avoid chipping, denting, scratching, or other damage. Replace damaged items with same item in new condition.

3.02 Provide permanent metal and wire positioners, supports and fixture carriers to secure fixtures and piping rigidly in proper alignment without sway or side play.

3.03 Anchor all fixtures securely to withstand applied vertical load of not less than 250 pounds on the front of the fixture, without noticeable movement.

3.04 Install all fixtures plumb, level and flush to the finished Architectural surface, so that the maximum gap between the fixture and the surface does not exceed 3/16 inch. **Grout** under water closets to level fixtures. Caulk the edge of the joint between fixture and surface with silicone or butyl type waterproof caulking compound.

3.05 Adjust all functional components for proper operation in accordance with manufacturer's recommendations, or as otherwise directed.

3.06 Clean all fixtures and trim thoroughly to spotlessly clean condition. Obtain a written certification from the Architect that this has been accomplished.

3.07 Where floor drains or janitor sinks are located over any room, provide waterproof installation.

3.08 Ensure final location of cleanouts have access and ample clearance at cleanout for rodding of drainage system. Check locations before installation. Contact Architect for alternate location if maintenance clearance is a problem. Cleanouts to be moved at no additional cost to Owner for failure to coordinate locations.

3.09 Coordinate slope of floors to floor drains with Architect. Adjust height of floor drain for proper drainage.

3.10 Provide all adapters, flanges, gaskets, etc. as required for proper installation of fixtures. Coordinate fixture placement before core drilling of floor or sleeve installation.

3.11 Insulate all exposed p-traps and water connections for handicapped lavatories with White “Truebro Handi Lav-Guard” Insulation Kit Model #102W (Use Model #105W when 5" offset strainer is used). (Phone: 203-875-2868), or equal products as manufactured by Brocar Products Inc., (Phone: 512-847-1524).

3.12 **No offset flanges will be allowed for installation of water closets.**

3.13 Install all trap priming devices per manufacturer’s installation instructions. Provide shut-off valves at each mechanical or electronic trap primer for service. Install minimum 12” x 12” access doors as required for service of trap priming devices.

3.14 Provide a floor sink with trap priming device in each sprinkler riser room.

**3.15 Cleanout locations:**

**A. On each horizontal drain line 5 feet or greater in length.**

**B. No more than 50 feet on center.**

**C. At changes in director of 90 degrees or more (line size).**

**D. At the end of each continuous waste line.**

**E. At the end of each battery of fixtures.**

**F. At each sink and urinal.**

**G. Additional areas required for service and by code.**

**END OF SECTION**

## SECTION 23 05 93 – TEST AND BALANCE

### PART 1 - GENERAL

1.01 DESCRIPTION

A. The section describes general requirements and methods of execution relating to the testing and balancing of the mechanical systems provided on this project.

B. Scope:

1. Furnish the services of a qualified and approved Testing and Balancing Agency to perform the work of this specification.

2. The work of this section includes, but is not necessarily limited to:

a. Testing and balancing all fans, all air handling systems, all energy recovery ventilators and makeup air systems.

b. Providing a final report. Final report to be submitted for review only after all deficiencies have been corrected and design CFM's are achieved.

C. SPECIAL NOTE: All provisions and divisions of these specifications are a part of this section of these specifications. The Contractor shall consult these divisions and provisions in detail for instructions and include all items pertaining to this work. The Contractor shall consult all other divisions of these specifications, determine the extent of impact on the work required to complete the work required by this section of the specifications or portion thereof and related work shown on the drawings.

1.02 APPLICABLE STANDARDS

A. SMACNA Manual for the Balancing and Adjustment of Air Distribution Systems.

B. AMCA Publication 203, Field Performance Measurements.

C. AMCA Standard 300-67, Test Code for Sound Rating.

D. National Environmental Balancing Bureau (NEBB) Recommended Procedures.

E. National Balancing Council (NBC)

1.03 PRE-QUALIFIED AGENCY

A. Subcontractor Minimum Qualifications Include:

1. Maintain a complete service organization that has operated within a one hundred (100) mile radius of the project for at least three years prior to bid date of this project.

2. Demonstrate satisfactory completion of three projects of similar size and scope. Provide references if requested.

3. Bids by suppliers, Contractors or any firm not listed in #5 below are not acceptable.

4. Independent, NEBB or TABB certified agency with no affiliation to mechanical contractor.

5. Pre-qualified T & B Agencies are as follows:

   a. Air Technologies (512)280-3398.

   b. PHI (512)339-4757.

   c. CenTex Air Balance Inc (254)913-3132.

1.04 TIMING OF WORK

A. Do not begin testing and balancing until the systems are completed and in full working order.

B. Schedule the testing and balancing work in cooperation with other trades.

C. Complete the testing and balancing before the date of final project completion.

1.05 MECHANICAL CONTRACTOR RESPONSIBILITY TO BALANCING AGENCY

A. Award the test and balance contract to the approved agency upon receipt of contract to allow the Balance and Testing Agency to schedule this work in cooperation with other trades involved and comply with completion date.

B. Put all heating, ventilating, and air conditioning systems, equipment and controls into full operation for the Balancing Agency and continue the operation of same during each working day of testing and balancing.

C. Provide scaffolding, ladders and access to each system for proper testing and balancing.

D. Provide and change pulleys, belts and dampers, add any dampers and correct any installation errors in a timely matter as required for correct balance as recommended by the Balance and Testing Agency or as directed by the Architect after review of Balancing Report, at no additional cost to the Owner.

**PART 2 - PRODUCTS**

THIS PART NOT USED.

**PART 3 - EXECUTION**

3.01 INSTRUMENTS

A. Maintain all instruments accurately calibrated and in good working order. Use instruments with the following minimum performance characteristics.

B. Air Velocity Instruments: Direct reading in feet per minute, 2% accuracy.

C. Static Pressure Instruments: Direct reading in inches water gauge, 2% accuracy.

D. RPM Instruments: Direct reading in revolutions per minute, 1/2% accuracy; or revolution counter accurate within 2 counts per 1000.

E. Temperature Readout: Direct reading in degrees F., plus minus 0.1 degrees F.

3.02 GENERAL PROCEDURES FOR ALL SYSTEMS

A. In cooperation with the Contractor's representative, coordinate adjustments of automatically operated dampers and valves, including the controlling thermostats, to operate as specified, indicated, and/or noted.

B. Use manufacturer's ratings on all equipment to make required calculations.

C. MAKE FINAL ADJUSTMENTS FOR EACH SPACE PER HEATING OR COOLING COMFORT REQUIREMENT. State reason for variance from design cfm, i.e., “too noisy”, “too drafty”, etc.

D. Balancing to occur with clean filters when applicable and wet coils when applicable.

3.03 REQUIREMENTS FOR ALL AIR HANDLING SYSTEMS

A. Identify each diffuser, grille, and register as to specific location and area.

B. Identify and list size, type and manufacturer of diffusers, grilles, registers and all equipment tested.

C. In readings and tests of diffusers, grilles and registers, include required fpm velocity and required cfm and test cfm after adjustments. If test apparatus is designed to read cfm directly, velocity readings may be omitted. Identify test apparatus used. Identify wide open (W.O.) runs.

D. Adjust all diffusers, grilles and registers to minimize drafts and excess noise in all areas.

3.04 BALANCING LOW VELOCITY CONSTANT VOLUME DUCTWORK

A. Adjust the branch dampers so that each stale air exhaust inlet or outside air supply outlet in the system is a minimum of design airflow on all makeup air units and energy recovery ventilators.

B. All other HVAC systems on the project are to be adjusted as per ‘A’ above except to + or -10% of design airflow. **However, comfort cooling units are to be balanced to never exceed 410 cfm/ton or be less than 300 cfm/ton. Notify engineer if plans deviate from this CFM range. 5 ton units must be balanced to provide under 2000 CFM.**

C. Adjust the fan for design airflow.

D. Read and record the airflow at each return or exhaust inlet and each supply outlet. Balance as required.

E. Secure each branch damper and mark the balanced position of the damper quadrant.

3.05 FAN ADJUSTMENT

A. Balance ductwork before making final fan adjustment.

B. Verify that system is free of debris that inlets and discharges are not obstructed, and that filters are clean.

C. Make pitot traverse of main ductwork to determine total airflow and record.

D. Adjust fan rpm to obtain design airflow.

E. Test and record motor amperage and voltage on each phase leg. Reduce fan rpm if necessary, so that motor running amperage does not exceed motor nameplate amperage. Record final amperage and voltage.

F. Record fan rpm.

G. Test and record system (suction) return and (discharge) supply static pressures.

H. Record airflow.

I. Test and adjust system for minimum design cfm outside air (intake and exhaust), as shown, where applicable.

J. Test and record entering air temperatures across coils and fans.

K. Test and record leaving air temperatures (heating and cooling) across coils

L. Test and record static pressure drop across each filter and coil bank.

M. Provide test data for each AHU, FCU, RTU, MAU, ERV, EF, SF, ETC., used on project:

1. Test and document operation of each MAU, RTU, AHU, CU, HP and FAN to insure that all pieces of HVAC equipment are functioning properly and are properly connected to the control system. Check in cooling, heating and emergency heating modes, if unit is so equipped.

3.06 BALANCING REPORT

A. Compile the test data and submit 8 copies of the complete test data for forwarding to the Architect for acceptance and/or analysis and recommendations. Report must be complete and all deficiencies corrected prior to submittal to architect.

B. Include a complete list of all test equipment used, including apparatus manufacturer's name, model number, serial number and date last calibrated.

C. Include complete identification of all elements. Identify by unit number, room name and number, air outlet symbol, etc., to clearly and positively identify the location of each element.

D. Include all test data specified in addition to test data recommended in the applicable standards referenced in Part 1. Tabulate all nameplate data at all balanced equipment and at the associated motors.

E. Tabulate data separately for each system. Describe balancing method used for each system.

F. Include at the front of the report a summary of problems encountered, deviations from design, resolution of problems, recommendations and comments.

**END OF SECTION**

## SECTION 23 08 02 - CONTRACTOR START-UP

### PART 1 - GENERAL

1.01 DESCRIPTION

A. Description:

1. **This section describes specific requirements and methods of execution which relate to the Contractor start-up of the mechanical installation by the mechanical contractor and their subcontractor's, acting together as a team**. **The contractor, all their subs and vendors (as required) will spend sufficient time TOGETHER at the site to insure that all requirements are met.**

2. Contractor start-up is a performance verification and documentation process of ensuring that all mechanical systems are installed and are performing according to the design intent and operational needs of the project. The Contractor start-up process encompasses a coordinated effort for system documentation, equipment startup, control system calibration, testing and balancing, and performance testing and training.

3. Contractor start-up by the contractor during the construction phase is intended to achieve the following specific objectives;

   a. Verify that applicable equipment, controls and systems are installed according to the plans and specifications, manufacturer's recommendations and to industry accepted minimum standards.

   b. **Verify and document proper performance of equipment and systems as a whole and as controlled by the DDC system. Verify that total integration of the mechanical and DDC systems are complete and fully operational in all modes. This requires both the mechanical contractor and the control contractor to work together at the site at the same time as required. Testing equipment operation with jumper wires or in a stand-alone mode and/or testing controls for continuity does not meet the requirements of this section**.

   c. Verify that the Owner's operating personnel are adequately trained.

   d. Verify balancing report is completed and outside ventilation air quantities are confirmed.

**4. RETAINAGE WILL NOT BE RELEASED UNTIL WORK OF THIS SECTION IS SUCCESSFULLY COMPLETED. IF THE CONTRACTOR CAN'T COMPLETE THIS WORK IN A TIMELY FASHION IT WILL BE ASSIGNED TO A THIRD PARTY FOR COMPLETION AND BILLED AGAINST THE CONTRACTORS' RETAINAGE.**

B. SPECIAL NOTE: All provisions and divisions of these specifications are a part of this section of these specifications. The Contractor shall consult these divisions and provisions in detail for instructions and include all items pertaining to this work. The Contractor shall consult all other divisions of these specifications, determine the extent of impact on the work required to complete the work required by this section of the specifications or portion thereof and related work shown on the drawings.

**PART 2 - PRODUCTS**

2.01 TEST EQUIPMENT

A. All standard testing equipment required to perform startup and checkout and functional performance testing shall be provided by the contractor for the equipment being tested.

B. Special equipment, tools and instruments (only available from vendor, specific to a piece of equipment) required for testing equipment, according the Contract Documents shall be included in the base bid price to the Contractor.

C. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance. If not otherwise noted, the following minimum requirements apply: Temperature sensors and digital thermometers shall have a certified calibration within the past year to an accuracy of $0.5^0$ F and a resolution of + or - $0.1^0$ F. Pressure sensors shall have an accuracy of + or - 2.0% of the value range being measured (not full range of meter) and have been calibrated within the last year. All equipment shall be calibrated according to the manufacturer's recommended intervals. Calibration tags shall be affixed or certificates readily available.

**PART 3 - EXECUTION**

3.01 MEETINGS

A. Pre-Contractor start-up Meeting: At the beginning of the project the contractor shall schedule, plan and conduct a pre-Contractor start-up meeting with the Owner, engineer and construction manager to discuss process and procedures to be used in Contractor start-up process.

B. Miscellaneous Meetings: Other meetings will be held throughout project at owner, engineer or contractor request during construction, to cover Contractor start-up progress coordination, deficiencies, and other Contractor start-up issues.

3.02 EQUIPMENT REQUIRING MANUFACTURER START-UP:

A. Standard manufacturer start-up forms shall be submitted for review.

B. HCE forms must be fully completed and included in the Contractor start-up report.

C. All standard forms shall be signed and dated by technician doing start-up and shall be included in final Contractor start-up report.

3.03 TESTING CRITERIA:

**A. Systems shall be tested in all modes of operation (ie. cooling/heating, dehumidification, occupied/unoccupied modes, etc.). Systems may be started up in a stand-alone mode before control integration is complete, however all HVAC systems must be totally rechecked in all modes of operation through the manipulation of the DDC system once that part of the work is complete. Using jumper wires and testing for continuity does not meet the testing requirements.**

**B. Tests are to be performed under conditions that simulate actual conditions where possible. Simulated test conditions are allowed in order to confirm system functions at required conditions. At completion of individual tests, all affected building equipment and setpoints shall be returned to their pre-test condition.**

**C. Simply filling out the associated Contractor start-up Form does not totally satisfy all requirements of this section. Perform all testing as outlined in this section. Provide signed and dated documentation of all testing. Legible field notes that are signed and dated are acceptable.**

3.04 CONTROLS:

A. A sequence shall be submitted that gives a clear concise narrative of the functional operation for each different system. This should be coordinated with control submittal.

B. Confirm as a minimum, the following for each space sensor (temperature, humidity, $CO_2$):

1. Verify that sensor is labeled to match associated equipment number.

2. Verify that foam isolation pad is installed behind sensor.

3. Verify sensor location is appropriate and not in direct airflow from adjacent grille or sunlight.

4. Verify that sensor element is not in contact with cover, base or set point adjustment.

5. Test sensor with separate meter adjacent to (with-in 4 inches) sensor and verify building automation system (BAS) readout is with-in tolerance. Adjust offset as required for proper calibration. Recheck sensor. Insure measuring instrument is allowed to settle out at each sensor prior to confirming reading. Temperature tolerance is +/-0 .5$^0$F, humidistat tolerance is +/- 3%.

6. Replace any bad sensors, and document which sensor is replaced.

7. Confirm that push button override is set for 120 minutes.

8. Confirm that push button override is operational.

9. Confirm that set point adjustment at thermostat is set for +/- 3$^0$F.

10. Confirm occupied heating, cooling and RH set points.

11. Confirm occupancy schedules. (May turn over to Owner with floor level schedule set at 7am to 4pm with no imbedded schedules at equipment level at owner's request.)

12. Confirm fan status (continuous or automatic mode).

13. Confirm that zone sensors are properly located, labeled and that they actually control the equipment that serves that zone.

**14. Physically confirm that the HVAC equipment performs all of the functions that the controls can command it to do, in all modes. Continuity check alone is NOT SUFFICIENT.**

**15. CONFIRM THAT ANY INTEGRAL UNIT MOUNTED CONTROL SETTINGS HAVE BEEN PROPERLY SET UP TO MATCH THE JOB REQUIREMENTS AND TO PROPERLY INTEGRATE WITH THE DDC SYSTEM AS INSTALLED.**

C. Document all test data for sensors, etc, on appropriate control system Contractor start-up Forms.

3.05 SPLIT SYSTEMS:

A. Submit any required manufacturer's start-up test report.

B. In addition to any start-up reports perform checkout and record the following for each piece of equipment.

1. Unit size and model number.

2. Outside air (O/A) temperature and humidity during testing period.

3. Verify interior of unit is clean.

4. Insure O/A damper has been adjusted and balanced, permanently mark position of damper.

5. Verify that fan rotation is correct.

6. Verify that cooling coil is clean.

7. Verify that condenser coil is clean and fins are not damaged.

8. Verify that hail guards are installed if specified.

9. Confirm that condensate drain and trap are installed properly and drain pan is clean.

10. Verify that overflow switch is installed and working properly for AHU's.

11. Verify that heating and cooling modes are functioning and record inlet and discharge air temperatures in each mode.

12. Verify that hot gas reheat is working properly in dehumidification mode. Record inlet and discharge temperature.

13. Verify that filters are clean.

14. Confirm that belt tension and alignment has been adjusted properly.

C. Document all Contractor start-up data on Form C2.0 for Roof Top Units and on Form C3.0 for Split System Units.

# CONTROL SYSTEM CONTRACTOR START-UP FOR RTU'S & SPLIT SYSTEMS

## FORM C1.0

(CONTROLS CONTRACTOR) Page 1 of 2

PROJECT NAME:_____ PAGE: _____OF_____

FULL NAME OF INDIVIDUAL PERFORMING TEST:_____ DATE:_____

| # | DESCRIPTION | UNIT MARK | | |
|---|---|---|---|---|
| | | | | |
| 1 | TEMP. SENSOR LABELED | | | |
| 2 | HUMIDITY SENSOR LABELED | | | |
| 3 | CO2 SENSOR LABELED | | | |
| 4 | FOAM ISOLATION PAD INSTALLED BEHIND SENSOR | | | |
| 5 | VERIFY TEMPERATURE / HUMIDITY / CO2 SENSOR LOCATION (LIST ROOM #) | | | |
| 6 | LIST OFFSETS INPUT TO CALIBRATE TEMPERATURE / HUMIDITY / CO2 | | | |
| 7 | SENSOR PUSH BUTTON OVERRIDE SET FOR 120 MINUTES & FUNCTIONAL | | | |
| 8 | SET POINT ADJUSTMENT AT SENSOR +/- 3 DEGREES | | | |
| 9 | OCCUPIED COOLING SET POINT | | | |
| 10 | OCCUPIED HEATING SET POINT | | | |
| 11 | UNOCCUPIED COOLING SET POINT | | | |
| 12 | UNOCCUPIED HEATING SET POINT | | | |
| 13 | OCCUPANCY SCHEDULE | | | |
| 14 | HUMIDITY SET POINT (%RH) | | | |
| 15 | FAN STATUS ON SS/RTU<br>A = AUTO C = CONTINUOUS | | | |

## CONTROL SYSTEM CONTRACTOR START-UP FOR RTU'S & SPLIT SYSTEMS

**(CONTROLS CONTRACTOR)** **FORM C1.0** **Page 2 of 2**

PROJECT NAME:_____ PAGE: _____OF_____

FULL NAME OF INDIVIDUAL PERFORMING TEST:_____ DATE:_____

| # | DESCRIPTION | UNIT MARK | | |
|---|---|---|---|---|
| | | | | |
| 16 | PHYSICALLY CHECK & VERIFY THAT CONTROL SIGNAL(S) ACTUALLY INITIATES ALL MODES OF UNIT FUNCTION REQUIRED FOR THE TYPE HVAC EQUIPMENT BEING CONTROLLED. | | | |
| 17 | VERIFY THAT UNITS INTERNAL CONTROL SET POINTS (ECTO SETTINGS ON LENNOX RTU'S FOR EXAMPLE) HAVE BEEN SET TO MATCH THE REQUIREMENT FOR THE EXTERNAL CONTROLS ACTUALLY INSTALLED. | | | |
| 18 | LIST EQUIPMENT TYPE, IE, E/E SS, HP SS, GAS HEAT RTU, E.E RTU ETC… | | | |
| 19 | LIST COOLING STAGES | | | |
| 20 | LIST HEATING STAGES | | | |
| 21 | IF HEAT PUMP, DOES EM. HEAT COME ON DURING DEFROST CYCLE? | | | |
| 22 | IF HORIZONTAL SPLIT SYSTEM, IS FLOAT SWITCH WIRED INTO CONTROLS? | | | |
| 23 | VERIFY THAT OWNER HAS RECEIVED SPECIFIED AMOUNT OF OWNER TRAINING. | | | |
| 24 | VERIFY THAT SITE COMPUTER HAS BEEN INSTALLED WITH ALL REQUIRED PROGRAMMING, GRAPHICS & BACKUP CD OF SITE SPECIFIC PROGRAMMING. | | | |

ok = ITEM VERIFIED AND ACCEPTABLE

X = ITEM NEEDS ADDITIONAL WORK AND/OR VERIFICATION

n/a = DOES NOT APPLY

REMARKS:

**POINT TO POINT CHECK OUT OF CONTROLS DOES NOT CONSTITUTE THE FUNCTIONAL CHECK OUT REQUIRED.**

# SPLIT SYSTEM CONTRACTOR START-UP

## FORM C3.0

(MECHANICAL CONTRACTOR) PAGE 1 OF 2

PROJECT NAME:_____ PAGE: _____OF_____

FULL NAME OF INDIVIDUAL PERFORMING TEST:_____ DATE:_____

| # | DESCRIPTION | UNIT MARK | | |
|---|---|---|---|---|
| | | | | |
| 1 | UNIT SIZE / TYPE | | | |
| 2 | AHU MODEL NUMBER | | | |
| 3 | CU/HP MODEL NUMBER | | | |
| 4 | INDOOR TEMPERATURE (AND RH IF AVAILABLE) | | | |
| 5 | OUTSIDE TEMPERATURE / HUMIDITY | | | |
| 6 | CONDITION OF UNIT INTERIOR C = CLEAN NC = NEEDS CLEANING | | | |
| 7 | OUTSIDE AIR DAMPER ADJUSTED AND MARKED | | | |
| 8 | OUTSIDE AIR CONNECTED PER PLANS | | | |
| 9 | CHECK FAN ROTATION | | | |
| 10 | CONDITION OF INDOOR COIL C = CLEAN NC = NEEDS CLEANING | | | |
| 11 | CONDITION OF COND. COIL C = CLEAN NC = NEEDS CLEANING | | | |
| 12 | CU / HP SECURED TO ROOF SUPPORT | | | |
| 13 | DRAIN PAN CLEAN | | | |

## SPLIT SYSTEM CONTRACTOR START-UP

### FORM C3.O



PROJECT NAME:_____ PAGE:_____OF_____

INDIVIDUAL PERFORMING TEST:_____ DATE:_____

| # | DESCRIPTION | UNIT MARK | | |
|---|---|---|---|---|
| | | | | |
| 14 | CONDENSATE DRAIN AND TRAP INSTALLED PROPERLY | | | |
| 15 | COOLING DISCHARGE AIR TEMP. IF MULTISTAGE, ARE ALL STAGES OF COOLING OPERATIONAL? | | | |
| 16 | HEATING MODE DISCHARGE AIR TEMPERATURE | | | |
| 17 | IF HP, DOES EM HEAT COME ON IN DEFROST CYCLE? | | | |
| 18 | HOT GAS REHEAT DISCHARGE AIR TEMPERATURE | | | |
| 19 | CONDITON OF FILTERS C =CLEAN D = DIRTY | | | |
| 20 | BELT TENSION AND ALIGNMENT PROPERLY ADJUSTED | | | |
| 21 | ATTACH START-UP FORM WITH REFRIGERANT PRESSURES, AMPS, ETC. | | | |

ok = ITEM VERIFIED AND ACCEPTAB

X = ITEM NEEDS ADDITIONAL WORK AND/OR VERIFICATION

n/a = DOES NOT APPLY

REMARKS:

**ALL OPERATIONAL MODES ARE TO BE CHECKED BY MANIPULATING CONTROLS THAT THE OWNER WILL END UP WITH. USE OF JUMPER WIRES OR PLACING UNIT CONTROLLER IN STAND ALONE MODE IS NOT ACCEPTABLE FOR CONTRACTOR START-UP.**

**END OF SECTION**

## SECTION 23 30 00 - AIR DISTRIBUTION

### PART 1 - GENERAL

1.01 DESCRIPTION

A. Description: This section describes specific requirements, products and methods of execution relating to the project air distribution systems.

B. Provide all air distribution systems as shown and specified, complete in every detail and in perfect operating order.

C. All equipment warranties to be per Specification Section 20 00 00, 1.17.

D. SPECIAL NOTE: All provisions and divisions of these specifications are a part of this section of these specifications. The Contractor shall consult these divisions and provisions in detail for instructions and include all items pertaining to this work. The Contractor shall consult all other divisions of these specifications, determine the extent of impact on the work required to complete the work required by this section of the specifications or portion thereof and related work shown on the drawings.

1.02 Provide all air distribution work in accordance with the minimum provisions of the latest approved editions of the following codes and standards.

A. NFPA 90 A - Air Conditioning and Ventilating Systems.

B. NFPA 90 B - Warm Air Heating and Air Conditioning.

C. SMACNA - Low Velocity Duct Construction Standards.

D. TIMA - Fibrous Glass Duct Construction Standards.

E. SMACNA - Duct Liner Application Standard.

F. SMACNA - Ducted Electric Heat Guide.

G. AMCA Standard 210-74 Laboratory Methods of Testing Fans for Rating Purposes.

H. AMCA Pub. 261 Directory or Products Licensed to Bear the AMCA Certified Rating Seal.

I. AMCA Standard 300-67 Test Code for Sound Rating.

J. AMCA Standard 301-65 Method of Publishing Sound Ratings for Air Moving Devices.

K. AMCA Publication 511-75 Certified Ratings Program for Louvers, Dampers and Shutters.

L. ASHRAE Standard 52-76 Method of Testing Air Cleaning Devices Used in General Ventilation for Removing Particulate Matter.

M. ASHRAE Standard 70-72 Method of Testing for Rating the Air Flow Performance of Outlets and Inlets.

1.03 Where any references to “sheetmetal work” or “ductwork” appears in this section of these specifications or on the drawings, it shall be construed to include outside air ducts, supply air ducts, return air ducts, exhaust ducts, relief ducts, plenums, duct taps, grille taps, diffuser connections and all other related pieces and parts of the air conveying systems.

1.04 Before starting shop drawings or fabrication of any duct work, the Contractor must have an approved reflected ceiling plan with which he can coordinate location of air outlets, lights, grille patterns, etc.

**PART 2 - PRODUCTS**

2.01 FANS

A. General Requirements for All Fans:

1. All fans constructed to AMCA Standards, AMCA listed and labeled.

2. Bearings:

a. At factory assembled package units 1HP and larger, provide 200,000 hour bearings (AFBMA L-50) selected at maximum fan rpm.

b. At packaged equipment 3/4HP and smaller, provide manufacturer's standard bearings.

c. Arrange equipment for easy access to lubrication fittings. Provide extended grease lines whenever easy access is not possible.

3. Balance fans statically and dynamically at factory.

4. Factory paint fan housing, fan wheel (except aluminum), frame and support brackets with prime coat and enamel finish coat at factory, after properly preparing surfaces.

5. Arrange fans to be cleanable and so that wheel, bearings, shaft, and drive are removable. Provide plug type cleanout doors or split fan housing. Gasket joints and bolt airtight.

6. Provide vibration isolation for all fans per manufacturer's recommendations.

7. Assemble fans at factory and test with permanent motor for proper operation, alignment and balance.

8. **All fans are to be of similar size and operational characteristics as fans scheduled. Smaller fans run at higher speeds will not be accepted.**

B. Belt Drives (All Belt Driven Fans):

1. Provide V-belt drive with sufficient belts to prevent slipping at start-up. Select drive for 1.5 service factor.

2. On each fan 10HP and smaller, provide variable pitch drive sheave with infinitely adjustable pitch diameter. Select drive sheave and fan pulley combination to provide fan rpm with drive adjusted to near mid-span.

3. On each fan 10HP and larger, provide a fixed speed drive sheave. Change fan and drive sheave in field to attain specified air delivery at completion of balancing.

4. Provide belt guard with hinged tachometer cap.

C. Ceiling Exhaust Fans:

1. Centrifugal wheel with inlet perpendicular to, or remote from, inlet grille. Acoustically insulated housing.

2. 85% free open area grille.

3. Electrical junction box on fan housing with cord, plug, and receptacle inside housing.

4. Fan, motor and wheel assembly removable through grille without disturbing housing.

**5. Motor mounted on rubber-in-sheer isolators, grounded, maximum rpm shall not exceed scheduled rpm by more than 50 rpm.**

6. Unit supplied with grille when indicated by model number scheduled.

7. Provide and install roof cap or wall cap as shown.

8. Unit UL labeled.

9. Integral backdraft damper, shatterproof, with no metal to metal contact.

10. Manufacturers: Greenheck, Acme, ILG, Penn, Briedert, Carnes and Twin City.

2.02 FAN ACCESSORIES

A. Flexible Fan Connectors:

1. Provide at inlet and discharge of each fan, ERV, MAU, air handling unit, etc.

a. For Standard Application:

1) Material suitable to withstand the pressure encountered. Constructed from coated heavy glass fabric, flameproof and ozone resistant. Joints to be sealed airtight. Minimum of 3" flex connection to be used.

2) Manufacturer: Duro-dyne Corporation "EXCELON" or equal.

b. For Outdoor Installations and Where Duct is Exposed to Toxic Fumes:

1) Material suitable to withstand the pressure encountered. Constructed from heavy glass fabric, double coated with "Neoprene", non-combustible and fire retardant. Fabric to be waterproof and airtight. Minimum of 4" flex connection to be used.

2) Manufacturer: Duro-dyne Corporation Duralon or equal.

2. Insulate over flex connection at inlet and discharge of all air handling units and rooftop units with minimum two inch (2") Type "C" insulation with minimum installed "R" value of 6.0. Seal termination of external insulation to ductwork with Childers CP-11 mastic with 3" glass fiber reinforcing mesh. Do not seal over any access panels.

2.03 DUCTWORK

A. Low Velocity Ductwork Systems:

1. Definition: Ductwork systems where duct pressures do not exceed 2" W.G. maximum static pressure and duct velocity does not exceed 2000 FPM. **Minimum duct gauge to be 26 gauge.**

2. All ductwork connected to louvers is to be sloped back to louver to insure that any water entering the duct drains back to the exterior of the building.

3. Ductwork Construction:

a. Ductwork, unless otherwise specified herein, shall be constructed of new, prime grade, continuous hot dip mill galvanized, lock forming quality steel sheets and shall have a galvanized coating of 1-1/4 ounces total for both sides per square foot. The gauges of metal to be used and the methods of duct construction shall conform to the requirements for the class of work involved as set forth in the latest edition of "Standard Practice in Mechanical Sheet Metal" as published by SMACNA. Each sheet shall be stenciled with the gauge and manufacturer's name. If coil steel is used, coils shall be stenciled throughout on ten foot (10') centers with the gauge and manufacturer's name. Insulate per Specification Section 20 07 00.

b. All dimensions are inside clear dimensions. Sheet metal size shall be increased to allow for duct liner where applicable.

c. Seal all transverse joints, seams and fitting connections with "Ductmate Proseal", Childers CP-146 or Foster 32-19, UL listed Mastic to prevent air leakage. Oil base caulking and glazing compounds are not acceptable. Duct sealant must meet VOC units per South Coast Air Quality Management District (SCAQMD) Rule #1168.

4. Rectangular Ducts:

a. Where special rigidity or stiffness is required, construct ducts of metal two gauge numbers heavier.

b. Ducts larger than 96" require special field study for gauging and supporting and supporting methods. (Furnish shop drawings for supporting and construction requirements.)

c. Rectangular low pressure ducts shall be constructed, braced and reinforced in accordance with Sheet Metal and Air Conditioning Contractors National Association (SMACNA).

5. Round Ducts:

a. Construct round ducts from steel sheets, U.S. Gauge thickness, per SMACNA standards.

b. All exposed round ducts shall be double wall spiral duct per SMACNA standards with segmented fittings regardless of size.

c. Supply, return and exhaust duct runouts to/from air device shall be gauges as follows:

1) up to 12" diameter 30 gauge,

2) 14" to 18" diameter 28 gauge, and

3) 20" to 22" diameter 26 gauge.

**Provide minimum 26 gauge, 1" wide strap on heal and throat of adjustable fitting to provide additional rigidity.**

6. Transitions:

a. Provide tapered transitions at changes in duct size and at connections to fans and other equipment.

b. Offset not more than 20°, on diverging flow and 30° on contracting flow, unless called for otherwise on drawing.

7. Elbows and Turning Vanes:

a. Use long radius, 45° and 90° fittings for all elbows and at tees, unless otherwise shown or space restrictions dictate use of square elbows.

1) Construct fittings with centerline radius equal to 1-1/2 times the duct width at the turn.

2) Where square vaned elbows are used, provide access doors as detailed below.

b. Turning Vanes: In all 90° turns in supply air ducts where 1-1/2 radius elbows cannot be used, install double radius turning vanes in square elbows.

1) Ducts 19" and Smaller: Use small double vanes with an inner radius of two inches (2") and an outer radius of one inch (1") mounted on 3/4" center.

2) Duct 19" and Larger: Use large double vanes with an inner radius of four inches (4") and an outer radius of two inches (2"), mounted on three (3) 1/4" centers. Provide sound reduction type turning vanes: "Airsan" Acoustiturn, by Air Filter Corporation, "Sone-Turn" by Sound Control Products Company, per SMACNA Plat 22, or equal.

**3) Provide 12" x 12" insulated access door into duct on both sides of each vaned fitting to facilitate duct cleaning.**

8. Flexible Duct:

a. Do not use flexible duct except where specifically called for on the plans.

b. At diffuser connections:

1) Provide duct listed as UL-181 Class I air duct, and constructed in compliance with NFPA 90A.

**2) Minimum length 4 feet, maximum length 5 feet for supply ducts. Minimum length 4 feet, maximum length 5 feet for return air ducts. Install with not more than one (1) 90 full radius degree bend. Minimum and maximum lengths are to be closely followed since the flex duct acts as the main source of sound attenuation in the air system. Install with some slack in runout.**

3) Make joints with Nashua brand UL181A-P Duct Tape (Venture #1599B or Shurtape #PC857) and two (2) 1/2" wide positive locking straps, one on inner core and one on outer jacket. Use Panduit straps.

4) Minimum sound net insertion loss for duct as follows:

| BAND, HZ | 125 | 250 | 500 | 1000 | 2000 |
|---|---|---|---|---|---|
| Loss dB/ft. | 2.1 | 3.0 | 2.7 | 3.0 | 2.7 |

5) Submit sound and construction data for proposed alternates.

6) Tough vapor barrier reinforced metalized polyester jacket, tear and puncture resistant.

7) Airtight inner core with no fiberglass erosion into airstream.

8) **R-Value: 6.0 @ 75ºF. mean temperature if within building insulation envelope, or R-value of 8.0 if outside building insulation envelope.**

**c. Do not use flex duct on exhaust systems.**

d. Manufacturers: **Atco 36 Series**, Certainteed, Thermoflex, Wiremold, Genflex, approved equal.

B. Entire interior of ducts shall be thoroughly cleaned of all oil residue and dust prior to installing.

2.04 DUCT ACCESSORIES

A. Air Volume Controls:

1. Provide air volume dampers, or other control devices, at each low pressure duct main and branch for a balancer to adjust the system to produce the air quantities shown.

a. Provide opposed blade damper for balancing in each zone duct for HETD. Locate downstream of first elbow in accessible location and indicate location on record drawings.

2. Volume Dampers:

   a. Flat sheet, single leaf damper with a continuous rod; damper leaf two (2) gauges (minimum 16 gauge) heavier than the duct where installed. Provide locking quadrants with indicators located accessible without demolition.

      1) Use for supply, return and exhaust ductwork 14" round or 14" x 14".

   b. The locking-type quadrant operators for dampers, when installed on ducts to be thermally insulated, shall be provided with **stand-off mounting brackets, bases or adapters to provide clearance, between the duct surface and the operator, not less than the thickness of the insulation.** Stand-off mounting items shall be integral with the operator or a standard accessory of the damper manufacturer. All volume dampers indicated shall be provided with stand-off mounting brackets as required.

   **c. All operators accessible and lockable. Do not insulate over top of volume damper operator handle.**

   d. Locate dampers a minimum of 4 feet from diffusers.

3. Extractors:

   a. Combination air straightening vanes and volume control with locking quadrant on outside or accessible through face of register.

   b. Manufacturer: Titus AG-45 or approved equal.

   c. Provide extractors at supply grilles attached directly to any main or branch duct serving more than one (1) grille.

4. Splitter Dampers:

   a. Construct damper using sheetmetal blade hinge mounted inside duct.

   b. Dampers or splitters shall be constructed from the same gauge metal as the ducts which they serve with a minimum of 22 gauge. Splitter length shall be 1-1/2 times the duct width up to 24" in size and above 24" in size shall be 1-1/4 times the duct width.

   c. Attach Duro-dyne SRP-40 series splitter damper bracket to blade.

   d. Connect 1/4" steel rod to damper bracket and extend through Duro-dyne SRP-14 ball joint damper casting mounting on outside of duct. Use 3/8" steel rod for splitter in ducts above 24" in size.

   e. Install assembly for full swing of damper blade. Lock damper in proper position.

5. Opposed Blade Dampers:

   a. Provide opposed blade balancing dampers with multiple blades equal to Greenheck VCD-15, 20 gauge frame and 16 gauge blade construction with synthetic axle bearings and 1/2" diameter operator, complete with 1" stand-off and manual locking quadrant as follows:

1) Use for outside air ductwork. Minimum damper size is actual duct size or 10” x 10” whichever is larger. Provide transitions as required.

2) Use for supply, return and exhaust ductwork - 14” round or 14” x 14” and larger.

b. Damper material is to match ductwork material. (i.e., galvanized aluminum, stainless steel, etc.)

B. Gravity Backdraft Dampers:

1. Provide backdraft dampers counter balanced to desired static pressure setting. Wide open static pressure drop not to exceed 0.15” W.G.

2. Damper blades aluminum with felt applied to tops of blades. Where dampers are exposed to outside temperature, provide neoprene edged blades.

3. Damper frames extruded aluminum; nylon bearings.

4. Assembly designed for operation at 20$^{o}$F.

C. Access Panels and Doors:

1. Low Velocity System Access Panels:

a. Sheetmetal doors reinforced, cross-bracketed or otherwise stiffened to prevent rattle or vibration.

b. Seal doors airtight with felt edged gaskets.

c. Secure with hinges and sash locks.

d. Panels and doors for insulated duct systems are to be insulated.

2.05 GRILLES, REGISTERS AND DIFFUSERS

A. Provide grilles, registers, and diffusers of the types and sizes called for on plans and in schedule on drawings.

B. Finish with factory applied finish for extruded aluminum items, and with a prime coat for steel items. (Provide an additional factory baked enamel finish to match ceiling grid.) (Submit color sample for approval.)

C. Equip diffusers with panels of the proper size to match the suspended ceiling layout or with the proper frame for surface mounting. Fully correlate diffuser and grille style, dimension and fit with ceiling.

D. Manufacturers: Price, MetalAire, Titus, Tuttle & Bailey, Krueger, Anemostat, Carnes

E. All air devices located in damp areas are to be constructed from all aluminum components.

F. Provide minimum 12” deep externally insulated boot for sidewall type supply air devices.

G. Provide square to round transitions as required.

H. Provide minimum 12” deep (top duct tap) or 24” deep (side duct tap) externally insulated boot for return air and transfer air devices.

I. Provide minimum 12” deep boot for all exhaust devices.

2.06 LOUVERS AND HOODS

A. Provide air exhausts through building skin, as shown.

B. Louvers:

1. Size as shown; air pressure drop not to exceed 0.15” W.G. when handling 1150 FPM per square foot of free area.

2. Water penetration not to exceed .02 oz. per sq. ft. when handling 1150 FPM per square foot of free area.

3. 4” deep drainable louver constructed of .125” thick 6063-T52 extruded aluminum alloy with channel frame.

**4. Provide with 1/8” X 1/8” galvanized hardware cloth bee screen.**

5. Finish to be factory primed for field painting or applied .7 mil thick anodized dark bronze as directed by Architect.

6. Manufacturers: Greenheck ESD-403, Arrow, Carnes, Greenheck, Ruskin, Empco, Pottorff, or approved equal.

7. Any plenum or ductwork attached to louver is to slope to drain back through louver to exterior of building.

C. Hoods:

1. Construction of heavy duty aluminum sheets with rolled interlocking seams with galvanized hood support members, similar to Greenheck Fabrahood or equal.

2. Provide with bee screen on outside air intake hoods and 1/4” x 1/4” galvanized bird screen on relief hoods.

**3. Curbs are to be a minimum of fourteen inches (14”) high above finished roof surface and match slope of roof.**

4. Manufacturers: Greenheck, Acme, Penn, Cook, Briedert and Carnes.

5. Provide 120 volt motorized damper.

2.07 AIR FILTERS

A. General:

1. All air filters to be listed as Class 2 by Underwriters Laboratory, Inc., Building Materials Directory.

2. All arrestance, efficiency (dust spot efficiency on atmospheric air) and dust holding capacities specified are to be in accordance with ASHRAE Standard 52-76.

3. Performance characteristics are to be verified by certified data published in manufacturer's literature or by copies of current test data from an independent authorized test laboratory. Test data, where required, shall be an integral component of the manufacturer's submittal data.

4. Provide and install one (1) clean set of filters in all air moving units that require filtration at completion of project.

B. Disposable Panel Filters (for return air filter grilles and/or unit filter racks):

1. Media: Non-woven, lofted cotton bonded to 96% free area welded wire support grid. Not less than 2.45 square feet media area per square foot of filter face area. Arranged in radially pleated configuration and bonded continuously to inside perimeter of high wet-strength beverage board cell sides.

2. Cell Design: Two inches (2") deep with beverage board diagonal supports at entering air and leaving air faces of each cell.

3. Air Cleaning Performance: Minimum 25-30% efficiency 90-92% arrestance, MERV-7.

4. Initial Resistance: 0.2" W.G. at 500 fpm face velocity.

5. Dust Holding Capacity: Not less than 200 grams when operated at 500 fpm face velocity to a final resistance of .9 W.G.

6. Manufacturers: Cam-Farr Company Aeropleat II; AAF or approved equal.

C. Temporary Filters:

1. Reference 20 00 00, 3.07 for temporary filter requirements.

2.08 UNIT HEATERS (ELECTRIC)

A. Provide UL listed electric unit heaters with voltage, phase, number of steps, heating and air delivery capacities, as scheduled. Suitable for vertical and horizontal mounting.

B. Casings fabricated of die-formed heavy gauge steel and finished in high gloss baked enamel.

C. Steel finned tubular element. Provide automatic reset thermal cutout for each element.

D. Individually adjustable discharge louvers.

E. Thermostat to match number of heater control steps. Wall mount or built-in as scheduled.

F. Provide angle support between unit heater threaded rod supports and nearest wall to prevent unit sidesway.

G. Manufacturers: Markel, Brasch, Modine, Trane, Berko or approved equal.

2.09 RADIANT HEAT PANELS

A. Provide UL listed radiant heat panels with voltage, phase and wattage specified.

B. Twenty-four (24) gauge galvanized steel back overlapping and riveted to a twenty-two (22) gauge galvanized steel front with a crystalline type finish.

C. Electric resistance graphite element imbedded between two (2) layers of insulation. One (1) pound density, high temperature insulation above element; dielectric insulation below element.

D. Provide a thermostat for each panel unless noted otherwise.

E. Provide with surface mounting kit as required.

F. Manufacturers: Markel, Raywall, Berko or approved equal.

2.10 FIRE DAMPERS

A. Provide and install all fire dampers in all ductwork which passes a fire wall or fire rated ceiling as required by local building and fire safety codes.

B. All dampers folding blade type with no part of blade in the air stream.

C. All fire dampers UL approved and of type required by NFPA 90A.

D. Install all fire dampers per manufacturer's instructions. Installation detail must be submitted with damper submittal. **Post detail at job site in area of building permit.**

E. Provide UL rated sleeves and manufacturer supplied wall angles with damper.

F. Provide four additional fire dampers to be sized and installed as directed by Architect.

G. Manufacturers: Ruskin, Air Balance, Arrow, Greenheck, Nailor or approved equal.

**PART 3 - EXECUTION**

3.01 LOW VELOCITY DUCTWORK

A. Provide ductwork in accordance with SMACNA low velocity standards.

B. Provide backdraft dampers for all exhaust fans if motor operated dampers are not called for. Provide one inch (1") mesh bird screen at all exhaust discharges.

C. Seal all transverse joints, seams and fitting connections with KINGCO 11-376 "Super Seal" or "Ductmate Proseal", U.L. listed.

D. Where ducts, exposed to view, pass through walls, floors or ceilings, furnish and install sheetmetal collars to cover the voids around the duct.

E. This work shall be guaranteed for a period of one (1) year from and after the date of acceptance of the job against noise, chatter, whistling or vibration and free from pulsation under all conditions of operation. After the system is in operation, should these defects occur, they shall either be removed and replaced or reinforced as directed by the Owner.

F. Duct shall be erected in the general locations shown on the drawings, but must conform to all structural and final conditions of the building. Before fabricating any ductwork, the Contractor shall check the physical conditions at the job site, and shall make all necessary changes in cross sections, transitions, offsets, etc., whether they are specifically indicated or not at no additional charge to the Owner.

G. Reinforce all ducts to prevent buckling, breathing, vibration or unnecessary noise, such reinforcing to be as recommended in the SMACNA manual plus any additional reinforcing as may be required to meet job conditions.

H. Provide manually operated volume control dampers (with stand-off mounting brackets for externally insulated ductwork) in all branches, splits and taps for proper balancing of air distribution, whether shown on drawings or not, dampers to be either single blade or multi blade as shown in the SMACNA manual as required. They shall incorporate an indication device with lock to hold damper in position for proper setting.

I. Damper operators in all unfinished areas shall be Young Series 400 of the exact style, type and size required. All other operators shall be Young #315 and/or #896 opposite end from the operator. Where dampers are installed in ducts located above accessible type ceilings, damper operators shall not be extended through the finished ceiling.

J. All square elbows shall have turning vanes per the SMACNA manual requirements.

K. Where ducts connect to fans, including roof exhausters, flexible connections shall be made using “Ventglas” fabric that is fire-resistant, waterproof, mildew-resistant and practically air tight, and shall weigh approximately thirty ounces per square yard. There shall be a minimum of two and one-half inches (2-1/2”) distance between the edges of the ducts. There shall be a minimum of one inch (1”) of slack for each full inch of static pressure on the fan system.

L. Furnish and install screens on all ducts, fans, etc. furnished by the Contractor which lead to, or are outdoors. Screens shall be 16 gauge, three-eighths inch (3/8”) mesh in removable galvanized steel frames.

M. All holes in ducts for damper rods and other necessary devices shall be either drilled or machine punches (not pin punches), and shall not be larger than necessary. All duct openings shall be provided with sheetmetal caps if the openings are to be left unconnected for any length of time. All panels of ducts twelve inches (12”) and larger shall be cross broken.

N. Furnish and install a minimum 16 x 16 x 2 internally insulated (foil facing to airstream) filter rack with a hinged type access door with cam or spring lock and filter in all unfiltered raw outside air ducts that connect directly to return air plenums.

O. **All ductwork that is connected to any exterior louver or wall cap, etc. shall be sloped to drain outside.**

3.02 DUCTWORK SUPPORTS

A. Support all ductwork to prevent sag, undue play, and swing. All horizontal ducts shall have a support within 2’ of each elbow and within 4’ of each branch intersection. Provide a hanger within twelve inches (12”) from unit supply and return. Return air plenums on back of air handling units must have a minimum of four (4) support straps.

B. Low Pressure Ductwork:

1. Duct 40” and Less: Provide with 1” x 18 gauge straps fastened to ductwork, and to building construction. Space not more than eight feet (8’) on center. Hanger straps shall lap under duct a minimum of one inch (1”) and have a minimum of one (1) fastening screw on the bottom and two (2) on the side.

C. Vertical ducts supported where they pass through the floor lines with 1-1/2" x 1-1/2" x 1/4" angles.

D. Recommend methods of fastening bracing to ductwork, including riveting, bolting and tack welding.

E. All flex duct runouts must be properly supported. Use minimum twelve (12) gauge wire with 8" long saddle that fits up to mid-point of duct for support of flex duct. **Web Type fabric duct support is strictly prohibited**. Maximum permissible sag is 1/2" per foot of spacing between supports.

F. Provide 1" x 20 gauge straps, minimum 8' - 0" o.c. for all round sheetmetal runouts that are 18" in diameter or less (except Spiral Ducts).

G. Spiral ductwork is to be supported with 2" x 18 gauge strap bands around duct with a 3/8" bolt and nut connection at top. Connect to structure with minimum 3/8" all thread rods, minimum 8'-0" o.c.

3.03 ACCESS

A. Furnish all fans with consideration of location of motor and drive.

B. Furnish and install in the ductwork, hinged access doors to provide access to all manual and automatic dampers, fusible links, cleaning operations, etc. Where the ducts are insulated, the access doors shall be double skin doors with one inch (1") of insulation in the door. In rectangular ducts larger than twenty inches (20") in their smallest dimension, install access doors every twenty feet (20'). Where the size of the duct permits, the doors shall be eighteen inches (18") by sixteen inches (16"). Factory fabricated doors as manufactured by Milcor meeting these specifications will be acceptable. Access doors shall be submitted for approval.

C. Each fire damper door shall have a label with letters not less than 1/2" in height reading **"Fire Damper"**, **"Corridor Ceiling Fire Smoke Damper"** or "**Fire/Smoke Damper"** (as applicable).

D. Cycle damper after installation to insure free movement. Seal opening around fire damper with non-combustible material to maintain integrity of one (1) hour fire wall.

E. Provide access door in supply air and return air drops from rooftop units. Access door to be in accessible location directly above first elbow. Access doors to be 18" X 18" minimum where duct size allows. Access doors shall be shown on ductwork shop drawings.

F. Provide access doors for maintenance inspection and cleaning in each zone duct for HETD. Locate downstream of first elbow in accessible location and indicate location on record drawings.

3.04 Fully coordinate and work directly with the Balancing and Testing Agency to provide all systems in perfect operating order. Make corrections and adjustments as required by the Balancing and Testing Agency in a timely manner.

3.05 For Each Dryer: Provide 4" diameter or 5" x 3" rectangular flue pipe up through the wall and ceiling cavity and terminate into Briedert Cap. Provide transitions as required. Provide 4" diameter tie in point for residential type dryer or stacked washer dryer as required.

3.06 **CAP OPEN ENDS OF ALL DUCTS (INCLUDING SPIN-INS) AND EQUIPMENT WITH MINIMUM FOUR (4) MIL. PLASTIC TO PREVENT CONSTRUCTION DEBRIS AND DUST FROM ENTERING OPENINGS AT ALL TIMES DURING CONSTRUCTION.**

**END OF SECTION**

# SECTION 23 70 00 - MECHANICAL EQUIPMENT D - X SYSTEMS

## PART 1 - GENERAL

1.01 DESCRIPTION

A. This section describes specific requirements, products, and methods and execution relating to the D-X mechanical equipment for the project.

B. Provide complete operating installation for all systems shown and specified. Air handling unit, indoor coil and condensing unit shall be from single manufacturer.

C. **Reference 20 00 00 for information that must be supplied with submittals for use by Mechanical Contractor and/or Controls Contractor.**

**D. Reference 20 00 00 for warranty requirements.**

E. SPECIAL NOTE: All provisions and divisions of these specifications are a part of this section of these specifications. The Contractor shall consult these divisions and provisions in detail for instructions and include all items pertaining to this work. The Contractor shall consult all other divisions of these specifications, determine the extent of impact on the work required to complete the work required by this section of the specifications or portion thereof and related work shown on the drawings.

## PART 2 - PRODUCT

2.01 AIR HANDLING UNIT

**A. Air handler shall be a factory assembled unit, UL listed with fuses or circuit breakers, blower, heaters, steel casing and completely wired. Air handler and coil section may be bolted together in field but must be a mated pair from a single manufacturer.**

B. Cabinet:

1. At least 22 gauge cold rolled steel with baked enamel finish (galvanized finish not acceptable). Interior of cabinet around electric heating elements shall be lined with 1/2 inch thick 1-1/2 lb. density fiberglass insulation. All access panels to be easily removed and reinstalled for service.

2. Internal drain pan (factory installed).

C. Blower:

1. Centrifugal type, dynamically and statically balanced.

2. High efficiency direct driven multi-speed blower, factory installed with at least three blower speeds.

D. Heaters:

1. Nickel-Chromium Element(s). Element(s) to be sequenced on.

2. Three phase units to have true three phase heating elements or groups of 3-single phase heaters wired to provide a true and inherently balanced three phase electrical load.

3. Each set of heaters shall be equipped with limit control with fixed temperature “OFF” setting and automatic reset with supplemental thermal cut-off safety fuses.

4. Provide air handler with fan time-delay relay, manually reset transformer and complete internal control system.

5. **Provide 208 volt units with fuses or circuit breakers required for overload and short circuit protection.**

6. Stage elements on 1PH units over 8KW.

7. Stage complete banks of elements on 3PH units having 16KW or more. Example, 16KW 3PH heater to have two 8KW 3PH banks of heaters.

E. Furnace:

1. Furnace shall be a factory assembled unit, UL & AGA listed with blower, steel casing, control transformer and completely wired.

2. Die-formed, heavy gauge, cold-rolled steel or aluminized tubular heat exchanger with minimum ten (10) year warranty.

3. Powered forced draft combustion.

4. Spark ignition pilot.

5. Provide with temperature-activated fan and limit control.

6. Provide furnace with fan time delay, manually reset transformer and complete internal control system.

7. Cabinet to be at least 22 gauge cold rolled steel with baked enamel finish. Galvanized cabinet not acceptable.

8. Blower compartment to be lined with 1/2“ thick, 1-1/2” lb. density fiberglass insulation.

9. High efficiency direct driven multi-speed blower, factory installed with at least three blower speeds.

F. Cooling Coil:

1. Factory leak-tested, dehydrated, sealed and shipped with holding charge.

2. Coil installed in baked on enamel finish insulated casing (unless it is to be installed inside air handlers).

3. Staggered row copper tube, aluminum fins. Aluminum evaporator coils strictly prohibited.

4. Coils to be ARI certified and matched to system.

5. Provide with thermal expansion valve mounted inside AHU cabinet. (Capillary tubes or piston type metering devices are not acceptable).

G. Filter:

1. Provide two inch (2") thick pleated filter equal to Cam Farr Aeropleat II.

2. Provide two inch (2") thick mesh grease filter equal to those manufactured by American Air filter for all return air grilles located in Kitchen areas.

3. Install filters at return air filter grilles if system is equipped with them and at AHU when standard non-filtered return grilles are used.

4. Provide suitable insulated filter rack with hinged access door at base (inlet) of unit to house 2" thick filters when filters are to be installed at AHU.

H. Electrical:

**1. All units to be provided with terminal block type connection point for single electrical connection point. Loose wires and wire nut connection points are not acceptable.**

I. Approved Manufacturers: Trane, Daikin, Lennox or approved equal.

2.02 CONDENSING UNITS/HEAT PUMPS

A. Condenser coil shall have copper tubes with aluminum plate fins mechanically bonded.

B. Fans shall be direct driven propeller upflow type.

1. Fan motor thermostatically controlled, permanently lubricated, and designed with permanent protection.

2. Motors shall be resiliently mounted.

3. Each fan shall have a safety guard.

C. Unit shall operate properly in the cooling mode down to a minimum of $55^{O}$ F, unless otherwise noted on schedule.

D. Each condensing unit shall have one (1) compressor. Compressor shall be of hermetic design with the following features.

1. Crankcase heater (except on scroll compressor).

2. Resilient rubber mounts.

3. Compressor motor overload protection.

E. Controls:

1. Factory wired and located in separate enclosure.

2. High and low pressure cutout and condenser fan motor overload devices.

3. Off-cycle timer to prevent short-cycling of compressor and shall prevent compressor from restarting for 5 minutes if power is interrupted.

**4. Provide factory hard start kits for all single phase units.**

**5.** All interior units provided with low ambient control for operation down to 30°F.

F. Casing:

1. Fully weatherproof for outdoor installation. Baked-on enamel finish on all exterior surfaces.

2. Openings shall be provided for power and refrigerant connections.

3. Panels shall be removable for servicing.

4. Coil guards.

G. Provide externally mounted brass service valves with charging connections.

H. Thermostat:

1. Ecobee EB-EMS-02 Thermostat Wi-Fi enabled with free mobile apps and easy to use Ecobee Web Portal. Thermostat to have full color touch screen, 365 day scheduling and 7 day programmability. Thermostat to have up to 4 heat stages and up to 2 cool stages. Provide with 2 hour override and dehumidification capability. When building has DDC system, units are to be controlled by DDC sensors with appropriate controllers by Controls Contractor.

I. When AHU's/CU's or HP's come to the job site in sections, or when parts are sent for field installation, **all** pieces must be clearly marked as to which unit mark system they go with.

J. Condensing units/heat pump outdoor units to be products of same manufacturer as air handler and coil.

K. Manufacturers: Trane, Daikin, Lennox or approved equal.

2.03 REFRIGERANT SYSTEM

A. Furnish and install refrigeration system complete as a system with all refrigerant, oil, valves, dehydrators, gauges, flex connections and controls as required for proper operation.

B. Refrigerant Piping:

1. Meet requirements of ASTM B 280-83, "Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service," Type "L" or Type "K" only.

2. All refrigerant piping installed outdoors or in accessible spaces shall be hard drawn copper.

3. **Refrigerant piping in inaccessible spaces, such as wall cavities, or in underground sleeves is to be soft drawn copper with no fittings in the inaccessible areas. All bends required are to be made with refrigeration tubing bender.**

C. Refrigerant Fittings:

1. Wrought copper with long radius elbows.

2. Approved Manufacturers:

a. Mueller Streamline

b. Engineer approved equal.

D. Suction Line Traps:

1. Manufactured with one (1) 90º short radius elbow and two (2) 45º fittings.

E. Connection Material:

1. For Brazing--

a. Sil-Fos (minimum 10% silver content)

F. Expansion Valves:

**1. Provide thermal expansion valve for each system**.

2. Size valves to provide full rated capacity of cooling coil served.

G. Filter-Drier:

1. On lines 3/4" outside diameter and larger, filter-drier shall be replaceable core type with non-ferrous casing and Schraeder type valve.

2. On lines smaller than 3/4" outside diameter, filter-drier shall be a sealed type using sweat copper fittings.

3. Size shall be full line size and rated for tonnage and refrigerant used.

**4. Liquid line filter driers are required for each unit. However, if liquid line filter drier comes as an integral part of the condensing unit or heat pump outdoor unit, additional filter driers shall not be installed.**

**5.** External liquid line filter driers for heat pumps must be bi-flow type.

6. Manufacturers: Mueller, Alco or Sporlan.

H. Sight Glass:

1. Combination moisture and liquid indicator with protection cap.

2. Sight glass shall be full size of liquid line.

3. Sight glass connections shall be solid copper or brass.

**4. Required for each system utilizing expansion valve.**

5. Manufacturers: Mueller, Alco or Sporlan.

I. Manual Refrigerant Shut-Off Valve:

1. Ball valves designed for refrigeration service and full line size.

2. Valve shall have cap seals.

3. Valves with hand wheels are not acceptable.

4. Provide service valve on each liquid and suction line at compressor.

**5. If reusable service valves come as integral part of condensing unit, additional service valves shall not be installed.**

6. Manufacturers: Mueller, Superior

2.04 EQUIPMENT SUPPORTS

A. Factory Support:

1. Welded minimum 16 gauge galvanized steel shell, base plate and counter flashing.

2. Factory installed wolmanized 2 x 4 wood nailer.

3. Internal bulkhead reinforcement.

4. **Constructed to match roof pitch.**

5. Minimum height to be 14” above finished roof.

6. Manufacturer: Thycurb Model TEMS-3 or equal.

B. Coordinate other roof supports with Architectural and Structural Drawings:

1. **Roof supports shall be provided and located by Mechanical Contractor. Roof supports shall be installed, flashed and counter-flashed by the Roofing Contractor.**

2.05 ROOF CURBS

A. Factory installed wood nailer.

B. Welded galvanized steel shell and base plate. Minimum 18 gauge for fan or hood or hood curbs with top dimension under 48”. Minimum 16 gauge for fan or hood curbs with top dimensions 48” or over. Curbs up to 18” high for RTU’s and single wheel ERV’s to be minimum gauge as recommended by the Manufacturer. Extended height roof curbs (over 18”) and extensions for RTU’s to be minimum gauge as recommended by the Manufacturer. Curbs up to 18” high for Make Up Air Units to be minimum 12 gauge.

C. Extended height curbs (over 18” high) are to have a 12” to 14” curb base section and a curb extension section to facilitate height requirements and proper flashing in by the Roofing Contractor. Pad mounted curbs can be single or two piece.

D. **Constructed to match roof pitch.**

**E.** Curbs shall be as provided by equipment manufacturer. However, at Contractor's option, curbs equal to Thycurb Model TC-35F with internal wolmanized 2 x 4 nailer may be used. **Minimum height to be 14 inches above finished roof surface.**

**F. Curb shall be provided and located by the Mechanical Contractor. Curb shall be installed, flashed and counter-flashed by the Roofing Contractor.**

## PART 3 - INSTALLATION

3.01 Refrigerant piping shall be installed by licensed refrigeration Contractor. Size per Manufacturer's recommendation for length encountered. Size for minimal equipment capacity loss. Submit isometric drawing from the manufacturer indicating routing, sizes and velocity in piping and pressure drop in piping. Provide minimum four inch (4") diameter PVC sleeves as required for each refrigerant line set located under slab and through walls. Use 22-1/2$^0$ sleeve fittings for all underslab installation. Seal watertight top of PVC sleeves as they penetrate grade.

3.02 LIQUID LINE

A. **Install moisture indicator/sight glass at each condensing unit.**

B. Install properly sized filter-drier "in-line" type at each condensing unit if unit is not supplied with one. If unit is a heat pump, use bi-flow type drier.

C. All valves, driers and indicators to be full line size and have sweat fittings.

D. Maximum pressure drop in line shall be 10 psig. Size per manufacturer's written instructions.

E. **Insulate entire liquid line (indoors and outdoors) on heat pump systems as recommended by the manufacturer.**

3.03 SUCTION LINE

A. Every indoor coil (cooling and heat pump) shall be trapped when vertical rise is more than five feet (5'). When the compressor is below the evaporator, provide a trap in the suction line by coil, raise line to a point above coil and slope suction line down to compressor from that point. The trap shall be made up on one (1) short radius 90$^o$ trap and two (2) 45$^o$ fittings. For heat pumps, all horizontal vapor lines should be level.

B. All rises in suction lines returning to compressor shall be trapped. Use double suction risers where necessary. All risers must maintain a minimum of 1000 fpm and a maximum of 3000 fpm. Line sized for a maximum of 3 psig pressure drop in system. Size per manufacturer's written instructions.

C. Insulate all suction lines, including the thermal bulb, from the thermal expansion valve. See insulation section for type and thickness.

3.04 The length of refrigerant line runs shall be kept as short as possible. It is preferred that they not exceed seventy feet (70') in running length, but in no one case should they exceed the cooling equipment manufacturer's recommendations.

3.05 All condensing units/heat pump units shall have neoprene vibration isolation pads mounted under each corner and sized per manufacturer's recommendations.

3.06 Circulate dry nitrogen throughout system during welding or brazing process.

3.07 Test all refrigerant piping and repair all leaks. Pressure test with dry nitrogen; use pressure reducing valve to limit pressure to 150 psig. After testing, evacuate and fully charge system with refrigerant per manufacturer's written instructions. Submit manufacturer's evacuation procedures with submittal.

3.08 General Contractor to provide level concrete pad for all condensing units/heat pump units. Verify actual size with equipment.

3.09 Pack fiberglass insulation and sealing material, such as permagum, around refrigerant lines where they penetrate exterior building envelope.

3.10 VIBRATION ISOLATOR

A. Provide vibration isolation at each air handling unit (AHU) or fan. Vibration isolators are to be rubber in shear type for suspended AHU's and Neoprene pads for floor mounted AHU's up to 5 tons. Isolators are to be sized for actual equipment purchased.

B. Manufacturers: Amber Booth, Vibration Mounting & Controls, Inc. or equal.

3.11 EQUIPMENT SUPPORTS AND ROOF CURBS

A. Curb shall be manufactured in accordance with the National Roofing Contractors Association guidelines for rooftop equipment support.

B. Confirm exact roof curb installation requirements with Architectural flashing details. Coordinate installation requirements with roofing, structural and general contractors. Roof curb to extend above finished roof a minimum of 12", or 8" above highest point of cricket.

C. Roof deck to be cut out only where ducts penetrate roof. Provide 4" of rigid insulation (2 layers of 2" insulation with staggered joints) on roof deck below unit, topped by two layers of 5/8" exterior grade sheathing (densglass) or gypsum roof board (staggered joints) for sound attenuation.

D. Mechanical equipment to be secured to curb as required by code.

**END OF SECTION**

# DIVISION 26
# RIVER RANCH COUNTY PARK
# INTERPRETIVE CENTER
# WILLIAMSON COUNTY
# ELECTRICAL SPECIFICATIONS

CONTENTS:


26 05 00 . . . . . GENERAL PROVISIONS

26 05 10 . . . . . SCHEDULE OF VALUES

26 05 19 . . . . . WIRE & CABLE

26 05 26 . . . . . .GROUNDING & BONDING

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26 05 33 . . . . . RACEWAYS

26 05 34 . . . . . .OUTLET BOXES, PULL BOXES & JUNCTION BOXES

26 05 80 . . . . . .EMPTY RACEWAY ROUGH-IN

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26 24 16. . . . . BRANCH CIRCUIT PANELBOARDS

26 27 26. . . . . DEVICES

26 28 15 . . . . . SAFETY DISCONNECT SWITCH

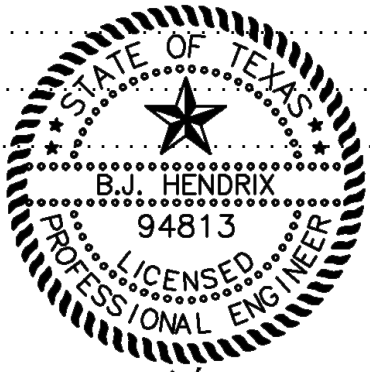
26 28 16 . . . . . FUSES

26 28 25. . . . . .CONTACTORS

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26 56 00. . . . . EXTERIOR LIGHTING SYSTEM


**03/21/2019**
**F-4095**

## SECTION 26 05 00 - GENERAL

### PART 1 - GENERAL

1.01 SCOPE OF WORK

Unless otherwise specified, provide all labor, equipment, supplies, materials, superintendence and testing necessary for the installation of complete electrical systems as required by these specifications and as shown on the Drawings, subject to the terms and conditions of the contract. Complete such details of electrical work not mentioned or shown which are necessary for the successful operation of all electrical systems described on the Drawings. Include empty conduits as required for all special systems and power for condensate pumps and HVAC control panels as required by the Mechanical Contractor. Field coordinate exact locations.

A. Submit a bid on the basis of a complete installation, including all labor, material, cartage, insurance, permits, associated fees and taxes.

B. Include temporary electrical power and lighting that will be required for the interior of the buildings. Provide lighting to satisfy OSHA requirements and the NEC.

C. All Agreement Forms, General Conditions, Supplementary Conditions, and Division 1 of the specifications shall apply to the work specified in Division 26-28.

D. Additional Site Visit Costs: The Contractor shall be charged with any cost resulting from uncompleted items that require additional site trips by the Architect/Engineer.

E. No attempt has been made to show complete design details of building construction on the Electrical plans. Refer to Architectural, Structural and Mechanical plans for additional details which will affect electrical work. No extra cost will be allowed for offsets in conduit and wiring to avoid other work or when minor changes are necessary to facilitate installation or maintenance.

F. Electrical Contractor is to provide all parts and labor to make final connections to all equipment shown in contract documents. Power may be shown in general location, it is expected that Electrical Contractor coordinate final locations for rough-in and connection requirements with exact equipment being installed. These items include but not limited to book security, exhaust fans, kilns, hand dryers, sensor operating plumbing devices, overhead doors, powered curtain, fire alarm door hold opens, etc.

**G. NO TOXIC NOR HAZARDOUS MATERIALS, INCLUDING BUT NOT LIMITED TO PRODUCTS OR MATERIALS CONTAINING ASBESTOS, PCB AND LEAD SHALL BE PROVIDED OR INSTALLED.**

**H.** AN EXTRA COPY OF ALL FIELD REPORTS SHALL BE KEPT IN A SEPARATE NOTEBOOK. CONTRACTOR TO SET UP IN THE CONSTRUCTION MANAGER'S TRAILER. THESE REPORTS SHALL BE USED FOR CONTRACTOR TO CHECK THAT EACH INDIVIDUAL ITEM NOTED HAS BEEN COMPLETED. ALSO KEEP LOG OF WHERE EXTRA RECEPTACLES AND OUTLET BOXES CALLED OUT IN 26 27 26, 3.01 AND 26 05 80, 2.01. ARE INSTALLED.

**I. Electrical Contractor shall use Fire Alarm Contractor's Shop Drawings and Rough-In details on drawings for rough-in of all fire alarm devices. Any devices not roughed-in according to Fire Alarm Shop Drawings and drawing details shall be relocated at no cost to Owner.**

J. Sensor Operated Plumbing Devices: Plumbing Contractor to provide transformers from manufacture. Electrical Contractor to provide all other electrical materials and labor to provide complete and workable device. This includes but is not limited to receptacles for plug in transformers, line voltage wire/conduit for direct connect low voltage transformers, all low voltage plenum rated 16 gauge wire.

K. **Cad Drawings:**

**Architectural Background Files – Architectural Files are background files, MEP drawings are not background files.** To insure the most current Architectural files are used for shop drawings backgrounds, they must be obtained from the architect and cannot be given from the engineer. Reference Architect for cost of Architectural Files.

**MEP Drawings** – These drawings cannot be used for shop drawings, as they are diagrammatic in nature only. Actual shop drawings prepared by sub-contractors must be used for coordination between all trades. If MEP floorplan files are requested they may be obtained with a signed confidentiality release form, only as outlined below. These files may be used in conjunction with this project only. There are no guarantees of compatibility or accuracy; all technical support will be billed hourly at current Engineer's Rates. Engineer does not charge for actual file, but does charge for time required to prepare the files in format as requested by the Contractor. Fees will be based on Engineer's current hourly rates. Deposit of $500 must be paid prior to beginning file preparation and balance must be paid prior to release of any files. Total fee based on actual time required by Contractor's request. See submittal and shop drawing section for additional information.

**MEP CAD Files that will be released.**

- If no Architectural RCP is available for light locations. Lighting Floorplans will be released.
- Mechanical Floorplan will be released to Mechanical Contractor for aid in production of his own shop drawings. HCE mechanical drawings may not be submitted as shop drawings.
- Fire Alarm/Fire Sprinkler/Intercom etc… Contractors must use Architectural Revit Models and CAD files for backgrounds and Architectural RCP's (when available or lighting floorplan) and **Mechanical Contractor Shop Drawings** for coordination purposes. This must be obtained from Architect. Engineer may not release architectural drawings.

L. The Contractor binds himself, his partners, successors, assigns and legal representatives to the Owner hereto in respect to all covenants, agreements and obligations contained in the Contract Documents. The Contractor shall not assign the Contract or sublet it as a whole without the written consent of the Architect/Owner, nor shall the Contractor assign any monies due or to become due to him hereunder, without the previous written consent of the Owner/Architect.

M. The Contractor shall supervise and direct the Work using his best skill and attention. He shall be solely responsible for all construction means, methods, techniques, safety, sequences and procedures and for coordinating all portions of the Work under his Contract.

N. The Contractor shall provide, without extra charge, all incidental items required as a part of the Work, even though not particularly specified or indicated, and if he has good reason for objecting to the use of a material, appliance, or type of construction shown or specified, he shall register his objections with the Architect/Engineer, in writing; otherwise, he shall proceed with the work under the stipulation that a satisfactory job is required.

O. Provide a completed Schedule of Values, see Specification Section 26 05 10. Preliminary schedule of values shall be submitted to Architect/Engineer for review.

1.02 SITE INSPECTION

A. Prior to Bidding, the Contractor shall visit and examine the site verifying all existing items and familiarize himself with existing work conditions and understand the conditions which affect performance of the work of this Division before submitting bids for this work. The submission of bids shall be deemed as evidence of such visits and examinations.

B. All bids shall take the existing conditions into consideration and the lack of specific information on the drawings shall not relieve the Contractor of any responsibility. No subsequent allowance for time or money will be allowed for work or change related to failure to examine site conditions.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. All work covered by this section of these specifications shall be accomplished in accordance with the respective drawings, information or instructions to bidders, and general provisions of these specifications. Any supplementary conditions, special conditions, addenda, or directives which may be issued by the Owner's representative herewith or otherwise shall be complied with in every respect.

B. Provide electrical connections and service to items described in all other sections of these specifications.

C. The Electrical Contractor shall provide all wiring and connections required to fire/smoke dampers. Coordinate exact locations of dampers with Mechanical Contractor and relay requirements with Fire Alarm Contractor.

D. The Electrical Contractor shall provide all wiring and connections required to backdraft dampers at exhaust fans. Coordinate exact locations of dampers with Mechanical Contractor.

E. Electrical Contractor to provide conduit and junction boxes for all sensors and exterior conduit for controls to mechanical equipment. Conduit for space sensor to extend from junction box to above accessible ceiling. Conduit for exterior equipment to extend from equipment through wall or roof to above an accessible ceiling. Any control wiring in exposed ceiling areas to be in conduit by Controls Contractor for protection. Controls Contractor to coordinate on all conduit requirements. Coordinate locations with Electrical Contractor.

1.04 WORK NOT INCLUDED

A. Certain labor, materials, or equipment may be provided under other sections of these specifications, by utility companies, or by the Owner. When such is the case, the extent, source and description of these items will be as indicated on the Drawings or described in the specifications, but the Contractor is responsible for verifying with all parties involved as to the extent of his requirements of work.

B. Unless otherwise indicated, motors shall be furnished by others, but connected by the Electrical Contractor as indicated on the Drawings.

C. Unless otherwise specified, Mechanical equipment control low voltage wiring (less than 50 VAC) shall be provided and installed by the Mechanical Contractor.

1.05 SPECIFICATION TERMINOLOGY (Definitions)

A. "Provide": Includes all material, installation, labor subcontracts, appurtenances and mark-up required for a complete operable system as shown and specified, set in place, connected and ready to use.

B. "Furnish": Purchase and deliver to job site, material as shown and specified.

C. "Install": Includes all installation, labor subcontracts, appurtenances and mark-up required for complete installation of equipment furnished by others.

**D. "Record Drawings": Drawings that reflect the electrical systems as actually constructed by the Contractor including conduit routing.**

E. "Accessible" means arranged so that an appropriately dressed maintenance man may approach the area in question with tools and products necessary for the work intended, and may then position himself to properly perform the task to be accomplished, without disassembly or damage to the surrounding installation. All clearances per NEC.

F. Wherever the term "shown on drawings" is used in the specifications, it shall mean "noted", "indicated", "scheduled", "detailed", or any other diagrammatic or written reference made on the drawings.

G. "Conduit" includes, in addition to conduit, all fittings, hangers and other accessories relative to such conduit system.

H. "Concealed" means hidden from sight in chases, furred spaces, shafts, hung ceilings, imbedded in construction, crawl spaces, etc.

1.06 DIAGRAMMATIC DRAWINGS:

A. The drawings are in general diagrammatic, and the location of outlets, switches, motors, etc., on the drawings does not necessarily mean that such units shall be placed at that exact spot, as scaled on the drawings, but shall be located to function best. Use the drawings, and these specifications for guidance and secure the Engineer's approval of all changes in location. Coordinate all dimensions for floor boxes with Architect. Contractor shall not scale from drawings.

B. Verify all measurements at the site. No extra compensation will be allowed because of differences between locations shown on the drawings and measurements at the building.

C. The Contractor is to draw electrical rooms and service to scale **(1/4" minimum)** with actual equipment to be used and submit to the Engineer prior to installation. The Contractor must insure that all minimum NEC working clearances are maintained. Coordinate with equipment of other trades.

D. Where lighting fixtures and other electrical items are shown in conflict with structural members and mechanical or other equipment, provide all required supports and wiring to clear the encroachment.

E. The branch circuits and arrangement of home runs have been designed to compensate for voltage drop and other considerations to accomplish maximum economy. Re-circuiting will not be permitted without specific approval. **Circuit numbers may change to achieve balanced loads on panels.**

F. In the event of discrepancy, immediately notify the Engineer. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

G. Drawings and specifications are complimentary each to the other. What is called for by one shall be as binding as if called for by both.

H. Should the drawings disagree in themselves, or with the specifications, the better quality or greater quantity of work or materials shall be used.

I. Outlets and switches obviously placed in a location not suitable to the finished room or area shall be removed and relocated when so directed by the Architect at no cost to the Owner. The Architect shall have the right to make any reasonable change in outlet locations before rough-in without additional cost to the Owner. The contractor shall contact engineer when switches are inadvertently shown on hinge side of door prior to rough-in.

J. Location of light fixtures shall be coordinated with reflected ceiling plans and/or room finish schedules.

1.07 MATERIAL AND EQUIPMENT SUBMITTALS

A. Submittals: Provide submittals for all products and systems described in Division 26-28 and shown on the drawings to demonstrate compliance with the requirements of the project. Furnish equipment submittals in the manner described elsewhere in these specifications.

B. Submit to the Engineer, after the award of the contract or as dictated by project schedule, a type written list of those items of equipment and appurtenances which will be furnished. Include the name or description of the item, name of manufacturer, model or type, catalog number and manufacturer's printed information. The information submitted shall include overall dimensions, weights, voltage rating, phase, wiring diagrams, etc., and nameplate data. Assemble cut sheets into separate submittals as defined in this section or by Specification Section. Submit priority items and long lead time first. Then follow with remaining items. This will allow for faster review and response to accommodate project schedule. **Any submittal with all sections under one (1) submittal number will be returned and required to be broken into unique separate submittal numbers.** The Engineer's check will be general and does not relieve the Contractor of final responsibility to comply with the Contract Documents in all respects.

C. Submittal review is for general design and arrangement only and does not relieve the Contractor from any of the requirements of the Contract Documents. Submittals will not be checked for quantity, dimension, fit or proper technical design of manufactured equipment. Where deviations of substitute product or system performance have not been specifically noted in the submittal by the Contractor, provision of a complete and satisfactory working installation is the sole responsibility of the Contractor. **Warranties cannot be reduced through the submittal process.**

**D. Contractor shall indicate items being used on cut sheets by highlighting or arrowing to actual part number. Submittals may be returned without checking if submittals not appropriately marked.**

E. **'Individual submittals' means separate submittals with unique submittal numbers for each specification section. Separate PDFs for each Submittal number.**

**F. HARDCOPY SUBMITTAL REQUIREMENT: Hardcopy submittals will not be required by Engineer.**

**G. PDF SUBMITTAL REQUIREMENT:**
For submittal sections listed below as allowed pdf's the following requirements must be met or the submittal will not get through email security and will be auto-deleted and not checked. Each specifications section must be a separate pdf file, **one giant pdf for all sections will be rejected**.

**PDF FILE:** MUST BE NAMED AS FOLLOWS:
JOB NAME – SUBMITTAL No. XX – SUBMITTAL DESCRIPTION

**EMAIL TITLE/SUBJECT**: FOR SUBMITTALS MUST BE AS FOLLOWS:
JOB NAME – SUBMITTAL No. XX – SUBMITTAL DESCRIPTION

Failure to follow these instructions will result in the submittal never reaching the engineer and not being checked. Delays cause by not following these procedures are the sole responsibility of the contractor. Emailed submittals must come from the Architect and must not be emailed directly from the contractor. Do not Carbon Copy the Engineer on Emailed submittals.

H. **Multiple re-reviews required due to Contractor not following instructions, specifications, etc will be billed to Contractor at Engineer's current hourly rates. This shall be paid prior to submittal approval.**

I. **Submittals will be returned in order of construction of the project, not necessarily in order submitted.** If all sections are submitted under one binder/at one time and transmittal, each section will be returned at the appropriate time for construction phasing. Electrical Gear will not be reviewed until "Mechanical/Electrical Coordination Sheet" has been submitted. Electrical Gear and Light Fixtures may require extended review time**. If submittals are submitted early relative to construction phasing, submittals may be held, reviewed and returned at the appropriate time for construction phasing, not necessarily 2 weeks. In some cases, if submittals are received vastly out of order of construction, submittal may be rejected.**

J. **DO NOT SUBMIT THE FOLLOWING SECTIONS UNLESS DEVIATING FROM THE SCHEDULES/SPECIFICATIONS. Provide directly to General Contractor/CMR for inclusion into O & M Manuals. If deviating from the specifications submittal will be required. (Highlight items in each submittal content that are different to allow for proper review.):**

1. 26 05 00 – General Provisions
2. 26 05 10 – Schedule of Values
3. 26 05 19 – Wire and Cable
4. 26 05 26 – Grounding and Bonding
5. 26 05 29 – Hangers and Supporting Devices
6. 26 05 33 – Raceways
7. 26 05 34 – Outlet Boxes, Pull Boxes and Junction Boxes
8. 26 05 80 – Empty Raceway Rough-In
9. 26 27 26 – Devices
10. 26 28 15 – Safety Disconnect Switch
11. 26 28 16 – Fuses
12. 26 28 25 – Contactors

K. **PDF Submittals Allowed** for Product Cut-Sheets for are limited to the following items: **Separate PDF file for each Submittal number is required. Follow file format above.**

1. 26 24 13 – Main Switchboard
2. 26 24 16 – Branch Circuit Panelboards
3. 26 43 00 – Surge Protective Devices

4. 26 51 00 – Interior Lighting System
5. 26 56 00 – Exterior Lighting System
6. 28 31 00 – Fire Alarm System - (Product Data and Shop Drawings)
7. Electric Rooms (coordinate with mechanical). Also, include other equipment and/or systems on plan.

L. When requested, present samples of all materials proposed for use to the Engineer for his approval.

M. Certify Shop Drawings have been checked for compliance with Contract Documents. Certify that the materials submitted can be delivered and installed according to the construction schedule.

N. Select all other materials, not specifically described on the Drawings or in these specifications but required for a complete and operable facility, and submit to the Engineer for approval.

O. **Substitutions:** ("Substitution Request" form must be submitted)

1. Substitutions must be made and accepted PRIOR to Bid.

2. Unless otherwise indicated, base bid on the equipment shown on the Drawings and hereinafter specified.

3. Request for approval to substitute materials, methods, or processes shall be made to Architect and if found acceptable, will be confirmed by an addendum to the Construction Documents. Where proposed substitutions are not incorporated into the Construction Documents by addendum **PRIOR** to time of the General Contract bid opening, all bids shall be held to have been made on the basis of the materials, methods and processes required by the Construction Documents.

4. All substitutions shall be of equal or better quality to the equipment specified.

5. Acceptance of the substitution by the Engineer does not relieve the Contractor of responsibility for proper operation of the systems, compliance with specifications, necessary changes due to dimensional differences or space requirements, and completion of work on schedule.

6. It is not the intent of the Specifications to limit materials to the product of any particular manufacturer. Where definite materials, equipment and/or fixtures have been specified by name, manufacturer or catalog number, it has been done so as to set a definite standard and a reference for comparison as to quality, application, physical conformity and other characteristics unless no substitutions are noted.

7. **Submit fully completed "Substitution Request" form located at end of this section. If this form is not submitted, all substitution request will be automatically rejected.**

8. **For substitutions that require substantial review by engineer to ensure equality, the contractor requesting substitutions shall reimburse the engineer at current hourly rates for all review time. This shall be paid prior to submittal approval. This applies to all equipment not previously approved on construction documents.**

   a. Light Fixtures Packages

b. Alternate Transformers

c. Alternate Surge Protective Devices

d. Alternate Equipment/Gear Packages

e. Contractor Cost Savings Packages Requiring Substantial Review Time

1.08 SHOP DRAWINGS REQUIRED

A. Prepare and submit working construction drawings as requested, specified, and otherwise necessary to demonstrate proper planning for installation and arrangement of all work. Layout drawings to scale and show dimensions where accuracy of location is necessary for coordination or communication purposes. Show work of all trades, including Architectural, Structural, Mechanical, and Electrical items which may be pertinent to proper and accurate coordination.

B. Architectural drawings must be used for backgrounds in preparation of shop drawings and shall be obtained from the Architect. Confirm requirements and stipulations for obtaining floor plan backgrounds with Architect and with other sections of specification. Engineer's drawings and CAD files **may not** be used for Shop Drawings. Reference 1.01-L.

C. Reference other specification for additional requirements.

1. Fire Alarm

2. PA System

3. Electrical Rooms

1.09 RECORD DRAWINGS

A. Reference requirements stated elsewhere in the specifications.

B. THE CONTRACTOR SHALL TAPE ALL ADDENDAS ISSUED DURING BIDDING TO HIS CONSTRUCTION AND RECORD DRAWING SET PRIOR TO COMMENCING CONSTRUCTION. PAY REQUESTS WILL NOT BE PROCESSED UNTIL THIS REQUIREMENT IS MET.

C. In addition to other requirements, a master Record Drawing print set (separate from field sets) shall be kept in the site construction office as the work progresses. Show routing and location of items cast in concrete or buried underground. Work located in spaces with access, or above suspended ceilings, is not considered permanently concealed. Show complete routing and sizing of any significant revisions to the systems shown. Indicate locations of all existing active and inactive conduit uncovered during construction**. Keep marked up set at site for review at site meetings**.

D. **Contractor to indicate conduit routing locations for all major runs and branch circuits under slab along with major junction locations.**

E. The Contractor shall be responsible for updating all items, including but not limited to floor plan changes, system changes, addendums, change orders, etc. on the prints to "As-Built" conditions. At the completion of the job the marked up As-Built Drawings shall be submitted to the Architect for final review and comment. These corrected prints together with all the revisions, additions and deletions of work, shall form the basis for preparing a set of record drawings.

F. Using the “Record Drawing Set”, the Contractor shall print two (2) complete sets of prints one for submission to the Owner and one rolled in a 4” PVC pipe in main electric room mounted to wall and labeled. Tape all edges. The contactor shall provide pdf copies/scans for owner record purposes. Remove Engineer’s seal from record drawings.

G. The Contractor shall bear all the costs of producing the “Record Drawing Set”.

H. Electrical riser diagrams shall be laminated and mounted in the main electrical room or as directed by the Engineer.

1.10 CODES, REGULATIONS AND ORDINANCES

A. Comply with the requirements of the National Electrical Code, National Electrical Safety Code, Occupational Safety and Health Act (OSHA) and all other applicable Federal, State and local codes and ordinances. All codes and standards shall be per the latest adopted edition with all supplements and official interpretations included. Provide disconnecting means for all equipment per NEC. The Drawings and specifications take precedence when they are more stringent than codes, standards, ordinances, and statutes take precedence when they are more stringent or conflict with the Drawings and specifications.

B. Should the Contractor perform any work that does not comply with the requirements of the applicable Building Codes, State Laws, Local Ordinances and Industry Standards, he shall bear all costs arising in correcting the deficiencies, as approved by the Architect.

C. All work shall also satisfy applicable local codes, ordinances, and regulations of the governing bodies, and all authorities having jurisdiction over the work. Where alterations to, or deviations from, the drawings and specifications are required by the authority having jurisdiction, report the same in writing to the Owner’s representative and secure his approval before proceeding.

1.11 DELIVERY AND STORAGE OF EQUIPMENT AND MATERIAL

A. Investigate each space in the building through which equipment must pass to reach its final location. If necessary, the manufacturer shall be required to ship his material in sections sized to permit passing through such restricted areas in the building.

B. Retain all portable and detachable parts or portions of installation such as fuses, key locks, adapters, blocking clips, and inserts until final completion of work. Deliver parts to the Owner or his authorized representative and attach an itemized receipt to obtain request for final payment.

C. Product Handling:

1. Use all means necessary to protect the work and materials of this section before, during, and after installation and to protect the work and materials of all other trades.

2. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Engineer and at no additional cost to the Owner.

3. Store and protect materials and equipment in accordance with the manufacturer’s recommendations.

4. Provide suitable box or crate electrical equipment and cover with waterproof covers to protect against dirt, moisture or accidental damage during shipment or outdoors at the job site.

5. Store all conduits on skids.

1.12 SERVICEABILITY OF PRODUCTS

A. Furnish all products to provide the proper orientation of serviceable components to access space provided.

B. Coordinate installation of piping, ductwork, equipment, conduits, junction boxes, panels and other products to allow proper service of all items requiring periodic maintenance or replacement.

C. Replace or relocate all products incorrectly ordered or installed to provide proper serviceability.

1.13 ACCESSIBILITY OF PRODUCTS

A. Arrange all work to provide permanent, convenient and safe access to all serviceable and/or operable products. Layout work to optimize net usable access space within confines of space available. Advise Architect, in a timely manner, of areas where proper access cannot be maintained. Furnish layout drawings to verify this claim, if requested.

B. Provide access doors in ceilings, walls, floors, etc. for access to automatic devices and all serviceable or operable equipment in concealed spaces. Location of panels shall be submitted for approval in sufficient time to be installed in the normal course of work.

1.14 UTILITY COSTS

A. Provide complete utility service connections. The locations and elevations of the various utilities included within the scope of this work have been obtained from city and/or other substantially reliable sources as a general guide only, without guarantee as to accuracy. Verify the locations, elevations, and availability of all utilities and services required, and be adequately informed as to their relation to the work.

B. Include all service charges required by the electric utility or telephone/data/cable utility. Reference General Conditions for further information. Keep all utility company charges as a separate line item in bid. If cost is not available from utility company, indicate utility contact person, telephone number and **date of contact**.

1.15 CLEAN-UP

A. Remove debris and waste materials from within the construction areas and transport off-site, daily.

B. Keep the construction area clean, free from hazard, and orderly arranged.

C. Pay all costs of waste removal and disposal. Reference General Conditions for further information.

D. Dispose of waste materials in accordance with all regulations which govern.

E. Take all precautions to protect persons who enter the construction area from hazardous conditions, hazardous waste, toxic waste, or other unsafe conditions.

F. Upon completion of construction, remove all debris, waste materials, unused materials, temporary constructions, vehicles, tools, fencing, etc. to Owner’s satisfaction.

G. All equipment and materials shall be protected from physical moisture absorption, metallic corrosion and weather damage from time of delivery to completion of project. Replace any damaged materials.

**PART 2 - PRODUCTS**

2.01 EQUIPMENT AND MATERIALS

A. Unless otherwise indicated, provide only new equipment and materials.

B. On all major equipment components, provide manufacturer's name, address, model number, and serial number permanently attached in a conspicuous location.

C. All materials furnished under these specifications shall be the standard product of manufacturer's regularly engaged in the production of such equipment and shall be the manufacturer's latest approved standard design.

D. Guarantees:

1. The Contractor and Manufacturers shall provide a ONE (1) YEAR guarantee for all work under the Electrical Trade. However, such guarantees shall be in addition to and not in lieu of all other liabilities which the manufacturer and the Contractor may have by law or by other provisions of the Contract Documents. In any case, such guarantees and warranties shall commence when the Owner accepts the mechanical/electrical system, as determined by the Architect and shall remain in effect for a period of ONE (1) YEAR thereafter.

2. All materials, items of equipment, all lighting, and workmanship furnished under each section shall carry a ONE (1) YEAR warranty against all defects in material and workmanship. Any fault under any contract, due to defective or improper material, equipment, workmanship or design which may develop shall be made good, forthwith, by and at the expense of the Contractor for the work under his Contract, including all other damage done to areas, materials and other systems resulting from this failure.

3. The Contractor shall guarantee that all elements of the system, which are to be provided under his Contract, are of sufficient capacity to meet the specified performance requirements as set forth herein or as indicated.

4. Upon receipt of notice from the Owner of failure of any part of any systems or equipment during the guarantee period, the affected part or parts shall be replaced by the Contractor for his respective work, as applicable.

5. Furnish, before the final payment is made, a written guarantee covering the above requirements.

6. Reference other guarantee information elsewhere in these specifications.

2.02 STANDARDS

A. Where the Underwriters' Laboratories (UL) have established standards and issued labels for a particular group, class or type of material, apparatus, appliance or device, provide the UL label on all such items in that category incorporated into the work.

B. Where such items are not covered by UL standards, they shall meet or exceed the requirements of the current National Electrical Code (NEC), or if not covered there, by the applicable, published, recognized standard of the American National Standards Institute (ANSI), or of the industry and of the related engineering society. Example: National Electrical Manufacturers Association (NEMA) and Institute of Electrical and Electronics Engineers (IEEE).

C. Contractor is to follow the most current version adopted for all codes and standards.

## PART 3 - EXECUTION

### 3.01 CUTTING AND PATCHING

A. Carefully lay out all work in advance so as to minimize cutting, channeling, chasing, or drilling of floors, walls, partitions, ceilings, etc. Perform all cutting, channeling, drilling, etc., as required for the proper support, concealment, installation, or anchorage of raceways, outlets, or electrical equipment in a careful manner. Any damage to the building, structure, piping, ducts, equipment, or defaced finish, tile, plaster, woodwork, or metal work shall be repaired by skilled mechanics of the trades involved at the Contractor's expense and to the satisfaction of the Engineer. All cutting, channeling, chasing, or drilling of unfinished masonry, tile, etc., or cutting, drilling, anchoring to or welding of structural members shall be performed in a manner having the Engineer's prior approval. All openings made in fire rated or smoke rated walls, floors, and ceilings shall be patched and made tight in a manner to conform to the fire rating or smoke rating for the enclosure.

B. Where conduits pass through exterior walls, thoroughly caulk with sealant the annular space around the conduit to provide a watertight closure at the interior wall cavity and exterior wall surface. Provide ¼" maximum annular space around the conduit. Provide and install all counterflashing of all conduit, pipe and supports which pierces roofs and other weather barrier surfaces. Verify detail with Architect before installation. All work shall be performed in a workmanlike manner to assure weatherproof installation. Any leaks developed shall be repaired at his expense, to Architect's satisfaction. All waterproofing, flashing and counterflashing shall be compatible with roofing system so as not to void any roof warranties. Confirm installation with Architect and Roofing Contractor.

### 3.02 SEALING AND FIREPROOFING

A. **SEALING OF PENETRATIONS THROUGH RATED WALLS, FLOORS, CEILING AND ROOF ASSEMBLIES SHALL BE INSTALLED PER UL "FIRE RESISTANCE DIRECTORY." UL SYSTEM NUMBERS INDICATED ARE FOR A PARTICULAR LISTED INSTALLATION AND ARE FOR GENERAL INFORMATION AND INTENT. OTHER LISTED UL SYSTEM DESIGNS MAY BE USED. IN ALL CASES, SUBMIT MATERIALS, UL SYSTEM DESIGN NUMBERS AND UL DETAILS TO BE USED THROUGHOUT THE PROJECT AND IDENTIFY WHICH DETAIL IS TO BE USED FOR EACH SPECIFIC CONDITION. POST REVIEWED DETAIL AT JOB SITE FOR REFERENCE.**

1. Only materials tested in the specific UL System No. may be used.

    a. Caulk Manufacturer:

        1) 3M Type CP-25 W/B + for all assemblies requiring 3M caulk.

        2) For WL3045 and WL3046 use Hilti FS611A sealant.

b. Steel Sleeve (stud wall) (UL System No. WL1003): Cylindrical sleeve shall be fabricated from minimum 0.019" thick (no. 28 gauge) galvanized sheet steel and having a minimum two inch (2") lap along the longitudinal seam. Length of steel sleeve to be equal to thickness of wall plus one inch (1") such that, when installed, the ends of the sleeve will project approximately 1/2" beyond the surface of the wall on both sides of the wall assembly. The diameter of the openings cut on each side of the wall assembly (concentric with conduit) to be 2 to 2-1/2" larger than the outside diameter of conduit such that, when the steel sleeve is installed, a 1 to 1-1/4" annular space will be present between the steel sleeve and the conduit around the entire circumference of the conduit. Install sleeve by coiling the sheet steel to a diameter smaller than the through opening, inserting the coil through the openings and releasing the coil to let it uncoil against the circular cutouts in the gypsum wallboard layers.

c. Optional Steel Sleeve (concrete or block wall): Except for single insulated cables, provide sleeve cast in floor/wall or mortared into CMU wall; Schedule 40 or heavier, length to extend a maximum one inch (1") from top surface of floor or a maximum of one inch (1") from both sides of wall.

d. Forming Material: Minimum one inch (1") thickness mineral-wool batt insulation material. Tightly pack into sleeve with minimum 1/2" recess on ends. Manufacturer: Thermafiber Safing Insulation.

2. Firestop system shall be installed at top surface of floor and symmetrically on both sides of wall assemblies and one (1) side of floor.

3. Alternate floor penetration system (with firestop mortar): UL System No. CAJ1032.

4. Wires and Cables:

a. For gypsum frame wall, single cable: Fireproof per UL System No. WL3001. Opening for cables to be hole-sawed through gypsum wall board layers. Diameter of opening to be 3/8" to 5/8" larger than outside diameter of cable. Cable to be rigidly supported on both sides of wall assembly. Caulk to fill annular space throughout thickness of gypsum wall board layers and apply 1/4" bead of caulk to perimeter of cable at its egress from wall (both sides).

b. For gypsum frame wall, multiple cables: Use UL system No. WL3021, WL3045, WL3046 or equivalent to maintain rating of wall.

c. For concrete walls/floors or CMU walls, single or multiple cables: Fireproof per UL System No. CAJ3030. Install sleeve in assembly flush with both sides. Cables to be a minimum of ten percent (10%) and a maximum of thirty-three percent (33%) of cross-sectional area of opening. Recess minimum one inch (1") thickness of mineral wool material into opening around cables. Caulk openings around cable to minimum depth of one inch (1"). Optional sleeve may be used per UL detail requirements.

5. Reference Architectural for the exact location of all rated walls, floors, ceilings and ceiling/roof assemblies.

6. Materials used in firestop systems shall be installed in accordance with the manufacturer's written instructions (shall be posted at job site, in General Contractors trailer), provided with materials for specific UL System No.

7. Manufacturers: 3M, Metacaulk, Hilti, BioFireshield or equal.

B. In non-rated walls identified for sound insulation, provide 1/2" space between conduit and sleeve packed with multiple layers of forming material. Allow 5/8" minimum space on each side and caulk with acoustical sealant.

C. **Final condition to prevent passage of fire, smoke, noxious gas and water.**

D. For non-rated electrical/mechanical rooms: Seal all conduit passing through room walls, floors and ceilings with 3M caulk, Type CP-25 WB+.

3.03 WORKMANSHIP AND COMPLETION OF INSTALLATION

A. For the actual fabrication, installation and testing, use only thoroughly trained and experienced workmen completely familiar with the items required and with the manufacturer's recommended methods of installation. In acceptance or rejection of the installed work, no allowance will be made for lack of skill on the part of workmen.

B. Install all specialties as detailed on plans. Where details or specific installation specifications are not included herein, follow approved manufacturer's recommendations.

C. Install complete, thoroughly check, correctly adjust, clean, and leave ready for operation all equipment and material connected with this project.

D. Ballasts, contactors, starters, transformers and like equipment which are found to be noticeably noisier than other similar equipment on the project will be deemed defective and shall be replaced.

E. Electrical service stub locations, sizes and quantities for equipment are approximate only. The Contractor must verify all service locations, sizes and quantities with the equipment supplier before rough-in.

F. The Electrical Contractor shall make all final connections to all electrical equipment furnished and set in place by others, including millwork with outlets. The Electrical Contractor shall provide and install all disconnect switches as required.

G. The Electrical Contractor shall provide/install all circuit breakers, power wiring, conduit systems and final connections required for operation of heating cable systems.

H. Provide and install all adjustable mounting brackets, steel bar hangers, T-bar mounting clips, support channels and universal support bridges as required for installation of recessed light fixtures, speakers, alarm devices and other ceiling mounted devices. Ceiling tile shall not be used to support ceiling mounted devices in lay-in ceilings.

I. Provide wood trim for any semi-recessed panels installed. Verify finishes with the Owner/Architect.

J. Provide Hoffman enclosure (#A-244208WFLP) wall mounted at location shown on plans. Provided in enclosure shall be spare fuses, three (3) of each amperage used in project up to 100 amp size and spare smoke detectors (see Section 28 31 00.)

K. Equipment and materials shall be listed by an organization that evaluates products and states that the equipment or material, either meets appropriate designated standards or has been tested and found suitable for a specified purpose or shall be labeled by the manufacturer to indicate compliance with appropriate standards or performance in the specified manner to be used.

1. Listed or labeled equipment and materials shall be applied, installed, connected, erected, used, cleaned, adjusted, and conditioned in accordance with any instructions included in the listing or labeling.

L. The installation shall be performed by licensed, competent workmen to provide a thorough and complete installation.

M. All work shall be accomplished in conjunction with other trades in a manner which will allow each trade adequate time at the proper stage of construction to fulfill his work.

N. Exact locations shall be determined by reference to the general plans and measurements at the building and shall be subject to reasonable change by the Owner's representative without additional cost.

O. Prior to and during construction, provide adequate storage facilities and properly protect items subject to any damage. Failure to comply with this provision will be sufficient cause for the rejection of the particular apparatus involved.

P. At completion, the installation shall be thoroughly cleaned. All tools, equipment, obstructions, temporary power, temporary lighting and debris shall be removed from the premises.

3.04 BALANCING SYSTEM

A. Balance the electrical system between the respective phases of the system. Balance individual circuits in each panel of the system. Where phase assignments or circuit numbers are indicated on the drawing, do not deviate without the Engineer's approval. All deviations shall be noted on panelboard submittals and on Record Drawings and schedules

3.05 COOPERATION WITH OTHER CONTRACTORS

A. Cooperate with other Contractors so that the installation of the electrical materials and equipment may be properly coordinated. Where a conflict occurs with piping, duct work, etc., it shall be resolved as directed by the Engineer.

B. Interferences between conduit and other trades shall be handled by giving precedence to pipe lines requiring grade for proper operation. Where space requirements conflict, the following order of precedence shall generally be observed:

1. Building Lines
2. Structural Members
3. Drainage Waste and Vent Piping
4. Refrigerant Piping
5. Ductwork
6. Water and Gas Piping
7. Electrical Conduit
8. Fire Protection Piping

3.06 COORDINATION OF WORK

A. Each Contractor shall compare his drawings and specifications with those of other Trades and report any discrepancies between them to the Architect and obtain from the Architect written instructions to make the necessary changes in any of the affected work. All work shall be installed in cooperation with other Trades installing inter-related work. Before installation, all Trades shall make proper provisions to avoid interferences in a manner approved by the Architect.

B. Locations of conduit and equipment shall be adjusted to accommodate the work with interferences anticipated and encountered. Exact routing and location of systems shall be determined prior to fabrication or installation.

C. Offsets and changes of direction in all conduit systems shall be made as required to maintain proper headroom and pitch of sloping lines whether or not indicated on the drawings.

D. Where discrepancies in scope of work as to what Trade provides items such as starters, disconnects, flow switches and the like exist, such conflicts shall be reported to the Architect prior to signing of the Contract. If such action is not taken, the various Trades shall furnish such items as part of their work for complete and operable systems.

E. Verify voltage, phases, termination points, termination requirements and required disconnects for all equipment provided as part of this contract or equipment furnished by Owner prior to rough-in. Report any discrepancies to Architect/Engineer.

F. The Contractors are to avoid routing conduit through fire rated assemblies where practical. Each trade is responsible for proper coordination of required sleeves or block-outs with rated assembly installers. Each trade is responsible for providing sleeves, as required, for his work. Each trade shall verify acceptable tolerances around penetrating item in fire assembly before beginning fire sealing.

**G. The Electrical Subcontractor shall verify with HVAC, Plumbing and Fire Protection Subcontractors the required electrical characteristics for all motors and equipment before ordering and submitting of electrical gear. Verify actual connection points prior to installation and roughing-in. Mechanical and Electrical Contractor are responsible for coordination of electrical requirements and final fuse sizes of all A/C equipment. When Mechanical Contractor substitutes equipment that requires additions or upgrades to electrical system, he shall bear all costs arising from such substitutions. Reference "Mechanical/Electrical Coordination Sheet" in specifications.**

3.07 SAFETY PRECAUTIONS AND PROGRAMS

A. It shall be the duty and responsibility of the Contractor and all of its subcontractors to be familiar and comply with all requirements of Public Law 91-696, 29 U.S.C. Secs. 651 et. seq., the Occupational Safety and Health Act of 1970, (OSHA) and all amendments thereto, and to enforce and comply with all of the provisions of this Act. IN ADDITION, ON PROJECTS IN WHICH TRENCH EXCAVATION WILL EXCEED A DEPTH OF FIVE FEET, THE CONTRACTOR AND ALL OF ITS SUBCONTRACTORS SHALL COMPLY WITH ALL REQUIREMENTS OF 29 C.F.R. SECS. 1926.652 AND 1926.653, OSHA SAFETY AND HEALTH STANDARDS.

3.08 OPERATING AND MAINTENANCE MANUALS

A. Provide one (1) Operation and Maintenance manuals for training of Owner's personnel in operation and maintenance of systems and related equipment in the manner described elsewhere in these specifications. In addition, organize manuals and include data and

narrative as noted below (bind each manual in a hard-backed loose-leaf binder. Use 8-1/2" x 11" white paper). Provide PDF copy of O&M for owner records

B. Operating Sequence and Procedures:

1. Contents: In each chapter, describe the procedures necessary for personnel to operate the system and equipment covered in that chapter.

2. Typewritten Operating Procedures: Write procedures for start-up, operation and shutdown.

a. Start-up: Give complete step-by-step instructions for energizing equipment, making initial setting and adjustments whenever applicable.

3. Shutdown Procedures: Include instructions for stopping and securing the equipment after operation. If a particular sequence is required, give step-by-step instructions in that order.

C. Maintenance Instructions:

1. Provide a schedule of preventive maintenance for each product. Recommend frequency of performance for each preventive maintenance task: i.e., cleaning, inspection, etc.

D. Manufacturer's Brochures: Include manufacturers' descriptive literature covering all appurtenances used in each system, together with illustrations, exploded views and renewal parts lists. Provide the nearest manufacturer's representatives name, address and phone number.

E. Shop Drawings: Provide two copies of all corrected, approved submittals and shop drawings covering equipment for the project either with the manufacturer's brochures or properly identified in a separate subsection.

F. Spare Parts Lists: Include a list of all equipment furnished for the project, with a tabulation of descriptive data of all the spare parts proposed for each type of equipment or systems. Properly identify each part by part number and manufacturer.

3.09 IDENTIFICATION

A. Equip the following items with nameplates:

1. Motor Starters

2. Main Switchboard and Overcurrent Devices and Spares

3. Panelboards and Branch Circuits

4. Safety Disconnect Switches

5. Contactors

6. Control/Power Equipment in Separate Enclosures Including Relays

7. Bypass Switches and Transfer Switches

8. Emergency Generator Sets

9. UPS System and Battery Racks

10. Motor Control Centers

11. Transformers

B. No dymo (stick on indented plastic) type label will be permitted.

C. Identify equipment listed above. COORDINATE EQUIPMENT NUMBERS WITH MECHANICAL AND/OR KITCHEN PLANS. Each piece of equipment shall be numbered consistently throughout.

D. Fabricate nameplates as follows:

1. Provide three (3) ply, 1/16” laminated plastic nameplate material with white core for lettering and black background. All nameplates, for equipment powered from emergency circuits, shall have white core for lettering and red background.

2. Use capital letters.

3. Unless otherwise indicated, provide minimum 3/4” high x 2” long nameplates with 1/4” letters.

4. All labels shall be permanently affixed to the front of all required equipment using two (2) round head self tapping screws. Self-adhesive labels are not acceptable. Align labels with equipment.

E. All junction boxes shall have the panel/circuit number(s) identified on the blank coverplate, handwritten with a permanent black marker. Disconnects, combination motor starter/disconnects and manual motor starter shall have the panel/circuit number(s) identified on the inside of the front cover, hand written with a permanent black marker.

F. Provide engraved coverplates for all switches and control devices which are not otherwise clearly related to the equipment they serve.

**G. Label all receptacles and light switches with circuit number using electronic labeler (black on clear). Install label level on front of face plate for receptacles and back side of face plate for light switches.**

H. Spray paint J-Boxes red for Fire Alarm System. All other special systems J-Boxes to be painted white.

I. Color code all 600 volt insulated conductors by installing conductors with factory colored insulation for conductors No. 10 AWG and smaller.

J. Install colored tape on all 600 volt conductors No. 8 AWG and larger. Apply tape 6 inches from terminal points. Do not cover factory applied cable identification markings with taping; tape locations may be adjusted slightly to prevent the covering of factory markings. Tape shall be Scotch No. 35 or approved equal, 7-mil thick by 3/4” wide vinyl adhesive tape.

K. Install engraved plastic laminate nameplates as listed below.

| EQUIPMENT | LETTERING SIZE | INFORMATION |
|---|---|---|
| Switchboards, Panelboards, MCCs and other distribution system overcurrent devices | 1/4" / 1/8" | Switchboard name designation, ampere rating of the supply conductors, voltage characteristics, power source and room number(s).<br>EX: MDP, 1900A, 480Y/277V, Served from Utility<br>EX: HVA, 175A, 480Y/277V, source DP-1,3,5. in Room 100. |
| Transformers | 1/4" / 1/8" | Transformer name designation, load served, power source and room number(s).<br>EX: Trans. TR-1, serves PANEL LV-1, source DP-7,9.11 in Room 203. |
| Remotely mounted Safety Switches and Starters | 1/8" | Load served, power source and room number(s).<br>EX: HWP-1, HVA 37,39,4 1 in Room 203.<br>EX: PANEL LV-2 in Room 303, source TR-2. |
| Contactors | 1/8" | Load served, power source and room nember(s).<br>EX: Room 502, Science Lab, LVA 31,33 35, 37,39,4 1.<br>EX: Building security lights, HVA 2, 4.<br>EX: Parking lot lights, HVA 6, 8, 10. |

L. Prepare a neatly typed panelboard circuit directory. Identify all circuits by the equipment served and by the room number, room numbers may be different from those shown on drawings. Verify room numbers prior to typing directories. Indicate spares and spaces with light, erasable pencil marking.

3.10 TESTING

A. Test and record results for all power feeders for Megger Readings, including phase to phase and phase to ground as recommended by the cable manufacturer.

B. Measure and record service ground resistance.

C. For equipment having ground-fault protection the ground-fault protection system shall be performance tested when first installed on site. The test shall be conducted in accordance with instructions which shall be provided with the equipment. A written record of this test shall be made and shall be submitted to the Engineer and a copy put in the Operation and Maintenance Manuals.

3.11 CERTIFICATE OF COMPLETION

A. Submit, at time of request for final inspection, a completed letter in the following format:

I, (Name) , of (Firm) , certify that the electrical work is complete in accordance with Contract Plans and Specifications, and authorized change orders (copies attached) and will be ready for final inspection as of (Date). I further certify that the following specification requirements have been fulfilled:

1. Megger readings performed, six (6) copies of logs attached.

2. Ground tests performed, six (6) copies of method used and results attached, including service ground readings and ground fault test results.

3. Operating manuals completed and instructions of operating personnel performed for all systems, (Date) , (Signature, Owner's Representative).

4. Record drawings up-to-date and ready to deliver to Engineer.

5. Fire alarm system final connections, check-out and start-up completed on (Date) by (Signature, Factory Authorized Representative and Trained Technician) .

6. All other tests required by Specifications have been performed.

7. Final clean-up is completed.

8. All systems are fully operational.

Signed:_____

3.12 SITE OBSERVATION

A. Periodically, the Engineer will visit the site and review the construction progress. Field Reports will be issued noting any discrepancies or items that do not meet the intent of the contract documents found during said site visit. The contractor must answer each item listed on each field report, item by item.

**B. It shall be the duty of the Contractor to personally make a careful inspection trip of the entire project, assuring himself that the work on the project is ready for final acceptance before calling upon the Owner, Architect or Engineer to make final acceptance of the work. Subsequent trips required because of Contractor's failure to do so, will be made at Contractor's expense, billed at current Engineer's hourly rates.**

C. The final acceptance of the work will be made jointly by the Architect and the Owner.

D. Time spent for Investigation/Site Trips due to Contractor lack of installation capabilities/skills or knowledge is not part of Engineer's scope. Therefore, time spent assisting contractor in these matters or problems that arise due to these matters will be billed to Contractor. Engineer will bill the contractor at the current hourly rates of the Engineer. These fees will be paid in full prior to release of contingency.

3.13 DURING FINAL INSPECTION

A. Demonstrate installation to operate satisfactorily in accordance with requirements of Contract Documents.

B. Should any portion of installation fail to meet requirements of Contract Documents, repair or replace items failing to meet requirements until items can be demonstrated to comply.

**3.14 CLOSE-OUT DOCUMENTS:**

A. Furnish three signed letters of guarantee.

1. Clearly and individually, document all material, equipment and service guarantees beyond a single year.

B. Furnish one original and two copies, of a statement from the inspecting authority stating that the installation has been accepted and approved.

C. Furnish one reproducible, two copies and an electronic "AutoCad" version, of complete, full-size sets of drawings showing conduit locations by accurate dimensions from permanent structures.

**1.** **"Record** Drawings" are to include:

a. A sheet legend shall be present on the 1st sheet of the required set which identifies each sheet making-up the set.

b. Site plan(s) with primary and secondary electric power and communication lines to the property line (may be a civil sheet).

c. Site plan(s) with all underground conduits to other buildings, structures, fixtures and equipment.

d. Marked-up electrical plans and schedules.

D. Furnish three complete sets of overload settings and motor data records.

E. Furnish three complete sets of the electrical testing results.

F. Furnish three complete sets of the power system study final report.

G. Furnish all manufacturer's software if required for start-up or modifying products furnished.

H. Furnish two complete sets of the AC Drive's comprehensive manual that includes operation, programming, diagnostics, applications, wiring diagrams, layout diagrams, and outline dimensions.

1. Identify each AC Drive's model number on a cover sheet.

I. All major Owner training sessions to be videotaped in non-pixelated video in Windows file format.

MEP/ENERGY CONSULTANTS

HENDRIX CONSULTING ENGINEERS

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COMMISSIONING • FIELD INVESTIGATIONS

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## PRE-CONSTRUCTION INSTRUCTION SHEET

**Submittal/RFI Requirements**

**A. 'Individual submittals' means separate submittals with unique submittal numbers. One single giant PDF will be rejected.**

**B. 2 Submittal CATEGORIES (Reference Specifications)**

**a. Not required unless deviating from specification**

**b. PDF allowed.**

**PDF SUBMITTAL/RFI FILE TITLE REQUIREMENT:**
For submittal sections listed below as allowed pdf's the following requirements must be met or the submittal will not get through email security and will be auto-deleted and not checked. Each pdf submittal must be a separate pdf file.

**PDF FILE:** MUST BE NAMED AS FOLLOWS:
JOB NAME – SUBMITTAL No. XX – SUBMITTAL DESCRIPTION
JOB NAME – RFI No. XX – RFI DESCRIPTION

Example: Texas ISD ES No. 2 – Submittal 8 – Plumbing Fixtures
Example: Texas ISD ES No. 2 – RFI 3 – Library Light Fixture Mounting Height

**EMAIL TITLE/SUBJECT REQUIREMENTS:**
Emails without Job Name and proper format will not get through email security and will be auto-deleted and not checked.

JOB NAME – SUBMITTAL No. XX – SUBMITTAL DESCRIPTION
JOB NAME – RFI No. XX – RFI DESCRIPTION

**C. If submittals are submitted early relative to construction phasing, submittals may be held, reviewed and returned at the appropriate time for construction phasing, not necessarily 2 weeks. In some cases, if submittals are received vastly out of order of construction, submittal may be rejected.**

D. Time Critical Submittal Coordination Items

**Mechanical to provide to General Contractor for Structural Roof Coordination**

a. Mechanical to provide roof opening shop drawing as early as possible for structural coordination. Per specifications.

**Mechanical to provide to General and Electrical Contractors for Gear Coordination**

b. Mechanical to complete "MECHANICAL/ELECTRICAL COORDINATION SHEET" prior to electrical gear submittals for coordination with electrical contractor. Per specifications.

**E.** **Do not submit non pre-approved substitutions during submittal time. These submittals will be automatically REJECTED. Substitution Pre-approval was at bid time.**

**F.** **Review time for multiple resubmittals of non-approved equipment will result in Contractor being billed for review time that is not part of Engineer's Scope. Engineer will bill Contractor at Engineer's Current hourly rates.**

**G.** **Email of all Submittals/RFI's must go directly to Architect. Do not Copy Engineer.**

**H.** **Engineer is not the Contractors plan reference resource. Do not submit an RFI until drawings and specifications have been reviewed first. If the answer is clearly on the drawings the response will be "The answer is clearly on the drawings, Engineer is not the Contractors plan reference resource."**

**I.** **Call before submitting a written RFI.**

**J.** **All formal Job emails must come from Architect.**

**K.** **Do not email send recurring jobsite meeting requests to Engineer. Engineer does not attend all weekly meetings. Architect will coordinate when Engineer is to be required at job site for specific meetings.**

**Shop Drawings and Cad Files**

A. Contractor Shop Drawings must use Architectural Backgrounds and Architectural RCP's (when available or lighting floorplan) and **Mechanical Contractor Shop Drawings** for coordination purposes. Do not request MEP floorplans, this will be cut and paste into an email for you to read. Engineer cannot send architectural backgrounds.

B. If no Architectural RCP is available for light locations. Lighting Floorplans will be released.

C. Mechanical Floorplan will be released to Mechanical Contractor for aid in production of his own shop drawings. HCE mechanical drawings may not be submitted as shop drawings.

D. Fire Alarm, Sprinkler, Intercom etc. all to use Architectural Backgrounds, must be obtained from Architect.

E. Schedule and Details sheets will not be released.

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# SUBSTITUTION REQUEST

FROM: _____ DATE: _____

PROJECT: _____

RE: _____

*The following has been submitted for consideration on the aforementioned project:*

Specification Title, Section, Page and Article/Paragraph:

Drawings and Details Affected:

Proposed Substitution/Description:

Installer's Name:

Manufacturer's name:

☐ Point by Point Comparative Data attached - REQUIRED BY A/E (_____# of pages including cover)

## *Why is Substitution Being Submitted?*

☐Pre-Bid Substitution (Prior Appoval): Include detailed analysis comparing proposed substitution against specified product, including redlined Specifications showing differences or deviations.

☐Specified product is not available. Explain in detail as attachment.

☐Cost Savings to Owner. Indicate comparative cost analysis as attachment.

☐Other. Explain.

## *Effects of Proposed Substitution?*

(Attach complete explanations and technical data, including laboratory test, if applicable.) Include complete information changes to Drawings and/or Specification that proposed substitution would require for its proper installation. Fill in blanks below:

A. Does substitution affect dimensions shown on drawings? ☐No ☐Yes

B. Will undersigned pay for changes to building design, including engineering and detailing costs caused by requested substitution? ☐No ☐Yes

C. What affect does substitution have on other trades?

D. Differences between proposed substitution and specified item?

E. Indicate how proposed substitution meets LEED requirements. (if applicable)

F. Manufacturer's guarantees of proposed and specified items are:
☐Same ☐Different (explain on attachment)

The Contractor and Subcontractor certifies:
- Proposed substitution has been fully investigated and determined to be equal or superior in all respectes to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Similar maintenance service and source of replacement parts, as applicable is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.

**Submitted By:** (name, address, telephone and contact person of manufacturer and installer of proposed substitution)

_____

_____

_____

_____

_____

**For A/E Use: SR#** _____

☐Accepted ☐Accepted as Noted

☐Not Accepted ☐Received Too Late

☐Incomplete Information

☐No Substitutions Accepted

Reviewed by/date: _____

Comments: _____

**Subcontractor's signature and date:** _____

**Contractor's signature and date:** _____

**COPY TO:**
☐FILE ☐OWNER ☐CONTRACTOR
☐ENGINEER ☐_____

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MEP/ENERGY CONSULTANTS

HCE HENDRIX CONSULTING ENGINEERS

COMMISSIONING • FIELD INVESTIGATIONS

# MECH / ELEC EQUIPMENT COORDINATION SHEET

## (THIS IS REQUIRED – NOT OPTIONAL)

| MARK # | UNIT TYPE | MANUFACTURER'S RECOMMENDED MOCP | VOLTAGE | PHASE | MARK # | UNIT TYPE | MANUFACTURER'S RECOMMENDED MOCP | VOLTAGE | PHASE |
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**END OF SECTION**

## SECTION 26 05 10 - SCHEDULE OF VALUES

### PART 1 - GENERAL

1.01 DESCRIPTION

A. The Contractor shall breakdown the final Schedule of Values to be used for pay application into the following minimum categories.

**B. ALL CATEGORIES SHALL HAVE APPROPRIATE MATERIAL AND LABOR BREAKDOWN.**

C. Definitions:

1. Service: Conduit for utility company and conduit and wire from utility transformer to main switchboard.

2. Feeders: Include all conduit and wire serving transformers and panelboards.

3. Branch Circuit: Any circuit from a panelboard to a utilization device.

4. Gear: Main switchboard, panelboards, transformers, disconnects, etc.

5. Site conduit voice/data.

1.02 SCHEDULE OF VALUES

A. Mobilization

B. Utility Company Fees

C. Service - Wiring and Conduit

D. Site Light Fixtures, Wiring and Conduit

E. Gear

F. Site Lighting Fixtures

G. Interior Lighting Fixtures

H. Branch Circuit - Wiring and Conduit

I. Feeders - Wiring and Conduit

J. Devices (switches and receptacles)

K. Fire Alarm System

L. Testing/Labeling of Equipment

M. Record Drawings and O&M Manuals ($1500 minimum)

**END OF SECTION**

## SECTION 26 05 19 - WIRE AND CABLE

### PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Provide a complete system of conductors in raceway systems as shown on the drawings and hereinafter specified. Route all wire through an approved raceway unless otherwise indicated, regardless of voltage application.

B. Provide 200% neutral conductors to all panels with 200% neutral specified. Reference Panel Schedules.

**C. Provide individual neutrals for each circuit, no shared neutrals allowed.**

D. **No de-rating of neutrals allowed.**

1.02 STANDARDS

Provide conductors in accordance with the applicable sections of UL and IPCEA Standards.

1.03 SUBMITTALS

A. Furnish Engineer shop submittals for each type of wire and cable.

B. Provide shop submittals which includes the following information:

1. Insulation type.

2. Insulation temperature rating.

3. Manufacturer

### PART 2 - PRODUCTS

2.01 MATERIALS

A. Wire and Cables: (600 Volts)

1. Provide copper wire and copper ground conductors **only**. Conductors shown on plans are thusly sized. **No aluminum conductors** will be allowed unless specifically noted.

a. Minimum wire size for branch circuits shall be #12, however, #14 may be used for motor control circuits where specified on the drawings.

b. All conductors #12 and smaller shall be solid and #10 and larger shall be stranded.

2. Provide copper conductors of annealed, 98 percent conductivity soft drawn copper. Provide stranded conductors for control circuits.

**B. Metal clad cable shall not be acceptable except from junction box to light fixture, maximum 6 feet in length.**

**C. Metal-clad cable shall not be acceptable for receptacles.**

D. Insulation: (600 Volts)

1. Provide all conductor insulation types rated for wet and dry locations and approved by the National Electrical Code for the particular application. Provide all wire and cable with the following (or better) insulation classes:

   a. All feeders and branch circuits are to be dual-rated Type THHN/THWN **copper** conductors.

   b. Insulation rated for operation at 600 volts.

   c. In areas where the temperature will exceed 167$^{O}$F, provide wire rated 105$^{O}$C. minimum and a type approved by the local code. Include any wiring within three feet (3') horizontally or ten feet (10') above any heating appliance.

2. Color code in accordance with the wiring diagrams furnished with equipment. All wiring for control systems to be installed in conjunction with mechanical and/or miscellaneous equipment. Color code by line or phase all branch circuit wiring including circuits to motors and feeders as follows: Wire No. 10 and smaller shall be factory color coded. Wire No. 8 and larger may be color coded by color taping within six inches (6") of exposed ends. **Color coding for each nominal voltage shall be consistent throughout building from point of origination to the termination point including tap conductors to luminaire. Mixing of colors between voltages will not be allowed.**

<u>120/240 Volts</u>

Phase A - Red
Phase B – Black
Phase C - Orange
Neutral - White
Ground - Green
(Orange is High Leg)

E. Wire and Cable: (50 volts or less)

1. Provide copper wire, minimum size #18 AWG for controls, #18 AWG minimum for fire alarm and #20 AWG minimum for communications. All wire and cable shall be solid. Stranded conductors are not acceptable.

2. All conductors shall be routed in conduit or shall have an insulation approved for plenum installation, unless otherwise noted.

F. ROMEX not allowed.

## PART 3 - EXECUTION

3.01 INSTALLATION

A. Unless otherwise indicated wiring size noted on the drawings extend for the entire length of a circuit. Install wire in raceways in strict conformance with the manufacturer's recommendations. Use a UL approved wire-pulling lubricant. Strip insulation so as to avoid nicking of wire.

B. Wire Connections and Devices:

1. Provide all terminating fittings, connectors, etc., of a type suitable for the specific cable. Make all fittings up tight. Make up all terminations in strict conformance with manufacturer's recommendations using special washers, nuts, etc., as required.

2. Connect No. 8 and larger wire to panels and apparatus with properly sized, solderless, or compression lugs or connectors.

3. Join No. 10 and smaller wire by twisting tight and applying UL listed twist-on connectors.

4. Leave at least an eight inch (8") loop of wire for ends at each outlet box for the installation of fixtures or devices.

C. Flashover or insulation value of joints shall equal that of the conductor. Provide connectors rated at 600 volts for general use and 1000 volts for use within fixtures.

D. Grouping shall be 3 Hots and 3 Nuetrals or 6 Hots max. Derating shall be based on the 90 degree chart of NEC 310-16 and table 310.15 (B)(2)(2).

E. Where the distance between the supplying panel and the first branch circuit receptacle, light fixture or equipment is more than 100 feet, upsize wire to allow for maximum of 3% voltage drop for actual routing of conduit to device.

F. Wiring for emergency systems shall be kept entirely independent of all other wiring and equipment as required by Article 700 of the NEC.

G. Mechanically protect conductors by installing in raceways. Do not install the conductors until raceway system is complete and properly cleaned. Use an approved wire-pulling compound when pulling conductors. Wiring pulling compound shall be listed and as recommended by the conductor manufacturer. Do not bend any conductor either permanently or temporarily during installation to radii less than four times the outer diameter of the insulated conductors. Do not exceed manufacturer's recommended values for maximum pulling tension.

H. Pull conductors simultaneously where more than one conductor is being installed in the same raceway.

I. Use pulling means including fish tape, cable, rope and basket weave wire/cable grips which will not damage cables or raceway.

J. Tighten electrical connectors and terminals, including screws and bolts, in accordance with 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 Standard 486A.

K. Neatly and securely bundle all conductors in enclosures using nylon straps with a locking hub.

L. At least 6 inches (measured from the finished surface) of each conductor shall extend outside a box's opening.

3.02 SPLICES AND TERMINATIONS

A. Splices shall be kept to a minimum.

B. Splices shall be made in junction and/or pull boxes.

1. Splices in conduit fittings (i.e., conduit bodies), and in panelboards are not acceptable.

C. All materials shall prevent corrosion or electrolysis between dissimilar metals.

D. Use terminal blocks within a junction box for all splices of No. 6 and larger conductors.

E. Use mechanical, crimp or compression type connectors for terminations of stranded conductors.

3.03 CONDUCTOR SIZING

A. Install conductor size required by the more stringent requirements of the drawings or specifications.

B. Install No. 10 AWG conductors the entire length of the circuit for single-phase, 120-volt, 20-ampere branch circuits for which the distance from panelboard to the first outlet is more than 100 feet.

C. Install No. 10 AWG conductors the entire length of the circuit for single-phase 277 volt, 20-ampere branch circuits for which the distance from panelboard to the first outlet is more than 200 feet.

D. General use circuit numbers may be changed. Equipment circuits have numbering to balance loads. This contractor is responsible for maintaining a balanced load and recording the actual circuit numbers.

E. Comply with ampacity adjustment factors as required by the NEC Article 310-16.

3.04 TESTING

A. Prior to energizing feeders, perform insulation resistance tests at 500 Volts D.C. for 30 seconds on each cable with respect to ground and adjacent cables. Maintain the following log for feeder tests:

FEEDER DESCRIPTION:_____

TESTER'S NAME:_____

TEST INSTRUMENT SERIAL #:_____

TEST DATE:_____

RESISTANCE:

| A-B | A-C | A-G | B-C | B-G | C-G |
|---|---|---|---|---|---|

B. Test all circuits for proper neutral connections.

C. Upon completion of all testing, prepare a detailed report of all voltage and insulation resistance measurements. Deliver report to Engineer with request for final inspection.

**END OF SECTION**

## SECTION 26 05 26 – GROUNDING AND BONDING

### PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Provide a complete grounding system in strict accordance with Article 250 of the National Electrical Code and as hereinafter specified and shown on the Drawings.

### PART 2 - PRODUCTS

2.01 MATERIALS

A. Provide copper clad 5/8" x 8 ft. - 0" long ground rods, appurtenances, bonding plates, clamps, connectors and grounding conductors as required. Furnish rods to which the copper cladding is permanently and inseparably bonded to a high strength steel core.

2.02 CONNECTORS

A. Provide exothermic weld type ground connections for concealed, underground, and concrete encased ground connections.

B. Exposed connections may be made with copper or bronze bolted or compression lugs.

2.03 INTER-SYSTEM GROUNDING BUS-BAR (communications)

A. Provide surface mounted terminal blocks sufficient to except 20 individual conductors of sizes 14 AWG thru 4 AWG.

2.04 CONDUCTORS

A. Furnish copper conductors.

B. Furnish 600-volt, insulated conductors for equipment grounding.

C. Size the system grounding electrode conductors to comply with NEC section and table 250-66, unless shown larger.

D. Size the main and separately derived system bonding jumpers to comply with NEC section 250-28 (D).

E. Size equipment grounding conductors to comply with NEC section and table 250-122, unless shown larger.

### PART 3 - EXECUTION

3.01 INSTALLATION

A. Properly ground all service equipment conduit systems, supports, cabinets, equipment, motor frames, fixtures, etc., and the grounded circuit conductor in accordance with the latest issue of the National Electrical Code. Provide all bonding jumpers and wire, grounding bushings, clamps, etc., as required for complete grounding. Route ground conductors to provide the shortest and most direct path to the ground electrode system. Bond conduit if made of

current conducting material. All ground connections shall have clean contact surfaces. Bond the service equipment to a grounding electrode as shown on the Drawings.

B. Provide a grounding type bushing for all feeder and branch circuit conduits which do not have a grounding conductor and individually bond this raceway to the enclosure's ground bus or lug.

C. Provide a grounding type bushing on the end of each isolated section of metal conduit and bond the conduit to the equipment grounding conductor, or using a conductor of the same size, bond directly to the equipment ground buss of the equipment at the end of the run.

D. Make single or dual connections to ground rods, plates, and other buried connections by the exothermic process (Cadweld) or Burndy Hyground TM Compression Systems and "hammer tested" to insure that a good bond has been made. Alternatively, all below grade compression grounding systems must meet all UL467, CSA, IEEE837 test requirements and conform to the National Electrical Code Standards. The material at the connectors shall be pure wrought copper extrusions, rod and seamless tubing and be identical material to the conductor. Connectors must be of heavy duty design and be of range taking design to accept conductor ranges of #6 solid to 500 Kcmil plus 5/8" ground rods. Compression connectors need to be compressed with system engineered tooling which makes a circumferential or round crimp. Hex crimp is not acceptable due to sharp flashes and spurs that may occur. Each connector must be clearly marked with catalog number, conductor size and installation die information. Inspection ports must be provided on lug terminations and splices. The system must emboss all the appropriate die index numbers on all connectors after completion of the crimp. Connectors must be prefilled with penetrox copper type oxidation inhibitor and be individually sealed in clear polyethylene sheet to keep out dirt and contamination.

E. Drive grounding electrodes as required. Where rock is encountered, grounding plates of copper, 1/4-in. x 24-in. x 24-in may be used in lieu of grounding rods. Plates must be installed at 36" minimum below finished grade.

F. Connect grounding electrode conductor to building steel and metallic waterline per NEC 250-81. Allow a minimum of 25 feet of grounding conductor in foundation footing and make 3 connections to Rebar. Connections shall utilize an acceptable compression method with connectors listed for contact with respective metal types.

G. Provide a grounding terminal pad in all panelboards, switchboards, and other electrical equipment.

H. Directly ground to the work piece welding machines used in construction. The use of the building or equipment steel or conduits of any kind as a common ground point is not allowed under any conditions. Contractor is responsible for any electrical pieces of equipment damaged by not using the welder grounding method described above.

I. Provide a green insulated grounding conductor in all conduit serving receptacles and/or equipment. Refer to panelboard schedules for sizing.

J. Ground all receptacles to outlet box with a conductor.

K. Flexible conduit will not be allowed as a grounding means.

L. Install metallic fittings on clean contact surfaces to ensure electrical conductivity.

M. Tighten connectors, terminals, screws and bolts, in accordance with manufacturer's published torque tightening values or comply with torque tightening values specified in UL 486A to assure permanent and effective grounding.

N. Apply a corrosion-resistant finish to places where factory applied protective coatings have been damaged.

O. Protect all exposed, grounding electrode conductors with Schedule 40 PVC nonmetallic conduit.

1. Grounding electrode conductors shall not be protected with metallic materials.

3.02 GROUNDING ELECTRODE SYSTEM

A. At each building's service or disconnecting means install a grounding electrode system which includes;

1. A concrete encased electrode connected to the concrete reinforcing bars and;

2. The building structural steel and;

3. The building's metal underground (10 ft.) water pipe.

a. This connection must be within the first 5 ft. of the water pipe's entrance into the building. Water piping cannot be the sole ground and must be supplemented.

4. Other electrodes such as a rod, plate or ring may be used to supplement but cannot be used as a substitute.

B. At each grounded separately derived system install a grounding electrode conductor to connect the grounded (XO-neutral) conductor to;

1. The nearest one of the following electrodes:

a. An effectively grounded structural steel member or;

b. An effectively grounded metal underground (10 ft.) water pipe.

1) This connection must be within the first 5 ft. of the water pipe's entrance into the building.

2. If neither of these is available, install a 3/0, copper, common grounding electrode conductor from the building's service or disconnecting means. Connect taps from this common grounding electrode conductor to the separately derived system's grounded (XO-neutral) conductor.

3.03 SYSTEM BONDING

A. SERVICES

1. Install a main bonding conductor between the service ground bus and the grounded (neutral) bus-bar.

B. SEPARATELY DERIVED SYSTEMS

1. Install a bonding jumper between the equipment ground bus and the separately derived electrical system's (transformer, UPS, central battery/inverter or generator) grounded (XO-neutral) bus.

3.04 ADDITIONAL BONDING

A. Install 3/0 AWG bonding jumpers around all structural metal expansion joints.

B. Each building's interior metal water piping system which does not qualify to be used as a grounding electrode shall be bonded to the building's service or disconnecting means.

C. Bond the grounded (XO-neutral) conductor of each separately derived system to the nearest available point of the interior metal water piping system(s).

1. When the structural steel is being used as the grounding electrode for the separately derived system the interior metal water piping system(s) may be bonded to the structural steel.

D. Install bonding jumpers around raceway expansion joints.

E. Install bonding jumpers around insulated water pipe joints.

F. Install a bonding jumper between all grounding electrodes used for communications, radio and television or antenna systems and the building's grounding electrode system.

3.05 COMMUNICATION GROUNDING

A. Provide a surface mounted, inter-system grounding bus-bar at the service equipment or a separate building's disconnecting equipment and in each communications room.

B. At the service or separate building's disconnecting means, provide an insulated 6 AWG, stranded conductor to connect the inter-system grounding bus-bar to the equipment ground bus.

C. At communications rooms, provide an insulated 6 AWG, stranded conductor to connect the inter-system grounding bus-bar to the building's structural steel.

3.06 EQUIPMENT GROUND

A. Raceways shall not be used as the sole equipment ground.

B. Bond the equipment grounding conductors to all boxes and enclosures.

C. Each receptacle shall be bonded to its respective device box. The connection shall be made by means of a bonding jumper between the device and the box. Where the receptacle mounting yoke is designed and listed for the purpose of grounding; the bonding jumper may be omitted. This does not substitute for the need of grounding the outlet box.

D. Each isolated ground receptacle shall have an isolated ground conductor installed complete from receptacle to the isolated ground bus in the panelboard. No other grounding connections shall be made to these receptacles, specifically connections to the device box or raceway system.

3.07 TESTING

A. Following completion of installation, test system ground for continuity and test resistance to ground by “fall of potential” method and all feeders or sub-feeders with appropriate meggers, or other approved instruments and methods, to determine ground and insulation resistance values.

B. Submit logs of values obtained, nameplate data of instruments used and instrument calibration data prior to final inspection. Instruments used are subject to acceptance.

**END OF SECTION**

# SECTION 26 05 29 – HANGER & SUPPORTING DEVICES

## PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Provide all required supporting devices, including but not limited to channels hangers, brackets, fittings, clamps, hardware, anchor bolts, rods, electrical accessories, etc., for conduit and equipment.

1.02 STANDARDS

A. Conform with the latest requirements of the NEMA and The National Electric Code.

## PART 2 - PRODUCTS

2.01 MATERIALS

A. Support Channel: Hot-dipped galvanized steel, sized for load, minimum size 12 gauge, 1-5/8 wide by 13/16 deep. Furnish fasteners sufficiently sized to carry load imposed.

B. Hardware: Corrosion Resistant (Hot-dipped galvanized all steel components)

C. Support Wires (16 Ga. Minimum) and Tie Wires (22 Ga. Minimum) or as required by UL listed assemblies: Galvanized Steel

D. Coatings: All steel components shall be hot-dipped galvanized.

## PART 3 - EXECUTION

3.01 INSTALLATION

A. Perforated iron straps are not permitted for supporting conduits. Conduits run between the webs of bar joists may use galvanized tie wire for securing the conduits. Cut excess wire and bend ends to prevent sharp ends.

B. Support horizontal and vertical conduit runs by one-hole straps, clamp-backs or other acceptable devices and suitable bolts. All conduits shall be secured to structure with supporting devices dedicated for the electrical system and/or conduits for systems furnished under the Electrical Contractor responsibilities. When two (2) or more conduits are run parallel, they may be supported on trapeze hangers, equal to the Modern Co. Other hangers shall be constructed with rods and hanger adjusters of adequate size to carry the loads imposed.

C. All conduits shall be supported a maximum of ten feet (10') on center. Also, support conduits within twelve inches (12") of any bends, outlet boxes, wall penetrations or joints in pipe. All conduits shall be secured to structure. Lighting fixture whips may not be secured to ceiling tie wires. Vertical risers shall be supported by approved riser clamps or supports installed at the respective floor lines

D. Conduits routed below bar joists shall utilize acceptable clamps.

E. Fasten hanger rods, conduit clamps and outlet and junction boxes to building structure using precast insert system, expansion anchors, preset inserts, or beam clamps. Do not use spring steel clips and clamps. Submit method of attachment for review prior to commencing work.

F. Use toggle bolts or hollow wall fasteners in hollow masonry, plaster, or gypsum board partitions and walls; expansion anchors or preset inserts in solid masonry walls; self-drilling anchors or expansion anchor on concrete surfaces; sheetmetal screws in sheetmetal studs; and wood screws in wood construction.

G. Do not fasten support wires to piping, ductwork, mechanical equipment or conduit.

**H. Do not fasten conduit or junction boxes to ceiling grid wire. All conduit must be independently supported.**

I. Support recessed fluorescent light fixtures with support wire at all four corners as required by roof/ceiling assembly. If roof/ceiling assembly does not require supports at each corner, support fixtures with minimum of two support wires at diagonally opposite corners. Spray paint ends of fixture support wires orange.

J. Conduits, except as approved by NEC, shall not be used to support low voltage cables.

K. Support all piping on roof with pipe stands/roller equal to MIRO Industries Model 4-RAH-PC or Portable Pipe Hangers, Inc., Type PP10 with roller for conduit 2-1/2" and smaller. For conduit over 2-1/2", up to and including 4" use MIRO Industries Model 6-RAH-PC or Portable Pipe Hangers, Inc. (PPH) Type PS-1-2. All conduit stands to sit on walk board (coordinate type and methods of support with Roofing Contractor). Provide minimum pipe height above roof deck as required by jurisdiction having authority (at least 3-1/2"). Provide supports for piping under 2" at six feet on center. Provide supports for conduit 2" and over at eight feet on center.

L. Provide all angles, unistrut supports and threaded rods under any structural elements or mechanical equipment where required for proper placement and support of light fixtures and/or conduits.

M. Supports and hangers shall be installed to permit free expansion and contraction in the raceway systems. Where necessary to control expansion and contraction, the raceways shall be guided and firmly anchored. Anchors shall be approved by the Engineer and shall be designed for equal effectiveness for both longitudinal and transverse thrust. No conduit shall be self-supporting, nor shall it be supported from equipment connections. Transmission of vibrations, noise, etc., shall be considered and any special suspension with vibration dampers to minimize transmission shall be used where necessary.

N. Where ducts interfere with the proper location of hangers, furnish and install trapeze hangers. Trapeze hangers may be used to support groups of conduit run in parallel.

O. Install metal framing to support wall mounted equipment and wall or ceiling mounted raceways.

P. Install expansion bolts to attach framing to concrete. Space bolts a maximum of 24 inches on center, with not less than two bolts per piece of framing.

Q. Touch up all scratches or cuts on steel components with an approved zinc chromate or a 90 percent zinc paint.

**END OF SECTION**

## SECTION 26 05 33 - RACEWAYS

### PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Provide a complete conduit system as shown on the drawings and as hereinafter specified.

1.02 STANDARDS

A. Conform with the latest requirements of the NEMA, the National Electrical Code, and be UL listed.

### PART 2 - PRODUCTS

2.01 MATERIALS

A. Rigid Metal Conduit (RMC): Hot-dip galvanized, threadable steel raceway, galvanized after fabrication. Fittings shall be malleable iron, either cadmium plated or hot-dip galvanized.

B. Intermediate Metal Conduit (IMC): Conduit shall be similar to rigid steel conduit except thinner wall. Fittings shall be malleable iron, either cadmium plated or hot-dip galvanized.

C. Electrical Metallic Tubing (EMT): EMT shall be made of hot-dip galvanized strip steel. Fittings shall be die cast compression or set screw type.

D. PVC - Schedule 40 and Schedule 80 polyvinyl chloride conduit (PVC Duct) shall be UL rated. Conduit fittings and cement shall be produced by the same manufacturer and approved for such use.

E. Flexible Metal Conduit (FMC): Spirally wound continuously interlocked zinc coated strip steel. Fittings shall be die cast zinc, either screw-in or squeeze type.

F. Flexible Conduit (LFMC): Liquid-tight (vibration and/or wet areas) fabricate from continuous lengths of spirally wound galvanized steel strip interlocked with a gray polyvinyl chloride cover extruded over the core to make the conduit liquid tight, oil proof and bendable to a small radius. Fittings shall be compression type, die cast zinc, with insulated throat.

G. Metal-Clad Cable (MC): Galvanized interlocking steel armor. 600 volt, type THHN/THWN, integrally colored insulation. Size #12 AWG or #10 AWG, copper conductors. Fittings shall be listed for MC usage and include anti-short bushings. Reference Section 3.03 for acceptable uses.

H. Metal Wire-ways.

1. Furnish with wire retainers on not less than 12 inch centers. All screws installed towards the inside shall be protected to prevent possible wire insulation damage.

2. The finish shall be the manufacturers' standard color and shall consist of not less than two coats of enamel over a rust-inhibiting prime coat.

I. Surface Metal Raceway (2000 series).

1. Surface metal raceway shall consist of a single compartment base, blank cover, and appropriate fittings to complete the installation per the electrical drawings.

2. The base and cover shall be manufactured of steel and finished with a white color.

3. Approximately ¾" deep, 1 ¼" high and 5' sections.

J. Non-Metallic Multi-outlet Assemblies (5400 series).

1. Surface raceway system shall consist of a dual compartment raceway base, twin cover, appropriate fittings, outlets and device mounting plates necessary for a complete installation.

2. Duplex receptacles and data outlets ("activate connectivity inserts") mounted at 24" centers or as noted on plans. Connect adjacent receptacles on alternate circuits.

3. Approximately 1 ¾" deep, 5 ¼" high and 8' sections with equal compartments.

4. The finish shall be white color and shall consist of not less than one coat of enamel over a prime coat.

**PART 3 - EXECUTION**

3.01 GENERAL INSTALLATION REQUIREMENTS

A. Raceway and cable usage and installation shall conform to the appropriate article of the National Electrical Code (NEC), as a minimum.

B. Do not install conduit that is crushed or deformed in any way.

C. Provide a nonmetallic (nylon, polypropylene, or approved equal) drag line of suitable strength in spare conduits and telephone conduits. Tightly plug spare conduits at both ends.

D. Do not pull wire into conduit system until the conduit system is complete in all details; in the case of concealed work, until all rough plastering or masonry has been completed.

E. No wiring systems of any type shall be installed in ducts used to transport dust, loose stock, or flammable vapors.

F. No wiring system of any type shall be installed in any shaft containing ducts used for vapor removal or for ventilation of commercial-type cooking equipment.

G. Fasten and support the wiring method employed to the permanent structure using listed straps with corrosion resistant hangers and fasteners.

H. Ceiling system wires or lay-in type ceiling grid components shall not be used as a means of support.

1. Independent support wires and associated fittings which are installed in addition to the ceiling system support wires, shall be permitted: (300.11.A)

2. Independent wires within the cavity of a fire-rated floor–ceiling or roof–ceiling assembly shall be distinguishable by color. (300.11.A.1)

3. Independent support wires that provide support for device boxes shall be secured at both ends. (300.11.A).

I. Bends shall be made with factory elbows or field bent. Field bends shall be made using equipment designed for the particular raceway material and size. Bends shall be free from dents or flattening.

J. Conduit bodies may be used in lieu of conduit elbows where covers will be accessible and ease of installation and appearance warrants their use.

K. Install expansion-deflection fittings where raceways cross structural expansion joints or where required to compensate for thermal expansion and contraction. Install bonding jumpers across expansion-deflection fittings in metal raceway systems.

L. Openings through fire-resistant-rated or sound-resistant-rated walls, partitions, floors or ceilings shall be fire-stopped by installing raceways or cables through sleeves set through the walls, partitions, floors or ceilings and fire-sealing all openings and voids around the sleeves, raceways and cables.

M. Do not drill or pierce structural steel members under any circumstances without the Engineer's specific approval.

N. Minimize roof penetrations by routing conduit through the equipment roof opening. If roof penetration is necessary, coordinate with the Architectural Specifications and penetrate as directly below the equipment disconnect or wiring connection point as possible. Do not use flexible conduit in a pitch pan.

O. Arrange all conduits to drain away from the building.

P. Perform all necessary excavation and backfilling. Tamp backfill in six inch (6") layers to original grade, moistening as required for proper compaction. All backfilling shall be free from harmful materials. Provide shoring, bracing, and de-watering as necessary. Remove all excess and materials not suitable for backfill from the site. Provide barricades to prevent endangering the public. Provide warning beacon lighting at night to adequately mark all excavations.

Q. A tracer tape wire shall be installed in all trenches which do not contain conductive conductors within them. This will include future use raceways, optical fiber, etc.

R. Raceway systems shall be complete before installing conductors.

S. The interior of all raceways shall be cleaned before installing conductors.

T. Terminate future use raceways with a capped coupling within an accessible area.

U. Workmanlike manner: Type MC cable shall be installed in a neat and workmanlike manner. Cable shall not cross other cable or have excess slack. Cable that is installed vertically, must be plumb with the vertical framing of the structure.

V. Bundling of cable is limited to three cables for each support ring.

W. Type MC cable may be only supported by fasteners or clamps that are approved and UL tested for cable support.

3.02 INSTALLATION BELOW GRADE

A. Minimum size raceway is 3/4 inch.

B. Provide rigid galvanized steel conduit or PVC where conduits are installed in concrete floor slab ¾" maximum. Maintain proper concrete coverage as directed by structural engineer. PVC conduit shall not penetrate slab above finished grade.

C. Provide rigid galvanized steel or PVC conduit where conduits are installed below grade.

D. Swab clean all conduits before cable installation. Waterproof all conduit joints after cable installation.

E. Provide conduit wall sleeves for all conduits penetrating walls, grade beams, etc. and other locations shown on the Drawings.

F. Where required to bend PVC ducts to satisfy indicated routing, preform ducts to allow ends of duct sections to be in a straight alignment. Accomplish preforming of ducts by utilizing proper duct heater units.

G. Perform all necessary excavation and backfilling for proper installation of work. Take precautions not to excavate below depth required. Backfill trenches with sand, 3" below conduits and 3" above. Tamp remainder of backfill in six inch (6") layers to original grade, moistening as required for proper compaction. All backfilling shall be free from harmful materials. In areas to be paved, compact to density to receive pavement. Where pavement is broken for the installation of conduit, repair to original condition. Provide shoring, bracing, and de-watering if necessary for installation of work. Remove from site all materials encountered which are not suitable for backfill.

H. When and if damage is caused to underground utility lines or structures, above ground utility lines or structures, or other purposeful surface conditions, either on or off the right-of-way, make immediate temporary repairs. At the first opportunity, make permanent repairs which are acceptable to the Owner. All such repairs shall be made at the Contractor's expense.

I. Where necessary, provide barricades around open excavations to prevent endangering the public. Provide warning beacon lighting at night to adequately mark all excavations.

J. Where conduits embedded in concrete floor or roof deck cross expansion joints, they shall be joined together using O.Z. Gedney type DX expansion fittings and bonding jumpers. Straight runs of conduit over 150' long shall have O.Z. Gedney Type AX expansion fittings installed to minimize movement. Fittings shall be installed at a maximum of 150' on center.

K. Where horizontal runs of conduit transition to vertical and continue above finished grade or finished floor; the transition shall be made with a 90 degree long radius sweep. The sweep may be PVC (2" and smaller) and shall be RGS (2-1/2" and larger). No PVC conduit will be allowed above finished grade or finished floor.

**L. CONDUITS RUN BELOW FINISHED FLOOR SHALL NOT PENETRATE GRADE BEAMS. UNLESS APPROVED BY STRUCTURAL ENGINEER.**

3.03 PERMITTED RACEWAY USAGE:

A. Raceway transitions at all locations;

1. Rigid nonmetallic conduit runs from below grade level shall transition to galvanized rigid steel or intermediate steel conduit, wrapped with corrosion protection tape, prior to exiting at grade level and continue thereafter in accordance with their usage requirements.

a. Caulk concrete-to-conduit joints with a silicone rubber compound.

2. Continue the more protective conduit type into an area where a less protective conduit type is permitted for a distance of not less than 1 foot.

B. Electrical metallic tubing at;

1. Interior locations when;

a. Concealed within walls and ceilings or; **do not use in the mortar filled cells of concrete masonry units.**

b. Exposed and more than 8 feet above finished floor or;

c. Exposed and more than 3 feet above finished floor in electrical or mechanical rooms or;

d. Exposed and more than 1 foot above a finished attic or mezzanine floor.

e. Do not use where exposed to standing water or other continuously damp or wet areas.

2. Exterior locations when;

a. More than 10 feet above the finished ground surface or;

b. More than 1 foot above the finished ground surface within a lockable equipment yard or;

c. In the crawl space below a building with the 1st level elevated.

C. Rigid or intermediate metal conduit at;

1. Interior locations when;

a. Exposed, in other than electrical or mechanical rooms, and installed less than 8 feet above finished floor or;

b. Exposed in electrical or mechanical rooms and installed less than 3 feet above finished floor or;

c. Exposed and less than 1 foot above a finished attic floor or mezzanine floor.

2. Exterior locations when;

a. Less than 10 feet above the finished ground surface or;

b. Less than 1 foot above the finished ground surface within a lockable equipment yard.

1) Malleable iron straps will be required at these locations.

D. Rigid metal and intermediate metal conduit wrapped with corrosion protection tape or rigid nonmetallic conduit at;

1. Underground locations with a ¾" minimum size when;

a. Located outside of the building line or;

b. Located below a concrete slab on grade or;

c. Located below a beam of a slab on grade or.

d. Located within a concrete slab on grade where the outside diameter is equal to or less than 20 percent of the slab thickness.

1) Seal conduit ends at each building entry.

2. Below grade;

a. The minimum size shall be 3/4 inch.

b. Seal conduit ends at each building entry.

c. Coordinate covering with Structural Engineer.

E. Rigid nonmetallic conduit for;

1. An exposed grounding electrode or bonding conductor below 10 ft. to guard from physical damage.

F. Flexible metal conduit in;

1. Dry interior locations with a minimum length of 2 feet and maximum length of 6 feet to;

a. The final connection of transformers, motors and vibrating equipment.

G. Flexible metal conduit or metal-clad cable for light fixtures or ceiling mounted devices.

1. Dry or damp interior locations with a maximum length of 6 feet to;

a. The final connection of light fixtures; or

b. The final connection of ceiling mounted outlet boxes or.

H. Flexible metal conduit is not allowed for any technology rough-in, must be EMT.

I. Liquid-tight flexible metal conduit in;

1. All locations with a minimum length of 2 feet and maximum length of 6 feet for;

a. The final connection of all liquid pump motors and associated control connections or;

2. Damp or wet interior and all exterior locations with a minimum length of 2 feet and maximum length of 6 feet to;

a. The final connection of transformers, motors, and vibrating equipment.

**END OF SECTION**

## SECTION 26 05 34 - OUTLET BOXES, PULL BOXES AND JUNCTION BOXES

### PART 1 - GENERAL

1.01 SCOPE OF WORK

Provide outlet boxes in accordance with the National Electrical Code at locations shown on the Drawings and hereinafter specified.

### PART 2 - PRODUCTS

2.01 MATERIALS

**A. Provide standard hot-dipped galvanized pressed steel boxes, minimum 4"x4" by 1-1/2" deep. Use 4 11/16" by 2 1/8" deep box when using 1" conduit.**

B. Cabinets with screw covers or as specifically noted for junction or pull boxes larger than 150 cubic inches.

C. All junction, pull and splice boxes to conform to NEC Article 370.

D. All metallic boxes are to have an internal means of grounding.

E. Flush mounted wall and finished ceiling boxes.

1. Within framed, drywall, plastered or tile covered walls, with ¾" max. raceway, furnish galvanized steel, 4" square, minimum 1 1/2 inch deep boxes with a raised tile cover and a far-side support.

2. Within drywall or plaster covered or suspended ceilings, with ¾" max. raceway, furnish galvanized steel, 4" square, minimum 1 1/2 inch deep boxes with a raised tile cover.

3. Within masonry walls, with ¾" max. raceway, furnish galvanized steel boxes, minimum 2-1/2-inch deep.

F. Surface mounted boxes.

1. Mounted at or below 10' above the finished surface, ¾" max. raceway size, furnish cast aluminum boxes with a surface mounted cover.

G. Junction and Pullboxes.

1. Furnish, minimum 4" square, 1 – ½" deep, galvanized steel junction and pullboxes where installation conditions warrants their use. Boxes shall be furnished with screw-on covers or hinged covers. Covers shall be such that it can easily be handled by one person. All hardware and fasteners shall be galvanized steel.

H. Flush mounted floor boxes.

1. Furnish adjustable, concrete tight, corrosion resistant, duplex type. Compartmental type for combination receptacle and communication. The coverplate shall be brass with hinged flap and carpet flanges. The minimum below ground/slab conduit size shall be ¾".

I. Underground boxes.

1. U. L. listed.

2. Pre-cast, polymer concrete.

3. Minimum size of 10” W X 10” L X 10” H.

4. Bolt down cover.

5. Stainless steel hex-bolts and replaceable nuts.

6. Minimum load rating of 5,000 lbs. (select by location)

**PART 3 - EXECUTION**

3.01 INSTALLATION

A. Through wall boxes and boxes mounted back-to-back are not permitted. Provide 8 inch minimum separation in order to minimize sound transmission.

B. Set flush with wall or ceiling finish in accordance with N.E.C., Article 370. Extension sleeves are not permitted for boxes improperly set.

C. Verify location of outlets prior to rough-in. When necessary, relocate outlets to avoid interference with other work or equipment. Where fixtures are mounted on or in an accessible type ceiling, provide a junction box and extend flexible conduit to each fixture. Fit outlet boxes in finished ceilings or walls with appropriate covers.

D. Where more than one (1) switch or device is located at one (1) point, unless otherwise indicated, provide gang boxes and covers. When the voltage between switches exceeds 300 volts, provide barrier partitions between adjacent switches located in the same box. Sectional switch boxes or utility boxes not permitted.

E. Provide pressed steel boxes for all interior work. Provide square boxes with plaster rings. Provide appropriate size multi gang box for group devices. Single gang boxes screwed together is not acceptable.

F. Where boxes are installed in masonry walls, use only approved masonry type boxes for single gang and multi-ganged applications. Standard 4” square boxes with plaster rings are not allowed. Caulk around joint between receptacle box and masonry. Verify color with architect.

G. Do not drill and pierce structural concrete members and structural steel without prior approval of the Engineer.

H. Mount all boxes plumb.

I. Mount boxes completely rigid without conduit or finished wall support.

J. Where outlets are installed in steel stud type systems, provide additional cross bracing, bridging, and/or straps as required to make the outlet completely rigid. Support boxes with “caddy screw gun brackets”, “caddy box mounting bracket”, “caddy quick mount box brackets” or acceptable alternates.

K. **Dimensions are from finished floor to centerline of outlets.** Adjust heights of outlets in masonry walls from that indicated so that receptacles are not lower than 16" A.F.F. and switches are not higher than 48" A.F.F. Outlet height so adjusted shall be consistent. Unless otherwise indicated, mount outlets at the following heights:

| | |
|---|---|
| Wall switches/Wall Phone | 4 ft. - 0 in. |
| General Duplex receptacles | 1 ft. - 6 in. |
| Receptacles at Millwork | verify with millwork |
| Receptacle for Refrigerators | 2' – 6" |
| Weatherproof duplex receptacles | 1 ft. - 6 in. |
| Telephone/Data outlets/Teacher Station | 1 ft. - 6 in. |
| Telephone/Data at millwork | verify with millwork |
| Garages/Apparatus Bay receptacles | 2 ft. - 0 in. |
| Clocks | 8 ft – 0 in |
| Access Point Data Drops (wall mounted) | 10 ft – 0 in |

L. For boxes installed above ceilings, label the box cover with the circuit numbers installed. Labeling shall be with a permanent, black maker with broad tip.

M. Boxes installed in rated walls shall have a minimum horizontal separation of 24". Maximum surface area of boxes shall not exceed 16 square inches.

N. Completely envelope floor boxes in concrete except at the top. Increase slab thickness at boxes if required for bottom covering. Adjust covers flush with finished floor.

O. Where outlets are indicated adjacent to each other, mount these outlets in a symmetrical pattern with all tops at the same elevation. Where outlets are indicated adjacent, but with different mounting heights, line up outlets to form a symmetrical vertical pattern on the wall.

P. Install recessed boxes flush to the finished wall or ceiling line by the use of manufactured tile rings to extend the box forward.

Q. Boxes to which light fixtures or pendants are mounted shall NOT contain any conductors foreign to the operation of such light or pendant application. Removal of lights, pendants and cord drops to access other branch circuits is NOT acceptable.

R. Where fixtures are mounted on or in an accessible type ceiling, provide a junction box and extend flexible conduit to each fixture.

S. Install knockout closures to cap all unused openings.

T. All boxes shall be installed with coverplates.

U. Install boxes as required to facilitate conductor installation in raceway systems. Junction and pull boxes shall be sized to accommodate conductors, splices, devices and fittings.

V. Raceways are NOT allowed to terminate to extension rings.

W. Install boxes so that covers are accessible and easily removable after completion of the installation. The minimum clear space in the direction of the box opening shall be 36".

X. Include suitable access doors, with the proper fire rating, for boxes above inaccessible ceilings. Boxes shall be located within reach of the access.

Y. Install underground boxes with cover slightly above finished grade.

**Z. Spray paint J-Boxes red for Fire Alarm Systems. All other special system J-Boxes to be painted white.**

**END OF SECTION**

## SECTION 26 05 80 - EMPTY RACEWAY ROUGH-IN

### PART 1 - GENERAL

1.01 SCOPE OF WORK

A. The Contractor shall furnish and install all equipment, accessories and material required for the rough-in of empty raceway systems in accordance with the specifications and drawings.

B. Rough-in raceway sections for indicated devices and outlets in all walls, floors and underground sufficient to facilitate installation of the following systems without cutting or otherwise damaging walls, ceilings or floors installed in this contract:

1. Communications
2. Fire Alarm
3. Television
4. Data
5. Security
6. Controls

C. **ALL** CONDUITS SHALL HAVE A PULL CORD INSTALLED. INSTALL BLANK COVERS ON ALL UNUSED JUNCTION BOXES.

D. 3/4” CONDUIT MINIMUM.

E. Electrical Contractor shall provide all conduit, junction boxes and outlet boxes for HVAC controls as specified in Section 26 05 00, 1.03, D. Coordinate locations and requirements with Mechanical Contractor and Controls Contractor prior to rough-in. Provide outlet box for sensor and conduit to above accessible ceiling. Provide conduit for all wiring in areas with no ceiling. Provide conduit from outdoor units to above accessible ceilings. Provide conduit between make-up air units and associated condensing units.

**F. REFERENCE TECHNOLOGY DRAWINGS AND SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS CONCERNING CONDUIT ROUGH-IN FOR VOICE/DATA SYSTEMS.**

G. Floor mounted devices: Provide pathway to nearest accessible ceiling for all floor mounted devices called for in this specification.

1.02 QUALITY ASSURANCE

A. Construct each item of equipment, including parts and accessories, in a workmanlike manner, using new materials or the best quality obtainable for the purpose intended. Design and build materials in accordance with the best practices of the electrical industry.

B. Comply with all requirements of serving utility.

**PART 2 - EXECUTION**

2.01 INSTALLATION

A. Interior conduit systems shall have runs less than 100 feet from point to point.

B. Provide accessible pull boxes when necessary. Provide blank covers for all outlet boxes, unless otherwise noted.

C. All bends for telephone and cable television service shall be 36 inch radius, minimum.

D. Provide outlet box in wall at 18" A.F.F. (UON) and conduit with string to above accessible ceiling location. Provide insulated bushing on end of conduits.

**E. Provide four (4) additional outlet boxes and conduit with pull cord to above the ceiling. Final location shall be as directed by the Architect. Outlets can be added at any phase of construction with the exception of finished CMU walls.**

**END OF SECTION**

## SECTION 26 24 13 - MAIN SWITCHBOARD

1.01 SCOPE OF WORK

A. The Contractor shall provide and install a switchboard as shown on the drawings and as hereinafter specified.

B. The Contractor shall verify that all factory bussing and related equipment is properly connected, aligned, properly phased and identified. All bolts and connections shall be tightened as required by the manufacturer's instructions.

C. Manufacturer to do a coordination study and provide contractor with proper trip setting for all breakers where applicable.

D. Surge Protective Devices. Reference Riser Diagram and Surge Protective Devices specification.

E. Provide metering. Reference Riser Diagram.

1.02 STANDARDS

A. The switchboard shall be UL listed and labeled for service entrance and shall comply with the applicable NEMA Standards, ANSI Standards, and the NEC.

1.03 ACCEPTABLE MANUFACTURERS

A. Square D

B. ITE Siemens

C. General Electric

D. Cutler Hammer/Westinghouse

1.04 SUBMITTALS

A. Submit Manufacturer's technical product data on the switchboard, protective devices and instrumentation. Include data substantiating that materials comply with the requirements of this section.

B. Submit shop drawings which include dimensions, top and bottom views showing entry and exit space for conduits, front and side elevations showing arrangement of all scheduled and future devices, dimensional data on all buses including material type and capacity of the buses and the short circuit ampere interrupting rating.

C. Submit one line diagrams for the switchboard being provided. Also submit information on all protective devices including the type and ratings.

## PART 2 - PRODUCTS

2.01 GENERAL

A. Furnish a complete factory assembled switchboard from incoming line lugs to load terminals of all branch protective devices. Include all necessary buses, supports, devices and provisions for future connections as shown. Switchboard to be circuit breaker type.

B. The physical size and configuration of the switchboard may be varied to suit the manufacturer's standard design, provided the intended functions are accomplished. Any change in size or configuration must be noted on the submittal.

C. The manufacture of the switchboard shall be the same as the manufacturer of the switches mounted in the switchboard.

D. All new panelboards and switchboards on this project shall be by the same manufacture as the switchboard.

E. Service entrance switchboards shall include a separately mounted, dual listed transient voltage surge suppression device with a secondary surge arrester.

F. Power meter that measures a minimum of KW, Volts, KWH, Power Factor on all 3 phases, sends pulses that can be read by Owner's DDC

2.02 RATINGS

A. Provide plated copper bussing of the ampere rating shown on the Drawings. Neutral bus shall have the same ampere rating as the phase bus. Each switchboard, as a complete unit, shall have a short circuit current rating equal to or greater than the integrated equipment short circuit rating shown on the switchboard schedule or on the plans. This rating shall be established by testing with the branch devices mounted in the switchboard. Short circuit tests on the overcurrent devices and on the switchboard structure shall be made simultaneously by connecting the fault to each overcurrent device with the switchboard connected to its rated voltage source. Method of short circuit testing shall be per Underwriters Laboratories Standard. The source shall be capable of supplying the specified switchboard short circuit current or greater. Testing of switchboard overcurrent devices for short circuit rating only while individually mounted is not acceptable. Also, testing of the bus structure by applying a fixed fault to the bus structure alone is not acceptable. Switchboards shall be marked with their maximum short circuit rating at the supply voltage and shall be UL listed. The bus shall have a temperature rise of 65$^{O}$C. above an ambient temperature of 40$^{O}$C. There shall be no reduction of through (horizontal) bus. Vertical bus shall be full height.

B. **Series rating not permitted.**

**C. Final AIC ratings for all panels shall be determined and provided by the gear manufacturer to meet minimum allowable fault current from utility company transformer. Provide coordination study and fault current analysis as required for justification of sizes. Make all changes required by coordination study and include in bid price. Coordination study must be completed prior to submitting gear.**

2.03 ENCLOSURE

A. Construction.

1. Fabricate the switchboard enclosure with the required number of vertical sections. Sections shall align at top, bottom, front and rear. Bolt vertical sections together to provide a rigid freestanding unit. Fit in the space designated and as shown on the drawings.

2. Completely enclose the frame with removable, bolted, code-gage sheet steel covered panels. Form all cover plates and doors to eliminate sharp edges.

3. Where indicated on the drawings or installed outdoors the enclosure shall be suitable for outdoor installation and be provided with hinged, lockable doors.

B. Access.

1. Furnish an assembly which permits front access to the buses and devices.

2. Hinge all doors which provide access to protective device load terminals.

3. Furnish adequate wiring gutter space at top, bottom and sides for easy access to all wiring terminations.

C. Lifting Provisions.

1. Provide permanent lifting means on the top of each section.

D. Finish.

1. Grind all steel surfaces smooth, with all burrs, sharp edges, welding splatters, loose rust, scale and the like totally removed after fabrication.

2. Inside and outside surfaces shall be properly cleaned, primed, and a finish coat of gray paint applied.

3. Supply one quart of finish paint for each switchboard for touch-up after installation.

2.04 BUS CONSTRUCTION

A. Fabricate all buses of 98 percent IACS conductivity, copper with rounded edges.

B. Size buses to limit their temperature rise within the switchboard to 65°C based on a 40°C ambient temperature.

C. Size all buses so that current density will not exceed 1000 amperes per square inch.

D. Support the bus systems using non-carbonizing, non-tracking insulators.

E. Insulate each individual phase bus to withstand 2000 volts a-c for 1 minute.

F. Size the supply and through (horizontal) bus on the total switchboard's load current shown on the drawings or schedules.

G. At the minimum, size the sectional (vertical) bus on the load currents served by the devices within each section including capacity for spaces. A further minimum of 60 percent of the through bus rating must be maintained. Extend the sectional (vertical) phase buses the height of the switchboard.

H. Extend the phase and neutral through (horizontal, supply) buses to all sections with busses sized at the maximum switchboard's amperage rating. Provide for through bus extensions from either end.

I. Fully equip spaces for future devices, including all appropriate connectors and mounting hardware.

J. Each switchboard section shall include a pre-drilled, un-insulated, ground bus bar. Secure the bar to the frame and extend to adjacent sections, thus providing a continuous equipment ground bus. Arrange the equipment ground bus to ground the switchboard parts which do not carry current. Include terminals for feeder and branch circuit grounding conductors. Make the cross-sectional area of the ground bus not less than one square inch.

K. Device Mounting.

1. Assembly must permit interchanging devices of the same type, rating and method of operation.

2. Construction shall permit devices to be field installed.

3. Devices shall be front removable and load connections shall be front accessible enabling the switchboard to be mounted against a wall.

2.05 CABLE TERMINATIONS

A. All mechanical-type terminals shall be UL Listed to accept copper conductors. Lugs shall be suitable for 75° C temperature rating.

B. Provide phase and neutral lugs to accommodate the conductors shown on the associated drawings or schedules.

C. Provide grounding lugs for the connection(s) of the main grounding electrode conductor(s) in the service conductor section.

D. Provide additional grounding lugs for the equipment grounding connection(s).

2.06 SERVICE ENTRANCE BARRIERS

A. Barriers shall be placed such that no un-insulated, ungrounded busbar or terminal is exposed to inadvertent contact by persons or maintenance equipment while servicing load terminations.

2.07 CIRCUIT BREAKERS

A. Furnish breakers with the number of poles and protective devices required as shown on the drawings or schedules.

B. Furnish breakers and protective devices which are fully rated for the short circuit indicated.

C. Breakers shall utilize bolted line bus connections.

D. Breaker shall be equipped with all required mounting brackets and guides.

E. Operating handles shall be mounted as an integral part in the operating mechanism with a visible ON/OFF switch indication.

2.08 LISTING

A. The completed switchboard shall be UL listed.

B. When required, the switchboard shall be UL listed as suitable for use as service entrance equipment.

**PART 3 - EXECUTION**

3.01 INSTALLATION

A. The switchboard sections shall be set in place, assembled, carefully aligned, made plumb on all faces. All connections and installations shall be in accordance with the manufacturer's recommendations and installation instructions. Clearances shall comply with Article 110 and installation with Article 384, NEC.

B. Free standing main switchboards shall rest on a 3-1/2" housekeeping pad. Coordinate with the General Contractor.

C. Make and torque field connections of buses between switchboard sections with splice bus and hardware provided by the switchboard manufacturer.

D. Restore all damaged surfaces to factory finish.

E. Thoroughly inspect and remedy the switchboard for the presence of foreign materials.

**END OF SECTION**

# SECTION 26 24 16 - BRANCH CIRCUIT PANELBOARDS

## PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Provide branch circuit panelboards as shown on the Drawings and as herein specified.

B. Panelboard feeders are sized from the “Panelboard Connection Schedule”. When a panel is fed from a transformer use the “Transformer Connection Schedule” for feeder size. When there is a conflict between the sizes, use the largest of the two.

C. This section specifies the furnishing and installation of molded case, thermal-magnetic circuit breakers. Electronic, solid-state trip circuit breakers are NOT allowed.

D. Maximum circuits per panelboard section shall be 42 circuits.

1.02 STANDARDS

A. Provide U.L. label.

B. Comply with applicable standards of NEMA and the NEC.

1.03 ACCEPTABLE MANUFACTURERS

A. Square D/Schneider Electric

B. ITE Siemens

C. Cutler Hammer/Westinghouse/Eaton

D. General Electric

1.04 SUBMITTALS

A. Furnish Engineer shop submittal for each branch circuit panelboard.

B. Submit shop drawings for each panelboard which include outline and support points, dimensions, voltage, main bus ampacity, short circuit ampere interrupting rating, circuit breaker arrangement, sizes and number of poles. Shop drawing shall list all spaces and circuit breakers to be installed in each panelboard.

C. Provide shop submittal which includes the following:

1. Cabinet

a. Housing

b. Trim

c. Outline dimensions

d. Available spaces

e. Panelboard mounting

2. Circuit breakers

   a. Frame size

   b. Trip setting

   c. Class

   d. Interrupting rating in RMS Symmetrical amperes

   e. Mounting

   f. Voltage rating

3. Busing

   a. Ampere rating

   b. Material

   c. Incoming cable lug size

   d. Bus bracing

4. Manufacturer's catalog numbers.

5. Other descriptive data as may be required.

**D. Circuit breaker arrangement must be identical to the schedules or one line diagram unless there is a technical reason for deviation. All reasons for deviation must be stated on the shop drawings.**

**E. Unless specifically noted, only Max 42 circuits per section will be allowed.**

## PART 2 - PRODUCTS

2.01 GENERAL.

A. All new panelboards and switchboards on this project shall be by the same manufacture. The manufacture shall be the same as the manufacturer of the circuit breakers.

B. Interior trim shall be of dead-front construction to shield user from energized parts. Dead-front trims shall have pre-formed covers for unused mounting space.

C. Interior leveling provisions shall be provided for flush mounted applications.

D. Panelboards shall be designed such that switching and protective devices can be replaced without disturbing adjacent units and without removing the main bus connectors.

F. Furnish suitable lugs for each conductor requiring a connection.

2.02 BUS CONSTRUCTION

A. Fabricate all buses of 98 percent IACS conductivity, copper. Size buses to limit their temperature rise within the panelboard to 65°C based on a 40°C ambient temperature.

B. Provide one continuous, un-reduced in size, bus bar per phase with “distributed phase” or “phase sequence” type connections to the branch circuit breakers. Extend the buses the height of the panelboard.

C. Provide circuit breaker connections to the bus by means of a bolt. Square D “I-Line” may be provided.

D. Insulate each individual phase bus to withstand 2000 volts a-c for 1 minute.

E. Support the bus systems using non-carbonizing, non-tracking insulators.

F. Furnish fully equipped spaces, include all appropriate connectors or mounting hardware.

G. Furnish an insulated neutral bus which is the same size as the phase buses. Larger sizes may be required by the schedules or one line diagram.

H. Furnish a solidly bonded equipment ground bus. Include terminals for feeder and branch circuit grounding conductors.

I. Furnish an isolated ground bus, with terminals, where scheduled or noted on the drawings.

J. Provide full size or larger insulated neutral bus bar. Where specified on the panel schedule, provide 200% rated neutral bus bar. Coordinate with plans.

2.03 RATINGS

A. Panelboards and circuit breakers shall be rated for 60 hertz and have a voltage and current rating as indicated on the drawings or schedules.

B. The finished panelboard assembly shall be fully rated to withstand mechanical forces exerted during short-circuit conditions when connected directly to a power source having available fault currents indicated on the drawings or schedules. The minimum rating for a 240 volt a-c panelboard shall be rated 10,000 AIC RMS symmetrical and a 480 volt a-c panelboard shall be rated 14,000 AIC RMS symmetrical minimum. Series ratings are not permitted.

**C. Final AIC ratings for all panels shall be determined and provided by the gear manufacturer to meet minimum allowable fault current from utility company transformer. Provide coordination study and fault current analysis as required for justification of sizes. Make all changes required by coordination study and include in bid price. Coordination study must be completed prior to submitting gear.**

2.04 ENCLOSURES

A. Enclosures shall be at least 20 inches wide and made from galvanized steel with welded interior mounting studs. Provide gutter space in accordance with the National Electrical Code. Where conductors are carried through a box, the box shall be sized to include the additional space. Enclosures shall be fully enclosed.

B. **ALL MULTI-SECTION PANEL ENCLOSURES SHALL BE THE SAME HEIGHT.**

2.05 HINGED FRONT COVER

A. Mounting shall be flush or surface as indicated on associated schedules or drawings. Surface trims shall be the same height and width as the box. Flush trims shall overlap the box by 3/4 of an inch on all sides.

B. Fronts shall be of the concealed hinged type. Front shall not be removable with the door closed.

C. Doors on front shall have rounded corners; edges shall be free of burrs. Doors shall have a flat latch type lock with a catch and spring loaded stainless steel door pull. All lock assemblies shall be keyed alike. One key shall be provided with each lock.

D. Furnish a nameplate, circuit directory frame, card and a clear plastic covering on the inside of the door. All loads shall be identified as specified in Section 16075.

2.06 FINISH

A. Surfaces of the trim assembly shall be properly cleaned, primed, and a finish coat of gray paint applied.

B. Nema 3R enclosures shall be properly cleaned, primed, and a finish coat of gray paint applied.

C. Supply one quart of finish paint for each project. Touch-up after installation.

2.07 MOLDED CASE THERMAL-MAGNETIC CIRCUIT BREAKERS

A. Furnish molded case, thermal-magnetic circuit breakers in lighting / appliance and power distribution panelboards for the specified service with the number of poles and ampere ratings indicated on the schedule or drawings. Incorporate inverse time characteristic by bi-metallic overload elements and an instantaneous characteristic by magnetic trip.

B. Current carrying components shall be completely isolated from the handle and the accessory mounting area.

C. Circuit breakers shall have a trip free, toggle operating mechanism which will provide quick-make, quick-break contact action. The circuit breaker shall have common tripping of all poles.

D. The circuit breaker handle shall reside in a tripped position between ON and OFF to provide local trip indication. Circuit breakers shall be clearly marked ON and OFF.

E. Circuit breakers shall be factory sealed.

F. All circuit breakers shall be suitable for mounting in any position.

G. Circuit breakers shall be equipped with factory installed mechanical lugs.

H. Circuit breakers shall have a permanent trip unit containing individual thermal and magnetic trip elements in each pole.

I. Thermal trip elements shall be factory preset and sealed. Circuit breakers shall be true rms sensing and thermally responsive to protect circuit conductor(s) in a 40° C ambient temperature.

J. For 2-pole and 3-pole breakers, use the common-trip type so that an overload or fault on one pole will trip all poles simultaneously. Handle ties are not acceptable except where multiple single breakers are used to serve modular furniture.

K. Where indicated, provide ground fault (GFCB) or shunt trip breakers.

2.08 LISTING

A. The completed panelboard shall be UL listed.

B. Certification standards, with applicable voltage systems and corresponding interrupting ratings, shall be clearly marked on the face of each circuit breaker.

C. Circuit breakers shall be equipped with listed electrical accessories as noted on the schedules or drawing.

D. When required, circuit breakers shall be listed as HACR type.

E. When required, circuit breakers shall be listed as Switch Duty type.

F. When required or indicated on the drawings or schedules, equipment shall be listed for the environment in which it is installed.

**PART 3 - EXECUTION**

3.01 INSTALLATION

A. Install box, trim and interior rigid and plumb. Center interior with opening.

B. Install panelboards in accordance with the instructions of the manufacturer and as shown on the Drawing. Install complete with all required electrical connections.

C. Unless otherwise noted, install panelboards with the top of the trim 6 ft. 0 in. above finished floor.

D. Field check panelboard loading and reconnect circuits as required to provide balanced phase and line loads.

E. Neatly bundle, route and support cables installed in wiring gutters of panelboards. Minimum bending radii as recommended by the wire and cable manufacturer.

F. Install five (5) 3/4” conduits from top of flush mounted panelboards to accessible void above ceiling. Cap end of conduits above ceiling.

G. All recessed panels are to be installed in 6” minimum wall thickness. Coordinate clear dimensions with Architect and General Contractor prior to rough-in.

H. Provide wood trim for any semi-recessed panels, including panelboards. Coordinate with General Contractor and verify finishes with the Owner/Architect.

I. Install filler blanks for any unused breaker space.

J. All panel interior to be free of debris and dirt prior to installing panel covers.

K. Check bolted and circuit breaker connections using a torque wrench.

L. The faces of all circuit breakers shall be flush with each other.

M. Affix permanent and individual circuit numbers to each circuit breaker in a uniform position.

**END OF SECTION**

# SECTION 26 27 26 - DEVICES

## PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Provide switches and receptacles as shown on the drawings and as hereinafter specified.

1.02 STANDARDS

A. Provide all receptacles which conform with NEMA standards for amperage and voltage classification.

B. Provide devices U.L. listed for the application and for the type of wire used.

1.03 ACCEPTABLE MANUFACTURERS

A. Leviton, or approved equal

1.04 SUBMITTALS

A. Furnish Engineer shop submittal for each device.

B. Provide shop submittals which include the following information:

1. Manufacturer and catalog number.

2. NEMA configuration.

3. Voltage and amperage ratings.

## PART 2 - PRODUCTS

2.01 MATERIALS

A. Straight Blade Receptacles: Furnish Leviton receptacles or approved equal, color shall be White. (Devices and coverplates connected to emergency circuits shall be red).

1. Single receptacle, 20 amp, 125-volt, 2-pole, 3-wire, grounding, NEMA 5-20R.

2. Single receptacle, 20 amp, 250-volt, 2-pole, 3-wire, grounding, NEMA 6-20R.

3. Duplex receptacle, 20 amp, 125-volt, 2-pole, 3-wire, grounding, NEMA 5-20R.

4. Tamper resistant, duplex receptacle, 20 amp, 125-volt, 2-pole, 3-wire, grounding, NEMA 5-20R.

B. Toggle Switches: Furnish Leviton switches or approved equal, color shall be White. (Devices and coverplates connected to emergency circuits shall be red).

1. Single pole, single throw, 20 amp, 120/277 volt.

2. Single pole, double throw, momentary, 20 amp, 120/277 volt.

3. Single pole, double throw, maintained, 20 amp, 120/277 volt.

4. Double pole, single throw, 20 amp, 120/277 volt.

5. Three way, single throw, 20 amp, 120/277 volt.

6. Four way, single throw, 20 amp, 120/277 volt.

C. Locking Switches: Furnish Leviton switches with #55500 key, color shall be White. (Devices and coverplates connected to emergency circuits shall be red).

1. Single pole, single throw, 20 amp, 120/277 volt.

2. Single pole, double throw, momentary, 20 amp, 120/277 volt.

3. Single pole, double throw, maintained, 20 amp, 120/277 volt.

4. Double pole, single throw, 20 amp, 120/277 volt.

5. Three way, single throw, 20 amp, 120/277 volt.

6. Four way, single throw, 20 amp, 120/277 volt.

D. Dimmer Switches: Furnish Lutron NT series, or equivalent, continuously adjustable slide dimmer with preset on/off switch. Dimmer shall be solid-state type for use with 120-volt incandescent lamps and shall have electromagnetic filters to eliminate noise, RF and TV interference. Dimmer wattage is indicated on the drawings or 1000 watt minimum.

E. Ground Fault Devices: Color shall be White. (Devices and coverplates connected to emergency circuits shall be red).

1. Ground fault circuit interrupter (GFCI), 20 amp, 125-volt, 2-pole, 3-wire, grounding, NEMA 5-20R.

2. Ground fault feed through switch, 20 amp, 125-volt.

F. Device Plates:

1. Unless otherwise indicated, provide smooth metal device plates of Type 430 stainless steel for all indoor devices. Verify color with architect prior to ordering. Cover plates for devices served by emergency circuits shall be red.

2. Provide telephone and data outlets with blank metal type 430 stainless steel covers.

3. Provide properly gasketed vertical single lift device plate of aluminum die cast for weatherproof receptacles and/or switches.

G. Floor Outlets:

1. Provide where shown on the drawings, PVC rectangular floor boxes. Coordinate all dimensions for floor boxes with Architect. Contractor shall not scale from drawings.

2. Receptacle floor outlets specified as duplex shall have duplex screw cap coverplates. Telephone and/or data floor outlet boxes to have combination screw cap coverplate.

3. Provide brass carpet flanges for each floor box installed in carpeted areas.

4. Multiple device locations shall incorporate two (2) or three (3) gang outlet box.

H. Provide GFI receptacles within 6 feet of any sink, lavatory, wet area and outdoors. All GFI resets to be located in the same room protected.

I. Provide GFI protection for all receptacles in areas where power hand tools or portable lights are used (shop areas, garages, etc.).

J. Provide GFI protection for all circuits used for heat tracing.

K. Provide a receptacle in all mechanical/electrical rooms.

L. Surge Arresting Receptacles: Where surge arresting receptacles are indicated, provide receptacles meeting Federal Specification WC-596F which are UL listed (UL 1449 and UL 498) with integral surge suppression. Provide with audible surge protection failure alarm and replaceable surge arrester module. Eagle Electric “Super Spec SurgeBloc” or acceptable equal.

M. All 120volt/20amp receptacles in kitchen area to be GFCI protected.

## PART 3 - EXECUTION

3.01 INSTALLATION

A. Install wiring devices of the type as indicated on drawings. Make up all connections tight and set device plumb. Use care in installing device in order to prevent damage to the device and the wire in the outlet box.

B. Device Plates: Provide a device plate for each outlet to suit the device installed and install blank plates or covers for junction boxes and empty outlets, including telephone, computer, etc.

C. Mount duplex receptacles vertically with grounding opening **up** unless otherwise noted.

D. Prior to installation of outlets other than 20A, 120 Volts, verify receptacle type with Owner through Architect. Receptacles not verified shall be changed at Electrical Contractor’s expense if necessary to operate equipment.

E. Install all switches that are required to be handicap accessible at proper height per latest ADA Standards.

F. Install wall switches vertically in an outlet box on the strike side of the door as finally hung.

G. Install single throw switches so up is the ON position.

H. Locking switches shall be furnished in corridors, common areas and any area with HID lighting. Contractor shall confirm exact location of all locking switches with the Architect/Engineer prior to rough-in.

I. Provide “Caddy Screw Gun Bracket” between wall studs, as required to install switches, thermostats, intercom devices, etc. Verify exact location of devices prior to rough-in. Device boxes shall be aligned on center line of each box.

J. Receptacles installed for electric water coolers shall be mounted at a height so as not to be visible after installation of EWC. Coordinate with equipment being provided.

K. Provide one (1) duplex GFI/weatherproof receptacle within 25 feet of all mechanical equipment, located on the roof, on mezzanines, or on the ground. Connect receptacles to nearest available circuit with not more than 6 receptacles or home run to the nearest available panelboard and provide breaker as required.

L. Engrave coverplates, designated for engraving, with 1/8 inch-high contrasting lettering.

M. Engrave the coverplates of wall switches that control equipment which is not in sight of the switch with the designation of the equipment being controlled. Lettering shall be 1/8 inch high and of a contrasting color.

N. All receptacles located above counter tops with sinks and receptacles in kitchens shall be GFI Type.

**O. All receptacles used in Pre-K, Kindergarten and First Grade Classrooms must be safety type receptacles.**

**P. Provide four (4) additional receptacles in base bid including wire, conduit, breakers and appurtenances. Each receptacle represents a dedicated circuit. Estimate length of circuit is 150 feet. Final location as directed by Architect.**

**Q. Provide two (2) additional switches including wire and conduit. Estimated length to circuit is 75 feet. Final location is directed by architect.**

**R. Provide unit price to add additional receptacles over base bid. Use same lengths indicated above.**

**END OF SECTION**

# SECTION 26 28 15 - SAFETY DISCONNECT SWITCH

## PART 1 - GENERAL

1.01 SCOPE OR WORK

A. Provide safety switches for all pieces of equipment per NEC as indicated on the Drawings and specifications or as required.

**B. All safety switches are to be FUSED unless noted otherwise.**

1.02 STANDARDS

A. Conform to U.L. listed and the latest NEMA standards.

1.03 ACCEPTABLE MANUFACTURERS

A. Square D

B. ITE Siemens

C. Cutler Hammer/Westinghouse

D. General Electric

1.04 SUBMITTALS

A. Furnish Engineer shop submittal for safety disconnect switches.

B. Provide shop submittals which include the following information:

1. NEMA type

2. Enclosure type

3. Ampere rating

## PART 2 - PRODUCTS

2.01 CONSTRUCTION

A. Provide safety switches appropriately rated for use with electrical system 600 Vac for 480 volts, 250 Vac for 208 volts and etc.

B. Provide safety switches NEMA Standard KS1 for type HD (heavy duty), and horsepower rated for A/C motors.

C. Switches requiring fuses and rated 600 amps and below shall be provided with rejection clips. Switches rated larger than 600 amps shall have Class “L” fuse connections provided.

D. Provide safety switches in NEMA 1 enclosure located on the interior dry locations. Provide safety switches in NEMA 3R enclosure located on the exterior of the building or in wet locations.

E. Provide quick-make and quick-break operating handle. Provide mechanisms which are an integral part of the box. Furnish a handle suitable for padlocking in the ON and OFF positions with a padlock of 5/16-inch diameter shank.

F. Door Interlock. Furnish a door interlock to prevent opening the door when the switch is in the ON position, unless bypassed, and to prevent turning the switch ON when the door is open.

G. Bypass Interlock. Furnish an external means to bypass the door interlock.

H. Terminal Shield. Furnish incoming line terminals with an insulated shield so that live parts are not exposed when the door is open.

I. Neutral. Where neutrals are indicated furnish switches with an isolated, fully rated neutral block. Make provisions for bonding the block to switch enclosure.

J. Equipment Grounding. Furnish an equipment grounding kit.

K. Fuse Holders. Where fusible switches are indicated, furnish switches with rejection-type fuse holders and fuses conforming to Section 16490, Fuses - 600 Volt and Below.

L. Auxiliary Contacts. Where switches are shown for elevator service, furnish switches with two DPST auxiliary contacts.

M. Provide lugs U.L. listed for copper cable.

## PART 3 - EXECUTION

3.01 INSTALLATION

A. Securely mount safety switches in accordance with the N.E.C. Provide all mounting materials and mount safety switches vertically.

B. In general, safety switches must be mounted on an independent and separate support system, not on the equipment being served. Where such an independent support would require penetrating or resting on a roof, it is preferable to mount on the equipment. In no case, however, may the switch interfere with access to or operation of the equipment, nor shall the switch be located within the significant impact zone of a flue or other high temperature component. Where screen walls are provided for outdoor units; the top of disconnect shall be below or equal to the top of screen wall.

C. Coordinate final location of disconnect switches to provide a minimum of 36” clear in front of switch. Conduit may not be routed in access clear directly in front of disconnect switch.

D. Install switches for all equipment that requires them. Mount so that operating handle is approximately 60 inches above finished floor. Where grouped, align tops of switches.

E. Disconnects mounted above ceiling must be mounted to be readily accessible near unit. Handle to be no more than 36” above ceiling grid.

F. All exterior disconnects to be mounted below line of sight of a screen wall or if single disconnects, level with top of condenser. Verify location with Architect/Engineer prior to rough-in.

**END OF SECTION**

## SECTION 26 28 16 - FUSES

### PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Provide and install fuses as shown on the Drawings and as hereinafter specified.

1.02 STANDARDS

A. Conform with the latest requirements of the National Electrical Code, NEMA and be UL listed.

1.03 ACCEPTABLE MANUFACTURERS

A. Bussman

B. Gould

C. Little Fuse

### PART 2 - PRODUCTS

2.01 MATERIALS

A. Time Delay/Dual Element (Class R) fuses 1/10 through 600 amps.

B. Time Delay/Dual Element (Class RK5) fuses 1/10 through 200 amps for mechanical equipment and where noted.

C. Time Delay (Class L) fuses 601 - 6000 amps.

### PART 3 - EXECUTION

3.01 GENERAL INSTALLATION REQUIREMENTS

A. Fuses shall not be installed until equipment is ready to be energized.

B. Test and inspection shall be made prior to energization of the equipment. This shall include a thorough cleaning, tightening and review of all electrical connections and inspection of all grounding conductors.

C. All fuses shall be furnished and installed by the Electrical Contractor.

D. All fuses shall be of the same manufacturer.

**E. Equipment Fuses: Verify final fuse size with actual equipment being installed. Do not exceed permitted fuse size and voltage of manufacturer ratings.**

3.02 INSTALLATION

A. Mains, Feeders and Branch Circuits:

1. Circuit 0 to 600 amperes shall be protected by current limiting dual-element, time delay fuses. All dual-element fuses shall have separate overload and short-circuit elements. The fuse must hold 500% of rated current for a minimum of ten (10) seconds, with an interrupting rating of 200,000 amperes r.m.s. symmetrical. The fuses shall be UL Class RK-1 (or RK-5 where specifically permitted). They shall be marked with the proper fuse rating, per the specifications, and placed in a conspicuous location on the enclosure.

2. Circuits 601 to 6000 amperes shall be protected by current limiting time delay fuses. Fuse link shall be pure silver links (99.9%) pure), to limit the short circuit current let through valves to low levels and comply with NEC Sections requiring component protection. Fuses shall be time-delay and must hold 500% of rated current for a minimum of four (4) seconds with an interrupting rating of 200,000 amperes r.m.s. symmetrical. The fuses shall be UL Class L. “CAUTION” labels to alert the end user of engineered level of protection of the electrical equipment, shall be field installed by the Electrical Contractor. They shall be marked with the proper fuse rating, per the specifications, and placed in a conspicuous location on the enclosure.

3. Motor Circuits - All individual motors rated for 200 horsepower or less shall be protected by time delay/dual-element fuses. The fuses for motors shall be installed in ratings approximately 125% of motor full load current, except where high ambient temperatures prevail, or where the motor drives a heavy revolving part which cannot be brought up to a full speed quickly, such as large fans. Motors shall be protected by fuses of the rating shown on the Drawings. The fuses shall be UL Class RK-1 (or RK-5 where specifically permitted) Dual Element/Time Delay. “CAUTION” labels to alert the end user of the engineered level of protection of the electrical equipment shall be field installed by the Electrical Contractor. They shall be marked with the proper fuse rating, per the specifications, and placed in a conspicuous location on the enclosure.

B. Spares:

1. Upon completion of the building, the Contractor shall provide the Owner with spare fuses in cabinet as identified in Specification Section 26 05 00.

**END OF SECTION**

# SECTION 26 28 25 - CONTACTORS

## PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Provide lighting contactors as shown on the drawings and as hereinafter specified.

1.02 STANDARDS

A. Approved per UL 508 and designed in accordance with NFPA 1C52-211B.

B. UL listed.

C. Conform to the latest NEMA Standards.

1.03 ACCEPTABLE MANUFACTURERS

A. Square D

B. ITE Siemens

C. Cutler Hammer/Westinghouse

D. General Electric

1.04 SUBMITTALS

A. Furnish Engineer shop submittals for contactors.

B. Provide shop submittal which includes the following information:

1. Voltage and ampere rating

2. Wiring diagram

3. Enclosure type

4. Coil voltage

## PART 2 - PRODUCTS

2.01 GENERAL

A. Continuously current rated.

B. Capable of making and breaking all cases of loads without the aid of auxiliary arcing contacts. Auxiliary arcing contacts are not acceptable.

C. Industrial duty rated for applications to 600 volts maximum.

2.02 MATERIALS

A. Totally closed, double break, silver to silver power contacts. Contact inspection and replacement shall be possible without disturbing line or load wiring.

B. Provide terminals with straight through wiring and accept copper wire.

C. Provide switches or provisions for switches as indicated on the drawings.

D. Unless otherwise indicated, provide contactor in NEMA Type 1 enclosure.

**PART 3 - EXECUTION**

3.01 INSTALLATION

A. Securely mount lighting contactor. Provide all mounting hardware.

**END OF SECTION**

# SECTION 26 43 00 - SURGE PROTECTIVE DEVICES (SPDs)

## PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Provide a complete grounding system in strict accordance with Article 250 of the National Electrical Code and as hereinafter specified and shown on the Drawings.

## PART 2 - PRODUCTS

2.01 SURGE PROTECTIVE DEVICES (SPDs)

A. SPD shall be UL 1449 labeled with 200kA Short Circuit Current Rating (SCCR). Fuse ratings shall not be considered in lieu of demonstrated withstand testing of SPD, per NEC 285.6.

B. SPD shall be UL 1449 labeled as Type 1 intended for use without need for external or supplemental overcurrent controls. Every suppression component of every mode, including N-G, shall be protected by internal overcurrent and thermal overtemperature controls. SPDs relying upon external or supplementary installed safety disconnectors do not meet the intent of this specification.

C. SPD shall be UL 1449 labeled with 20kA I-nominal (I-n) (verifiable at UL.com) for compliance to UL 96A Lightning Protection Master Label and NFPA 780.

D. Standard 7 Mode Protection paths: SPD shall provide surge current paths for all modes of protection: L-N, L-G, L-L, and N-G for Wye systems; L-L, L-G in Delta and impedance grounded Wye systems.

E. True 10 Mode Protection paths: SPD shall provide “directly connected protection elements” between all possible modes of protection: L-N, L-G, L-L, and N-G for Wye systems; L-L, L-G in Delta and impedance grounded Wye systems.

F. Maintenance: Provide SPDs with a serviceable replaceable module, with indicator lights for normal and faulted conditions. Provide audible alarm and visual status indicators to indicate need for renewal or replacement. Provide units which are UL listed for installation in accessible areas.

G. Disconnecting Means: If a dedicated breaker for the SPD is not provided in the switchboard, the service entrance SPD shall include an integral UL Recognized disconnect switch. A dedicated breaker shall serve as a means of disconnect for distribution SPD’s.

H. Styles: The following styles are defined for determining ratings, installation method, and applications.

1. Style E: Exterior to panelboard enclosure, enclosure suitable for same environment as panelboard enclosure, connected through branch circuit breaker in panelboard. Meet UL 1449 3rd Edition performance parameters.

2. Style S: Switchboard type, for mounting inside switchboard, connected to buss through instrument power type of disconnect and protection, provided under this section and installed by switchboard manufacturer. SPD shall be rated as either a Type 1 or as Type 4 intended for Type 1 or Type 2 applications. Meet UL 1449 3rd Edition performance parameters.

I. Voltage Protection Ratings : For the applicable voltage configuration the SPDs UL 1449 3rd edtion Voltage Protection Rating (VPR) in any mode (L-N, L-G, and N_G), shall not exceed the following:

| Voltage Configuration | UL 1449 3rd Edtion VPR<br>Standard or 10-Mode |
|---|---|
| 120 Volt, 1 Phase | 700 |
| 120/240 Volt, 1 Phase | 700 |
| 120/208 Volt, 3 Phase Wye | 700 |
| 240 Volt, 1 Phase | 1200 |
| 240 Volt, 3 Phase Delta | 1200 |
| 277/480 Volt, 3 Phase Wye | 1200 |
| 480 Volt, 3 Phase Delta | 1800 |

J. SPD shall meet or exceed the following criteria:

1. Style S: Surge current capability shall be 300kA/phase

2. Style E: Surge current capability shall be 150kA/phase

K. Available Manufacturers: Subject to compliance with requirements, manufacturers offering SPDs which may be incorporated in the work included, but are not limited to the following:

1. Basis of Design: Current Technology

2. Alt. Manufacture: All substitutions must get prior approval submit as an Alternate with 3rd party test to verify performance matches specification. Performance can not be reduced to be considered an alternate.

3. Substitutions not following substitution requirements outlined in general electrical section and criteria outlined in this section will not be considered.

**PART 3 - EXECUTION**

3.01 INSTALLATION OF SURGE PROTECTIVE DEVICES (SPDs)

A. General: Install surge arrestors where indicated. Follow the manufacturer's instruction and NEC Article 285 for installation on line or load side of services.

B. Limit the length of tap conductors to the least length practicable. In no case extend unprotected tap conductors more than ten (10) feet, or beyond the enclosure of the panelboard, switchboard or disconnect served.

C. For Style S SPDs, the switchboard manufacturer will supply their own UL 1449 3rd edition listed SPDs meeting the specification criteria. Include complete installation instructions.

# Surge Protection: _____ PROJECT NAME

**(Manufacturer to fill out entire form)**

1. Surge Manufacturer Name: _____

2. Model Numbers for:
   a. "MSB":
      Model: _____
   b. Panel s _____:
      Model: _____
   b. Panel s _____:
      Model: _____

3. Does MSB Surge have Advance Monitoring _____ Yes _____ No
   (Advanced Monitoring: Voltmeter, Surge Counter, Event Logger)
   Attached specification sheet on monitor _____ Yes _____ No

4. Does MSB have Over-Voltage Protection _____ Yes _____ No

5. Surge ratings:
   a. Model _____ Rating _____
   b. Model _____ Rating _____
   c. Model _____ Rating _____

6. Testing
   a. Have units been tested for Surge Impulse Surge Current by a third party independent laboratory? _____ Yes _____ No
   b. Attached 3rd party Test Report _____ Yes _____ No
   c. Can SPD be tested in field and compared to factory test _____ Yes ___ No

7. Warranty Period
   a. Standard Warranty _____ Years
   b. Life Expectancy _____ Years

**END OF SECTION**

## SECTION 26 51 00 - INTERIOR LIGHTING SYSTEM

### PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Provide all lighting fixtures and equipment as specified in the fixture schedule. Include all necessary accessories and appurtenances required for a complete and operating system whether or not specifically shown.

1.02 STANDARD

A. Provide all materials and accessories, whether specifically described or not, of the best grade of the commercial manufacturer. Provide first class workmanship in every respect.

B. Provide all lighting fixtures with Underwriters' label and manufacturer's label. Attachment of U.L. labels after delivery of fixtures is not acceptable.

C. Manufacture all lighting fixtures in accordance with the National Electrical Code.

D. Ballasts:

1. Provide ballasts for fluorescent lamps which meet U.L. specifications for Class P listing, applicable ANSI Standard Ballast Specifications, and certified by C.B.M. **Maximum - 2 lamps per ballast.**

2. Provide ballasts for HID lamps which comply with the UL Standard for High-Intensity Discharge Lamp Ballasts.

E. Provide lamps manufactured by North American Phillips or Sylvania. Unless otherwise indicated, lamp designations shown on the fixture schedule are Sylvania. (3500K)

1.03 ACCEPTABLE LIGHTING PACKAGES:

A. Lithonia

B. Thomas Daybrite

C. Hubbell

D. Others Fixtures as Scheduled or Noted

1.04 SUBMITTALS

A. Furnish Engineer shop drawings for each fixture.

B. Provide shop drawing which includes the following information:

1. Fixture type per the fixture schedule.

2. Manufacturer of the fixture.

3. Physical dimensions of the fixture.

4. Manufacturer's standard finish.

5. Fixture output distribution curves with utilization parameters.

6. Ballast temperature rating, voltage, wattage, and manufacturer.

7. Material type and thickness of lens.

8. Accessories for installation such as swivel hangers.

9. Number and type of lamps.

C. Submit point-by-point lighting calculations for areas as required by the specifications or noted on the drawings. The calculations shall include lamp lumen depreciation, luminaire dirt depreciation, ballast factor, lamp tilt factors, and initial lamp lumens. The calculations shall indicate maintained horizontal footcandle levels at a height of thirty inches above the floor. In interior spaces the maximum point spacing shall be five feet on center; for outdoor applications the maximum point spacing shall be 30 feet on center unless otherwise noted on the drawings.

D. Lighting Control Submittal

- Shop Drawing Floorplan drawings at 1/8” scale showing
    - motion sensor layout as directed on plans
    - daylight sensor layout as directed on plans
    - identify enabled fixtures
    - identify power packs
    - identify power pack location for open ceiling areas (above panel in electrical room)
- symbol legend identifying symbols
- control sequences
- riser diagrams showing low voltage cabling requirements
- cutsheets all parts

1.05 PRODUCTS STORAGE AND HANDLING

Protect fixtures delivered to the job site from the entrance of water and dust at all times. Replace fixtures damaged by improper handling or storage.

1.06 COORDINATION

A. Catalog numbers shown on the light fixture schedule may not include or adequately represent all the options and accessories required herein, this contractor shall conform to these specifications in there entirety.

B. The various ceiling types are indicated on the architectural plans and in the room finish schedules. All lighting fixtures shall be coordinated with the architectural requirements to insure that the proper trim kit, and/or mounting accessory is provided with each fixture for the intended application. All trim kits and accessories shall be provided by Contractor whether or not they are specifically indicated by the manufacturer’s catalog numbers on the lighting fixture schedule.

C. The locations of all lighting fixtures are approximate. Locations are subject to modifications at the time of installation in order to meet field conditions. Make such changes without extra charge; however, obtain approval from Engineer before any work is started which involves such modifications.

**PART 2 - PRODUCTS**

2.01 GENERAL

A. Provide all fixtures as called for in the schedules complete with lamps.

B. Provide manufacturer's standard finish unless otherwise noted.

C. Design all recessed or semi-recessed fixtures compatible with ceilings as installed. Provide frames where required for proper installation.

D. Furnish complete, all fixtures requiring end caps, mounting spacers or other necessary items whether the catalog number shown includes such items or not.

E. Conceal all fixture parts within the fixture construction.

**F. Self locking lenses/latches are not acceptable.**

G. Lighting fixture construction shall effectively eliminate light leaks between the frame, lens, housing and the interior finish surface. Furnish one lens hold-down clip at two foot centers.

H. Linear fluorescent lampholders shall be turn type, medium base, bi-pin, 660 watt, 600 volt.

I. Conceal all fixture parts, including emergency components, within the fixture construction.

J. Fixture construction shall allow parts and lens to be replaced without special tooling.

K. Fixture shall be provided with disconnecting means per NEC 2008.

2.02 FLUORESCENT LIGHTING FIXTURES

A. Grid troffers (lay-ins) must conform to the following:

1. Steel housing with T-bar clips.

2. Flush steel door frame with metal rotary action latches. Door latches or hinges from either side.

3. Diffusers (lens) shall be flat, UV stabilized, acrylic, # 12 pattern a with minimum thickness of 0.095 inches.

B. Wet location troffers must conform to the following:

1. Steel housing.

2. Flush aluminum door frame with metal rotary action latches.

a. Door latches or hinges from either side.

b. Neoprene gasketing between the lens, doorframe, housing and mounting surface.

3. Diffusers (lens) shall be flat, UV stabilized, acrylic, # 12 pattern with internal prisms and a minimum thickness of 0.125 inches.

C. Surface or stem mounted fixtures with a lens must conform to the following:

1. Steel housing.

2. Flush steel door frame with metal rotary action latches.

3. Diffusers (lens) shall be flat, UV stabilized, acrylic, # 12 pattern with a minimum thickness of 0.095 inches.

D. Strip lights must conform to the following:

1. Steel, heavy duty construction.

2. 4 foot lamp lengths. Tandem, double length units are acceptable.

3. Lampholder are secured by a screwed-on end plate.

4. 4 foot wireguards. Tandem units require 2.

2.03 COMPACT FLUORESCENT LIGHTING FIXTURES

A. Compact fluorescent downlights must conform to the following:

1. Galvanized steel frame with adjustable hangers.

2. Outdoor and wet area fixtures shall be lensed, gasketed and listed for wet locations. Only lenses which are flat shall be provided.

3. Electronic ballast if available.

2.04 FLUORESCENT BALLAST

A. Ballast which are located outdoors and in un-heated indoor areas shall be rated for reliable starting to 0 degree F.

B. All fluorescent ballasts must conform to the following:

1. Thermally protected Class P with auto restart circuitry.

2. Class “A” sound rating.

3. Power factor equal to or greater than 90.

4. Contain no PCBs or asbestos.

5. Certification Ballast Manufacturers (CBM) approved.

6. Provide Quick Disconnect (QD) option for quick disconnecting of all ballasts.

C. Linear fluorescent ballast must conform to the following:

1. Fixtures with three or more lamps shall have two ballast to accommodate dual level switching. Provide 1 or 2 lamp ballasts. Do not use 3 and 4 lamp ballasts. All ballast are to be installed within the fixture of the lamps served.

2. Electronic, instant-start and parallel-connected.

3. Enclosed in a metal enclosure.

4. Provided with integral, color coded leads.

5. Operate at a frequency of 20kHZ or greater with less than 3 % visible lamp flicker.

6. Input current total harmonic distortion (THD) shall not exceed 10%.

7. Lamp current crest factor (ratio of peak to RMS current) shall be 1.7 or less.

8. Operate from a 60 Hz input source of 120 or 277 volts and sustain variations of ± 10% (Voltage & Frequency) with no damage to the ballasts.

9. Provide transient immunity.

10. Allow remaining lamp(s) to maintain full light output if one or more lamps fail.

11. Tolerate sustained open circuit and short circuit output conditions without damage.

12. Tolerate operation of up to 65 deg. C. case temperature without damage.

13. Comply with the Federal Communication Commission Rules and Regulations for electromagnetic/radio frequency interference (EMI/RFI), for non-consumer equipment (class A).

D. Compact fluorescent ballast must conform to the following:

1. Operate at a frequency of 20kHZ or greater with less than 3 % visible lamp flicker.

2. Input current total harmonic distortion (THD) shall not exceed 20%.

3. Lamp current crest factor (ratio of peak to RMS current) shall be 1.7 or less.

4. Operate from a 60 Hz input source of 120 or 277 volts and sustain variations of ± 10% (Voltage & Frequency) with no damage to the ballasts.

5. Provide transient immunity.

6. Tolerate sustained open circuit and short circuit output conditions without damage.

7. Comply with the Federal Communication Commission Rules and Regulations for electromagnetic/radio frequency interference (EMI/RFI), for non-consumer equipment (class A).

## 2.05 FLUORESCENT POWER PACKS

A. Where indicated, furnish a system consisting of a sealed rechargeable maintenance-free nickel cadmium battery, battery charger, solid state inverter, test switch, and pilot light.

B. Fluorescent power packs must conform to the following:

1. Suitable for use in both normal and emergency operational modes.

2. Compatible with magnetic and electronic, instant start, 4 foot T8 lamps.

3. Produce 1000 to 1400 lumens initial emergency light output.

4. Operate one lamp in each fixture for a minimum of 90 minutes.

5. Steel housing, approx. 9 3/8” long, mounted concealed within the ballast channel.

6. Test switch and pilot light mounted on the ballast channel cover.

C. Label emergency lighting power packs, using a black marking pen, with the identity of the un-switched circuit.

2.06 EMERGENCY EXIT LIGHTS

A. Exit lights must conform to the following:

1. Furnish a system consisting of a sealed rechargeable maintenance-free nickel cadmium battery, battery charger, solid state inverter, test switch, and pilot light.

2. Meet or exceed the current NFPA requirements.

3. Light emitting diode (LED) type.

4. Die-cast aluminum.

5. Concealed and removable directional chevron knock-outs.

6. Stencil face.

7. Red letter color.

B. Label power packs, using a black marking pen, with the identity of the un-switched circuit.

2.07 METAL HALIDE FIXTURES

A. Metal halide downlights must conform to the following:

1. Galvanized steel frame with adjustable hangers.

2. Outdoor and wet area fixtures shall have flat tempered glass lens with gaskets.

3. Porcelain lamp socket of copper alloy with nickel plated screws, shell and center contact.

B. High and low bay light fixtures must conform to the following:

1. Die-cast aluminum housing.

2. Pendant splice box which allows the fixture housing to slide on.

3. Enclosed glass reflector for high bay

4. Enclosed acrylic reflector for low bay.

5. Porcelain, mogul lamp socket of copper alloy with nickel plated screws, shell and center contact.

6. Full wire-guard, 2 piece, to protect the lens and the reflector.

7. Safety chain.

8. Outdoor and wet area fixtures shall have gaskets.

C. Recessed squares (2 X 2, T-bar and non-T-bar mounted) must conform to the following:

1. Steel housing.

2. Earthquake clips.

3. Flush steel door frame with metal rotary action latches.

4. Flat tempered prismatic glass lens.

5. Porcelain lamp socket of copper alloy with nickel plated screws, shell and center contact.

2.08 HIGH INTENSITY DISCHARGE BALLAST

A. All metal halide ballasts must conform to the following:

1. Field replaceable without the need of special tools.

2. Core and coil, lag type, high reactance, autotransformer, high power factor ballasts for 50-150 watt ballast.

3. Core and coil, constant wattage, autotransformer, high power factor ballasts for 175-1500 watt ballast.

4. All ballast must conform with ‘Energy Independence and Security Act 2007’.

B. Library ballast shall achieve an “A” sound rating.

2.09 LAMPS

A. Incandescent lamps shall be rated at 130 volt and have medium, screw, brass bases.

B. Linear and compact fluorescent lamps shall have a color rendering index (CRI) of 80 or greater and a color temperature of 3500 Kelvins.

C. Mogul base HID lamps are preferred over medium bases.

2.09 LED LIGHT FIXTURE

A. Power supplies must use Constant Current Reduction (CCR) for dimming.

B. LED lamps shall have a color rendering index (CRI) of 80 or greater and a color temperature of 3500 Kelvins for interior fixtures and 4100 Kelvins for exterior fixtures or as specified on drawings.

C. Lamp life of minimum of 60,000 hours or as specified.

D. Fixtures must be supplied with multiple power supplies for multi-level switching when specified.

**PART 3 - EXECUTION**

3.01 INSTALLATION

A. Set luminaries true, free of light leaks, warps, dents or other irregularities. Provide the length of stems as required to hang all luminaries level and in the same plane. **VERIFY THE TYPE OF ALL CEILINGS BEFORE ORDERING FIXTURES, AND PROVIDE FIXTURES AND MOUNTINGS TO SUIT.** Mount all fixtures at a position and height to clear equipment, ductwork, piping, etc., in mechanical rooms, storage rooms, etc. Provide appurtenances for all light fixtures, which include stud supports, stems, mounting brackets, frames and plaster rings.

B. Support luminaries only from structural elements which are capable of carrying the total weight. Mount all lighting fixtures rigid with no rocking action. Provide 13/16" channels as needed.

C. The locations of all lighting fixtures as shown are approximate. It is understood that they are subject to such modifications as may be found necessary or desirable at the time of installation in order to meet field conditions. Make such changes without extra charge; however, obtain approval from Engineer before any work is started which involves such modifications.

D. Install ballasts and fixtures in accordance with the NEC and ANSI Standards.

E. Adjust all floodlights and spotlights to the satisfaction of the Engineer.

F. Connect all exit lighting fixtures to the nearest unswitched circuit or the nearest emergency circuit. Connect all emergency lighting fixtures to same circuit as normal area lighting in same area per NEC Article 700

G. Provide and install necessary hardware and accessories to maintain 1.5 inches clearance from combustible material on all light fixtures with ballast.

H. Provide all exit signs with required directional arrows, to indicate direction of egress travel.

**I. Fixtures shall <u>NOT</u> be daisy chained together.**

J. Troffer (lay-in) lighting fixtures shall be supported from the building structure by a minimum 12 gage galvanized carbon steel soft temper hanger wires. Install two hangers at diagonally opposite corners of each lay-in light fixture 2'x4' or smaller and one hanger at each corner of each lay-in light fixture larger than 2'x4'. Supporting of light fixtures from ceiling system is not acceptable.

K. Each recessed lighting fixture shall be separately connected to a junction box with a flexible wiring method (i.e. daisy chaining from fixture to fixture is not allowed). The flexible conduit from the junction box to the fixture shall not lay on the ceiling as finally installed and shall not exceed 6 feet in length.

L. Boxes to which light fixtures or pendants are mounted shall NOT contain any conductors foreign to the operation of such light or pendant application. Removal of lights, pendants and cord drops to access other branch circuits is NOT acceptable.

M. Pendant mounted light fixtures shall be provided with ¾", threaded, rigid metal conduit, painted to match the fixture color.

N. Install flush mounted fixtures properly to eliminate light leakage between fixture frame and finished surface, provide gaskets as needed.

O. Install high or low bay light fixtures between the joist with the bottom of the reflector flush with the bottom cord of the joist. Engineer will direct if obstructions such as ducts, beams, etc. are permanently installed below the joist.

P. Locate mechanical, electrical, equipment, etc. room light fixtures to provide the best coverage and clear all obstructions such as ducts, piping, bracing and supports.

Q. Fluorescent High Bay are to be rigidly mounted with all thread, ¾" threaded rigid metal conduit and unistrut as required.

3.02 CLEAN UP

A. Leave all fixtures in clean condition, free of dirt and defects.

**END OF SECTION**

## SECTION 26 56 00 - EXTERIOR LIGHTING SYSTEM

### PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Provide all exterior lighting fixtures and equipment as specified in the fixture schedule. Include all necessary accessories and appurtenances required for a complete and operating system whether or not specifically shown. Exterior lights shall be circuited through lighting contactor for time clock/photocell control.

1.02 STANDARDS

A. Provide all materials and accessories, whether specifically described or not, of the best grade of commercial manufacturer. Provide first class workmanship in every respect.

B. Provide all lighting fixtures with Underwriters' label and manufacturer's label. Attachment of U.L. labels after delivery of fixtures will not be acceptable.

C. Manufacture lighting fixtures in accordance with the National Electrical Code.

D. Provide lamps manufactured by North American Phillips or Sylvania. Unless otherwise indicated, lamp designations shown on the fixture schedule are Sylvania.

1.03 ACCEPTABLE LIGHTING PACKAGES:

A. Lithonia

B. Thomas Daybrite

C. Hubbell

D. Others as scheduled or noted

1.04 SUBMITTALS

A. Furnish Engineer shop drawings for each fixture.

B. Provide shop drawing which includes the following information:

1. Fixture type per the fixture schedule
2. Manufacturer of the fixture
3. Physical dimensions of the fixture
4. Manufacturer's standard finish
5. Lamp type recommended by the manufacturer
6. Fixture output distribution curves and photometrics
7. Ballast temperature rating, voltage, wattage, and manufacturer
8. Material type of lens

C. Furnish structural engineer with approved shop drawings on pole, post and Bollard light fixtures for purpose of designing fixture base.

1.05 PRODUCT STORAGE AND HANDLING

Protect fixtures delivered to the job site from the entrance of water and dust at all times. Replace fixtures damaged by improper handling or storage.

**PART 2 - PRODUCTS**

2.01 GENERAL

A. Provide luminaire complete with the fixture housing, refractor, lamp, and ballast.

B. Provide type, wattage, and voltage lamp designated on Drawings.

C. Where indicated on Drawings, provide parking lot poles and floodlight poles.

**PART 3 - EXECUTION**

3.01 INSTALLATION

A. Orient lighting fixtures as shown on Drawings.

B. Adjust all floodlights and spotlights to the satisfaction of the Engineer.

C. Coordinate exact location of lighting fixtures with Architect prior to rough-in.

3.02 CLEAN UP

A. Leave all fixtures and poles in clean condition, free of dirt and defects.

**END OF SECTION**

### Williamson County, TX

# RIVER RANCH COUNTY PARK Interpretive Center

## Issue For Bid

**February22, 2019**

## Location Map (NTS)




## Signatures

Client Name/ Title _____ Date _____

Client Name/ Title _____ Date _____

Client Name/ Title _____ Date _____

Client Name/ Title _____ Date _____

Client Name/ Title _____ Date _____




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| M001 | Schedules | • | • | • |
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| M210 | Floor Plan | • | • | • |
| P000 | Schedules, Notes and Legends | • | • | • |
| P001 | Details | • | • | • |
| P210 | Floor Plan | • | • | • |

**OWNER**
Williamson County, TX
Parks and Recreation Dept.
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Leander, TX 78641
Tel: (512) 943-1920

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Facsimile: (512) 499-0229

**CIVIL ENGINEER:**
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Facsimile: (512)476-0216

**MEP ENGINEER:**
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115 East Main Street
Round Rock, Texas 78664
Tel: (512) 218-0060

**STRUCTURAL ENGINEER:**
Engineering 360, Inc.
2851 Joe DiMaggio Blvd #22
Round Rock, TX 78665
Tel: (512) 244-1966

## GENERAL LANDSCAPE NOTES

1. Contractor shall protect and maintain all improvements until reviewed and approved by the Engineer, Landscape Architect and Owner
2. Contractor shall take necessary precautions to avoid any disturbance to existing conditions to remain and/or completed 'finish work' by others. Any disturbance and/or damage shall be restored (repaired) to a condition that meets and/or exceeds the previous non-disturbed state at the Contractor's expense.
3. Contractor shall provide paving surfaces that are flush, have positive drainage (1% minimum), particularly away from all buildings/structures, are slip-resistant, and meet smoothly and evenly with adjacent surfaces. Contractor shall provide expansion joints per approved detail wherever concrete pavement (incl. sub-slabs) meets buildings, structures, curbing, walls, other concrete or stone surfaces, etc. See also Site Details.
4. Stake proposed location for all furniture, lighting and trail elements in field for approval by Landscape Architect prior to installation.

## EXISTING CONDITIONS NOTES

1. Existing underground utilities are shown per available records. Verify the actual location and elevation in the field prior to beginning construction of the new facilities. Contractor shall protect existing utilities and be responsible for damage to utilities encountered during construction. Contact Texas "One Call" prior to digging.
2. Request inspection as required 48 hours in advance of performing any work unless otherwise noted on this sheet.
3. Debris created by removal operations become the property of the Contractor and are to be legally disposed of away from the job site, unless otherwise approved by Landscape Architect.
4. Notify local underground service companies for utility finds 48 hours prior to any excavation.
5. Verify in field for location of subsurface drainage elements.
6. Refer to survey and field conditions for documented existing conditions.
7. Follow all applicable tree protection per plans.

## MATERIALS, FINISHING AND LAYOUT NOTES

1. Layout and verify dimensions prior to construction. Bring discrepancies to the attention of the Landscape Architect.
2. Written dimensions take precedence over scale. Do not scale drawings.
3. Where dimensions are called as "equal (EQ)", space referenced items equally, measured to (their center lines).
4. Measurements are to face of building, wall or the fixed site improvement. Dimensions to center lines is indicated.
5. Install intersecting elements at 90 degree angles to each other unless otherwise noted.
6. Provide expansion joints where concrete flatwork meets vertical structures such as walls, curbs, steps and building elements.
7. Contractor is responsible for ensuring that all finished conditions have positive drainage as shown (no pooling or ponding) and meet all code requirements (cross slopes, vertical tolerances, etc).
8. Joint locations may vary based on field conditions.
9. Quantities of joints shown in plans should be observed. The layout shows design intent only; joint quanities shown shall be spaced evenly between logical break points.
10. All layout to align with face of building/property line. Curb alignments vary slightly and the dimension between features and front of curb should be considered a flex dimension.
11. Refer to materials plans and dimension control plans for expansion and control joint locations.
12. Dimensions on plan represent locations of key features and alignments; refer to details for specific dimensions and materials.
13. Designed intent is for most objects or elements to align, form equal spacing, or center between logical break points. Variations to this intent in either drawings, field directions or ASI (Architect's Supplemental Instructions) documents should be brought to the attention of the Landscape Architect prior to work.

## GRADING AND DRAINAGE

1. Existing underground utilities are shown per available records. Verify the actual location and elevation in the field prior to beginning construction of the new facilities. Protect existing utilities and be responsible for damage to utilities encountered during construction.
2. Request inspection as required 48 hours in advance of performing any work unless otherwise noted on this sheet.
3. Debris created by removal operations become the property of the Contractor and is to be legally disposed of away from the job site.
4. Notify local underground service companies for utility finds 48 hours prior to any excavation.
5. Finished conditions shall provide NO exposed PVC or other tubing/piping.
6. Provide a 2% maximum cross slope on all sidewalks, landings, curb ramps, crosswalks, and driveway areas that include pedestrian routes.
7. All walking surfaces shall be graded evenly and avoid all ponding or pooling of water.
8. Contractor shall provide paving surfaces that are flush, have positive drainage (1% minimum), particularly away from all buildings/structures, are slip-resistant, and meet smoothly and evenly with adjacent surfaces.

## LANDSCAPE PLANTING NOTES

1. Prior to major excavation, have utility locations verified by a licensed surveyor for precise grading plans for utility location and final grading. If actual site conditions vary from what is shown on the plans, contact the Landscape Architect for direction as to how to proceed.
2. Verify locations of pertinent site improvements installed under other sections. If any part of this plan cannot be followed due to site conditions, contact Landscape Architect for instructions prior to commencing work.
3. Exact locations of plant materials to be approved by the Landscape Architect in the field prior to installation. Landscape Architect reserves the right to adjust plants to exact location in field.
4. Verify plant counts and square footages: Quantities are provided as Owner information only. If quantities on plant list differ from graphic indications, then graphics shall prevail.
5. Contact the local underground utility services for utility location and identification.
6. Perform excavation in the vicinity of underground utilities with care and if necessary, by hand. The Contractor bears full responsibility for this work and disruption or damage to utilities shall be repaired immetely at no expense to the Owner.
7. Trees shall bear same relation to finished grade as they bore to existing.
8. Trees to be planted a minimum of 5' from face of building, or pavement, except as approved by Landscape Architect.
9. Provide matching forms and sizes for plant materials within each species and size designated on the drawings, unless noted.
10. Prune newly planted trees only as directed by Landscape Architect.
11. Finish grades of shrub areas shall be 1/2 inch below adjacent paving or header.
12. If trees or other plantings overhang circulation routes without protection at 27" a.f.f. or lower, assure they do not extend greater than 4" into the circulation route at a height of 80" above grade or lower (per ADA).
13. Refer to details for tree protection requirements.
14. Verify location/condition of all existing irrigation in the field. Coordinate service interruption with owner/resident prior to work.
15. Exercise precautions to keep the soil friable and porous. Do not handle or work soil when it is excessively wet, or during a rainfall. Do not place soil on any subgrade that has not been loosened or tilled, or allowed for drainage. Loosen and till the full depth of the soil and re-till any areas that become unduly compacted by vehicular movement.
16. The Contractor shall be responsible for minor adjustments to the finished subgrade if such treatment is required in the opinion of the landscape architect.
17. Hand rake the surface, removing all clods and undesirable material greater than one half inch (1/2") from ground surface. Fill all low spots with specified materials and cut irregularities to the acceptance of the landscape architect.
18. An acceptable fine grade shall be free from depressions greater than 6 inches (6") over any given space of 25' except at grade transitions which shall be gradual and even.
19. After completion of fine grading and soil operations, do not drive trucks or other heavy equipment over finished areas.
20. Upon completion of the work, remove all debris and excess material from the site so that the area is left neat and clean.
21. Filter fabric (geotextile) shall provide permeable layers while retaining soil matrix. Use fabric which meets physical requirements for Class A conditions defined by AASHTO M 288. Non-woven, non-degradeable fabric consisting of continuous chain polymer filaments or yarns at least 85% by weight polyolefins formed into a stable network.

## TABLE OF ABBREVIATIONS

| | | | |
|---|---|---|---|
| APPROX | APPROXIMATE | MH | MANHOLE |
| ARCH | ARCHITECT | MIN | MINIMUM |
| AVG | AVERAGE | MISC | MISCELLANEOUS |
| B&B | BALLED AND BURLAPPED | MTD | MOUNTED |
| BC | BOTTOM OF CURB | MTL | METAL |
| BF | BOTTOM OF FOOTING | N | NORTH |
| BLDG | BUILDING | NIC | NOT IN CONTRACT |
| BM | BENCHMARK | NO | NUMBER |
| BOC | BACK OF CURB | NOM | NOMINAL |
| BR | BOTTOM OF RAMP | NTS | NOT TO SCALE |
| BRG | BEARING | OC | ON CENTER |
| BS | BOTTOM OF STEP | OD | OUTSIDE DIAMETER |
| BW | BOTTOM OF WALL | OPP | OPPOSITE |
| CAL | CALIPER | PA | PLANTING AREA |
| CAP | CAPACITY | PAR | PARALLEL |
| CF | CUBIC FEET | PC | POINT OF CURVATURE |
| CHAM | CHAMFER | PE | POLYURETHANE |
| CIP | CAST IN PLACE | PERF | PERFORATED |
| CJ | CONTROL JOINT | PED | PEDESTRIAN |
| CL | CENTER LINE | PI | POINT OF INTERSECTION |
| CLR | CLEARANCE | PL | PROPERTY LINE |
| CM | CENTIMETER | PT | POINT, POINT OF TANGENCY |
| CO | CLEAN OUT | PVC | POLYVINYL CHLORIDE |
| COMP | COMPACTED | PVMT | PAVEMENT |
| CONC | CONCRETE | PVR | PAVER |
| CONST | CONSTRUCTION | QTY | QUANTITY |
| CONT | CONTINUOUS | R | RADIUS |
| CONTR | CONTRACTOR | RECEP | RECEPTACLE |
| CU | CUBIC | REF | REFERENCE |
| CY | CUBIC YARD | REINF | REINFORCE(D) |
| DBL | DOUBLE | REM | REMOVE |
| DF | DIRECTION OF FLOW | REQ'D | REQUIRED |
| DEG | DEGREE | REV | REVISION, REVISED |
| DEMO | DEMOLISH, DEMOLITION | ROW | RIGHT OF WAY |
| DIA | DIAMETER | RT | RIGHT |
| DIM | DIMENSION | S | SOUTH |
| DTL | DETAIL | SAN | SANITARY |
| DWG | DRAWING | SCH | SCHEDULE |
| E | EAST | SD | STORM DRAIN |
| EA | EACH | SEC | SECTION |
| EJ | EXPANSION JOINT | SF | SQUARE FOOT (FEET) |
| EL | ELEVATION | SHT | SHEET |
| ELEC | ELECTRICAL | SI | STORM INLET |
| ENG | ENGINEER | SIM | SIMILAR |
| EQ | EQUAL | SNT | SEALANT |
| EQUIP | EQUIPMENT | SPECS | SPECIFICATIONS |
| EST | ESTIMATE | SQ | SQUARE |
| E.W. | EACH WAY | ST | STORM SEWER |
| EXIST | EXISTING | SY | SQUARE YARD |
| EXP | EXPANSION, EXPOSED | STA | STATION |
| FF | FINISHED FLOOR ELEVATION | STD | STANDARD |
| FG | FINISHED GRADE | STL | STEEL |
| FIN | FINISH | STRL | STRUCTURAL |
| FL | FLOW LINE | SYM | SYMMETRICAL |
| FOC | FACE OF CURB | T&B | TOP AND BOTTOM |
| FT | FOOT (FEET) | TBC | TOP OF BACK CURB |
| FTG | FOOTING | TC | TOP OF CURB |
| GA | GAUGE | TF | TOP OF FOOTING |
| GAL | GALVANIZED | THK | THICK |
| GC | GENERAL CONTRACT(OR) | TOC | TOP OF CONCRETE |
| GEN | GENERAL | TOPO | TOPOGRAPHY |
| HORIZ | HORIZONTAL | TSL | TOP OF SLAB |
| HP | HIGH POINT | TRAS | TRANSFORMER |
| HT | HEIGHT | TR | TOP OF RAMP |
| ID | INSIDE DIAMETER | TS | TOP OF STEP |
| INV | INVERT ELEVATION | TW | TOP OF WALL |
| IN | INCH(ES) | TYP | TYPICAL |
| INCL | INCLUDE(D) | VAR | VARIES |
| INL | INLET | VERT | VERTICAL |
| IRR | IRRIGATION | VEH | VEHICLE |
| JT | JOINT | VOL | VOLUME |
| LIN | LINEAR | W/ | WITH |
| LF | LINEAR FEET | W/O | WITHOUT |
| LP | LOW POINT | WT | WEIGHT |
| LT | LIGHT | WL | WEIR LEVEL |
| MATL | MATERIAL | WWF | WELDED WIRE FABRIC |
| MAX | MAXIMUM | YD | YARD |
| MEMB | MEMBRANE | @ | AT |

## PLANT KEYNOTES:




## SITE KEYNOTES:

DETAIL / SHEET — SPEC. SECTION

**1.0 PAVEMENTS, RAMPS, CURBS**

1.1 Text description — 0 / L0-01 — 000000

- KEYNOTE HEADING (PROPOSED IMPROVEMENT SYSTEM)
- KEYNOTE CALL-OUT
- KEYNOTE (SYSTEM) ITEM AND BRIEF DESCRIPTION
- DETAIL REFERENCE (NUMBER AND SHEET) NOTE: MULTIPLE DETAILS MAY BE REFERENCED
- SPECIFICATION REFERENCE (CSI SECTION NUMBER MASTER FORMAT 2004) NOTE: MULTIPLE SPECIFICATIONS MAY BE REFERENCED

**(SUBGROUP TITLE)**

1 Text description

2 Text description

- SUPPLEMENTAL NOTE (SUPPLEMENTAL INFORMATION TO KEYNOTES. TYPICALLY DESCRIBES ITEMS TO BE CONSIDERED DURING CONSTRUCTION. MAY BE REFERENCED TO A DETAIL AND/OR SPECIFICATION.
- NOTE CALL-OUT

## LINETYPE LEGEND

- LOC — **LIMIT OF CONSTRUCTION**
- **PROPERTY LINE**
- **EXISTING TRAIL**

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**CIVIL:**
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**ARCHITECT:**
**McKINNEY YORK, 512.476.0201**

**MEP:**
**HENDRIX CONSULTING, 512.218.0060**

**STRUCTURAL:**
**ENGINEERING 360, 512.244.1966**

# RIVER RANCH COUNTY PARK INTERPRETIVE CENTER

WILLIAMSON COUNTY, TX




2/22/2019

ISSUE DATE: _____

REVISIONS

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ISSUE FOR BID

PROJECT NUMBER: 5619

LANDSCAPE NOTES

SHEET NUMBER

**L0-01**

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NORTH

0 20 40 80

ORIGINAL SCALE: 1"=40'

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**MEP:**
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**STRUCTURAL:**
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# RIVER RANCH COUNTY PARK INTERPRETIVE CENTER

## WILLIAMSON COUNTY, TX

REGISTERED LANDSCAPE ARCHITECT
LAURE HEMPEL
2455
STATE OF TEXAS

2/22/2019

ISSUE DATE:

REVISIONS

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# ISSUE FOR BID

PROJECT NUMBER: 5619

# REFERENCE PLAN

SHEET NUMBER

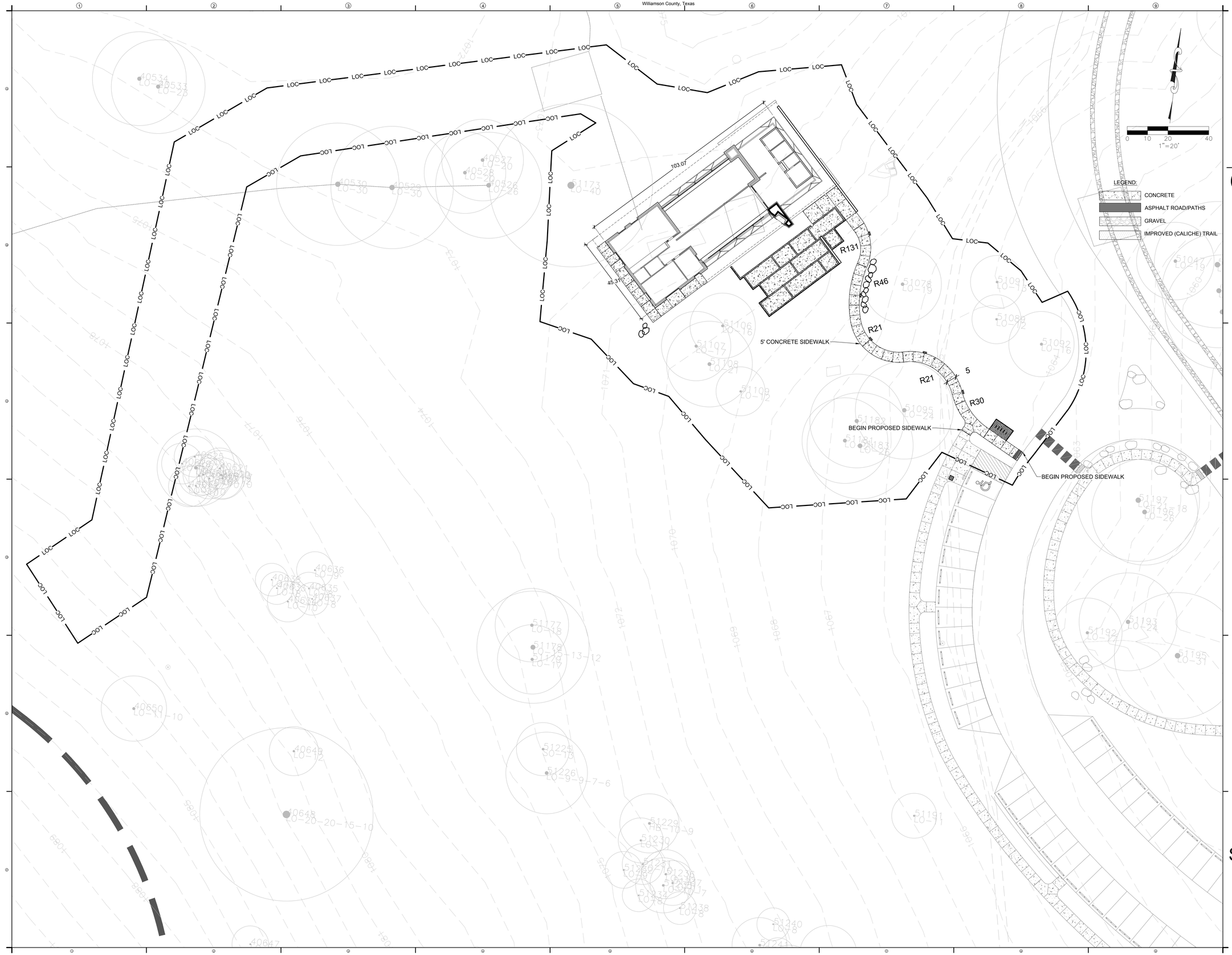
# L0-02

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6/28/2019 1:30 PM

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# RIVER RANCH COUNTY PARK INTERPRETIVE CENTER

## WILLIAMSON COUNTY, TX

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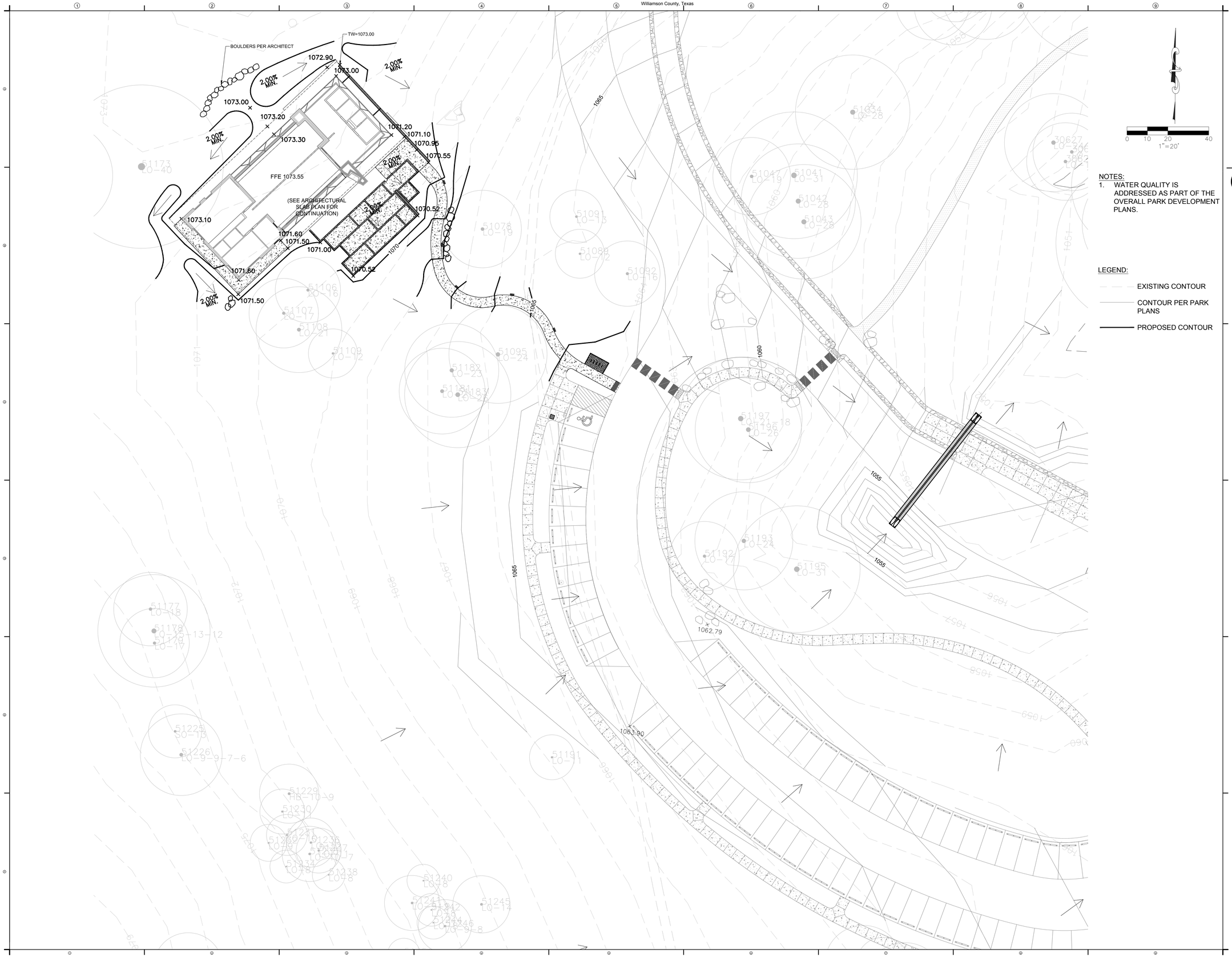
PROJECT NUMBER: 5619

# SITE & DIMENSION CONTROL

SHEET NUMBER

**C1-01**

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NOTES:
1. WATER QUALITY IS ADDRESSED AS PART OF THE OVERALL PARK DEVELOPMENT PLANS.

LEGEND:

- EXISTING CONTOUR
- CONTOUR PER PARK PLANS
- PROPOSED CONTOUR

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# RIVER RANCH COUNTY PARK INTERPRETIVE CENTER

## WILLIAMSON COUNTY, TX

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PROJECT NUMBER: 5619

# GRADING & DRAINAGE

SHEET NUMBER

# C2-01

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LEGEND:

- PREFERRED UNDERGROUND ELECTRICAL ROUTING (FINAL ROUTING TO BE COORDINATED WITH LANDSCAPE ARCHITECT) PER PARK PLANS
- W — WATER LINE PER PARK PLANS
- PREFERRED UNDERGROUND ELECTRICAL ROUTING (FINAL ROUTING TO BE COORDINATED WITH LANDSCAPE ARCHITECT)
- W — PROPOSED WATER LINE

STA 3+33.77
1-45° BEND

PI: 3+33.77

PI: 3+38.87

STA 3+70.26
1-22.5° BEND

PI: 3+75.15

STA 3+75.15
1-22.5° BEND

STA 3+38.87
1-45° BEND

STA 5+30.52
1-45° BEND

PI: 5+21.14

STA 5+21.14
1-45° BEND

STA 5+50
1-1" WATER METER (DOMESTIC)
1-2" G.V. & BOX

STA 5+50
1-1" WATER METER (IRRIGATION)
1-RPZ BACKFLOW PREVENTER
1-2" G.V. & BOX

PI: 5+72.24

STA 5+72.24
1-22.5° BEND

PI: 5+81.07

STA 5+81.07
1-22.5° BEND

STA 5+86.44
END 2" IRRIGATION WATER
LINE 5' FROM BUILDING

STA 5+95.71
END 2" DOMESTIC WATER
LINE 5' FROM BUILDING

EXISTING ELECTRIC
CONDUIT PER PHASE 1

EXTEND 19 LF ELECTRIC
CONDUIT TO 5' FROM BUILDING

EXISTING LOCATION OF SEPTIC
TANK PER PHASE 1 PLANS

PROPOSED LOCATION OF
SEPTIC TANK TO BE MOVED
AS PART OF PHASE 1

PHOLE #1

PHOLE #2

PI: 14+13.24

STA 1+00
BEGIN 2" DOMESTIC WATER
LINE AT EXISTING 2" STUB

STA 1+32.02
1-45° BEND

PI: 1+32.02

BP: 1+00.00

EP: 1+13.83

STA 1+33.83
1-45° BEND

STA 1+00
BEGIN 2" IRRIGATION WATER
LINE AT EXISTING 2" STUB

NOTES:

1. THE 2" WATER LINE SHOWN TO THE MAINTENANCE BUILDING AND RESIDENCE IS FOR SCHEMATIC REPRESENTATION PURPOSES ONLY. ALL DIMENSIONS SHOWN ARE APPROXIMATE. THE CONTRACTOR SHALL STAKE THE WATER LINE ALIGNMENT IN THE FIELD, AVOIDING ALL TREES, AND CONTACT THE LANDSCAPE ARCHITECT AND CIVIL ENGINEER TO REVIEW THE ALIGNMENT IN THE FIELD PRIOR TO CONSTRUCTION.
2. FOR ALL OTHER WATER AND UTILITY LINES NOT DESCRIBED IN NOTE 1, THE CONTRACTOR SHALL STAKE THE ALIGNMENTS IN THE FIELD, AVOIDING ALL TREES, AND CONTACT THE LANDSCAPE ARCHITECT AND CIVIL ENGINEER TO REVIEW THE ALIGNMENT IN THE FIELD PRIOR TO CONSTRUCTION.
3. CONTRACTOR SHALL MAINTAIN 3' MINIMUM COVER OVER ALL WATER AND OTHER UTILITY LINES UNLESS NOTED OTHERWISE.
4. WORK WITH CAUTION AROUND ALL EXISTING TREES.
5. THE CONTRACTOR SHALL STAKE ALL SEPTIC FACILITIES (I.E. LINES, TANKS, FIELDS, ETC.) IN THE FIELD, AVOIDING ALL TREES, AND CONTACT THE LANDSCAPE ARCHITECT AND CIVIL ENGINEER TO REVIEW IN THE FIELD PRIOR TO CONSTRUCTION.
6. SEE MEP PLANS FOR CONTINUATION OF ALL WATER LINES TERMINATING AT BUILDINGS AND/OR WATER FACILITIES.
7. ALL VALVE, FIRE HYDRANT, AND METER SYMBOLS ARE SHOWN FOR REPRESENTATION PURPOSES ONLY. ALL VALVES AND FIRE HYDRANTS SHALL BE PLACED OUTSIDE OF ROADS, SIDEWALKS, TRAILS, CALICHE, AND ANY PAVED AREAS.
8. ALL FINAL OVERHEAD AND ELECTRICAL ROUTES SHALL BE COORDINATED WITH THE LANDSCAPE ARCHITECT PRIOR TO CONSTRUCTION.
9. ALL WATER, WASTEWATER, ELECTRIC, AND ALL OTHER UTILITY LINES SHALL BE A MINIMUM OF 10' FROM ALL SEPTIC FACILITIES (I.E., LINES, TANKS, FIELDS, ETC.).
10. ALL SEPTIC FACILITIES (I.E. LINES, TANKS, FIELDS, ETC.) ARE SHOWN FOR INFORMATIONAL PURPOSES ONLY. THE CONTRACTOR SHALL REFER TO THE SEPTIC DESIGN PLANS FOR DETAILS.

0 10 20 40
1" = 20'

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# RIVER RANCH COUNTY PARK INTERPRETIVE CENTER

## WILLIAMSON COUNTY, TX

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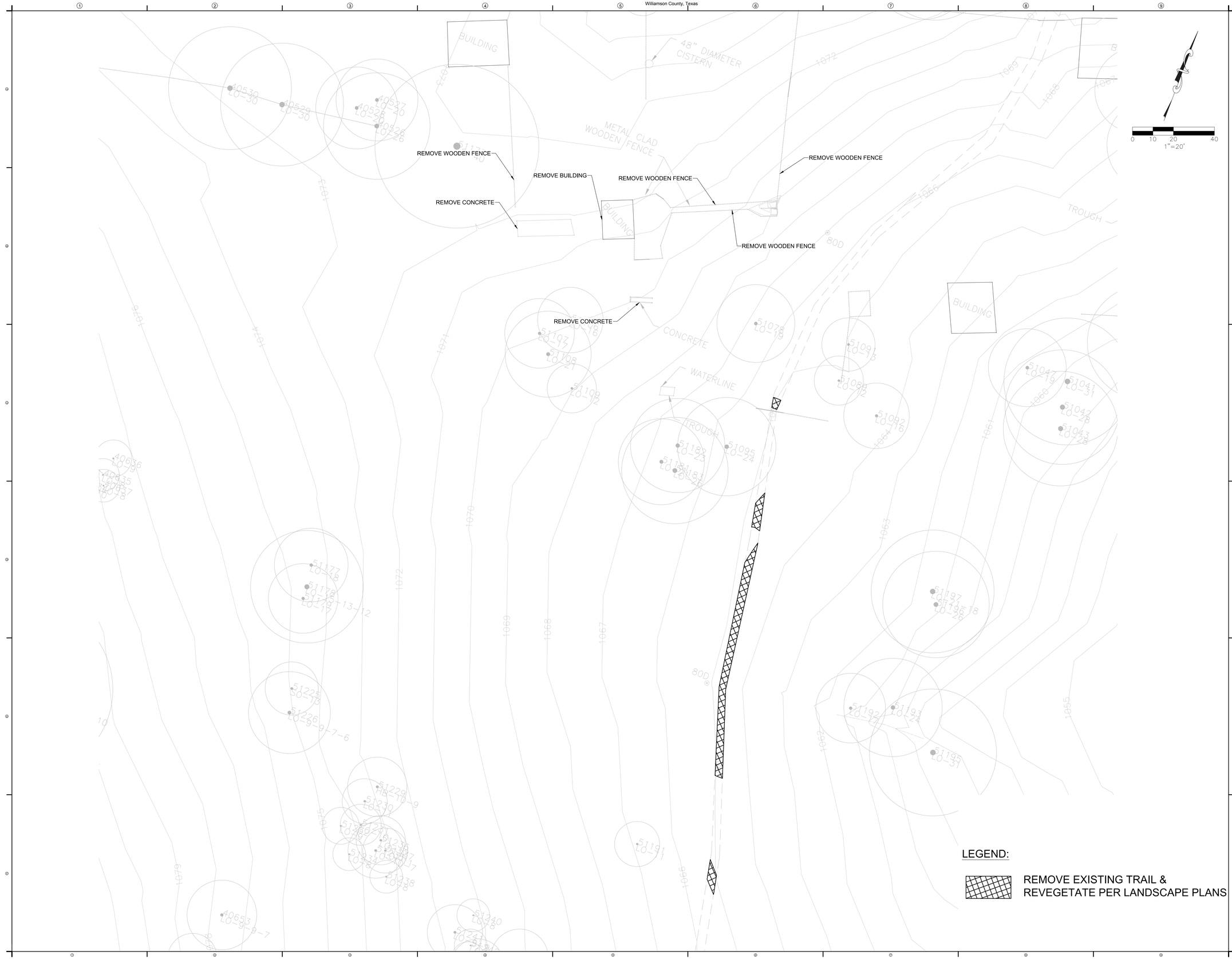
PROJECT NUMBER: 5619

# UTILITY PLAN

SHEET NUMBER

**C3-01**

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LEGEND:

REMOVE EXISTING TRAIL & REVEGETATE PER LANDSCAPE PLANS

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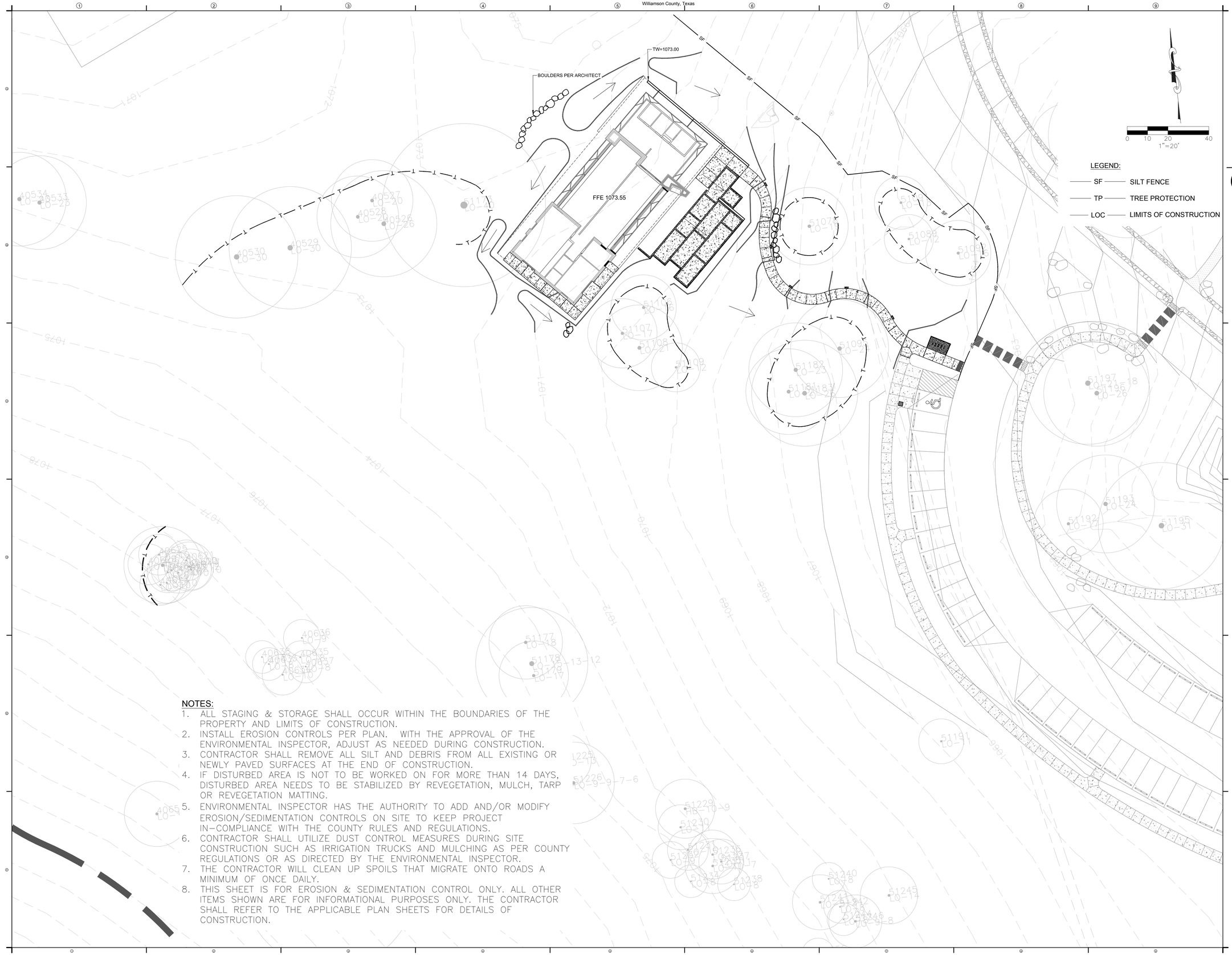
PROJECT NUMBER: 5619

# DEMOLITION PLAN

SHEET NUMBER

# C4-01

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LEGEND:

SF —— SILT FENCE

TP —— TREE PROTECTION

LOC —— LIMITS OF CONSTRUCTION

NOTES:

1. ALL STAGING & STORAGE SHALL OCCUR WITHIN THE BOUNDARIES OF THE PROPERTY AND LIMITS OF CONSTRUCTION.
2. INSTALL EROSION CONTROLS PER PLAN. WITH THE APPROVAL OF THE ENVIRONMENTAL INSPECTOR, ADJUST AS NEEDED DURING CONSTRUCTION.
3. CONTRACTOR SHALL REMOVE ALL SILT AND DEBRIS FROM ALL EXISTING OR NEWLY PAVED SURFACES AT THE END OF CONSTRUCTION.
4. IF DISTURBED AREA IS NOT TO BE WORKED ON FOR MORE THAN 14 DAYS, DISTURBED AREA NEEDS TO BE STABILIZED BY REVEGETATION, MULCH, TARP OR REVEGETATION MATTING.
5. ENVIRONMENTAL INSPECTOR HAS THE AUTHORITY TO ADD AND/OR MODIFY EROSION/SEDIMENTATION CONTROLS ON SITE TO KEEP PROJECT IN-COMPLIANCE WITH THE COUNTY RULES AND REGULATIONS.
6. CONTRACTOR SHALL UTILIZE DUST CONTROL MEASURES DURING SITE CONSTRUCTION SUCH AS IRRIGATION TRUCKS AND MULCHING AS PER COUNTY REGULATIONS OR AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR.
7. THE CONTRACTOR WILL CLEAN UP SPOILS THAT MIGRATE ONTO ROADS A MINIMUM OF ONCE DAILY.
8. THIS SHEET IS FOR EROSION & SEDIMENTATION CONTROL ONLY. ALL OTHER ITEMS SHOWN ARE FOR INFORMATIONAL PURPOSES ONLY. THE CONTRACTOR SHALL REFER TO THE APPLICABLE PLAN SHEETS FOR DETAILS OF CONSTRUCTION.

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# RIVER RANCH COUNTY PARK INTERPRETIVE CENTER

## WILLIAMSON COUNTY, TX

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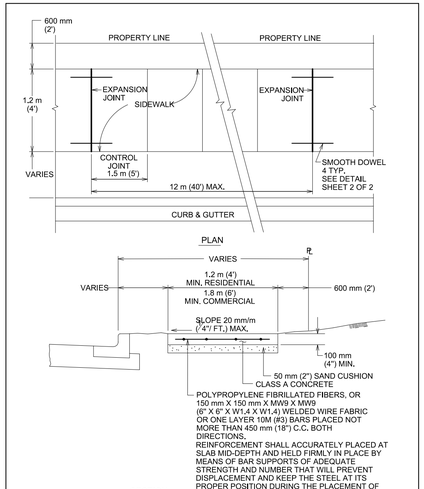
PROJECT NUMBER: 5619

# EROSION & SEDIMENTATION CONTROL PLAN

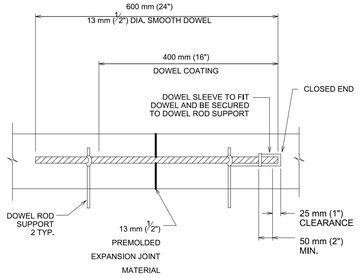
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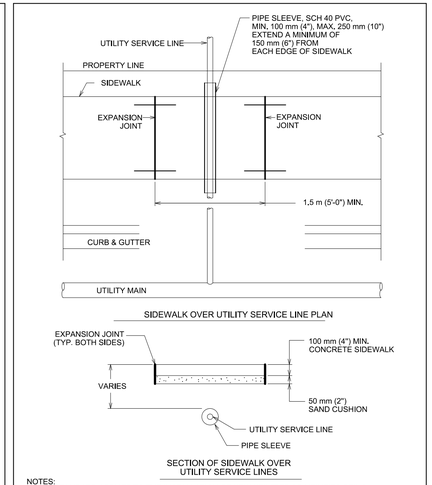
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| CITY OF AUSTIN<br>DEPARTMENT OF PUBLIC WORKS | | SIDEWALK | |
|---|---|---|---|
| RECORD COPY SIGNED BY BILL GARDNER | 03/26/08<br>ADOPTED | THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD. | STANDARD NO.<br>432S-1<br>1 OF 3 |

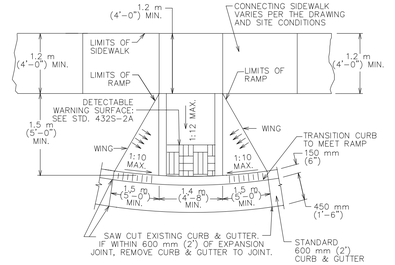



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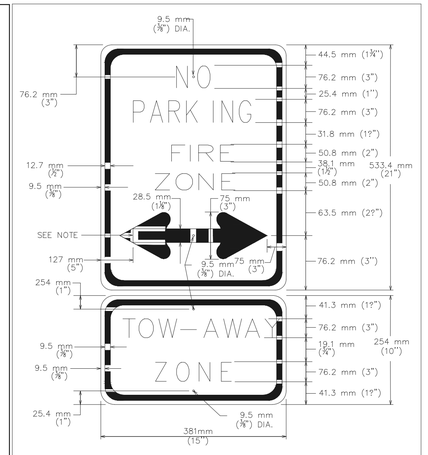



NOTES:
1. THIS STANDARD APPLIES TO THE INSTALLATION OF NEW UTILITIES OR UTILITIES BEING REPLACED BY A NEW LINE.
2. NO JOINTS IN UTILITY SERVICE PIPE TO BE LOCATED INSIDE PVC PIPE SLEEVE.

| CITY OF AUSTIN<br>DEPARTMENT OF PUBLIC WORKS | | SIDEWALK | |
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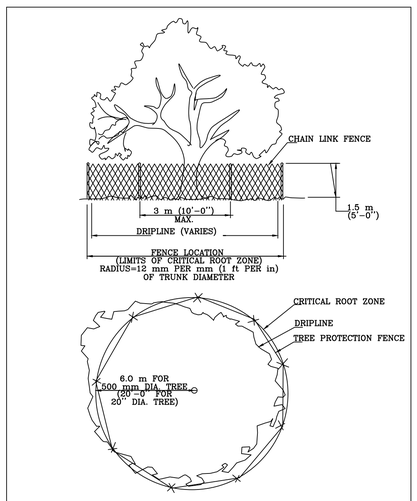

| CITY OF AUSTIN<br>DEPARTMENT OF PUBLIC WORKS | | TYPE 1 SIDEWALK CURB RAMP | |
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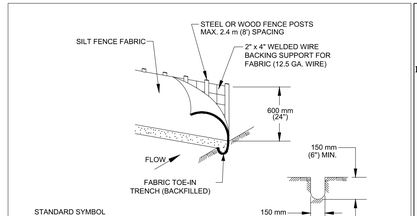

LETTERING, ARROW AND BORDER: RED TRANSPARENT
BACKGROUND – SILVER REFLECTIVE SHEETING

NOTE – ARROW MAY BE LEFT, RIGHT, OR DOUBLE

| CITY OF AUSTIN<br>FIRE DEPARTMENT | | RESTRICTED ZONE SIGNS, TYPE II | |
|---|---|---|---|
| RECORD COPY SIGNED BY CARL D. WREN | 9/14/05<br>ADOPTED | THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD. | STANDARD NO.<br>901S-6 |




| CITY OF AUSTIN<br>WATERSHED PROTECTION DEPARTMENT | | TREE PROPTECTION FENCE<br>TYPE A – CHAIN LINK | |
|---|---|---|---|
| *RECORD COPY SIGNED BY J. PATRICK MURPHY* | *11/15/99*<br>ADOPTED | THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD. | STANDARD NO.<br>610S-2 |




1. STEEL OR WOOD POSTS WHICH SUPPORT THE SILT FENCE SHALL BE INSTALLED ON A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE. POST MUST BE EMBEDDED A MINIMUM OF 300 mm (12 INCHES). IF WOOD POSTS CANNOT ACHIEVE 300 mm (12 inches) DEPTH, USE STEEL POSTS.

2. THE TOE OF THE SILT FENCE SHALL BE TRENCHED IN WITH A SPADE OR MECHANICAL TRENCHER, SO THAT THE DOWNSLOPE FACE OF THE TRENCH IS FLAT AND PERPENDICULAR TO THE LINE OF FLOW.

3. THE TRENCH MUST BE A MINIMUM OF 150 mm (6 inches) DEEP AND 150 mm (6 inches) WIDE TO ALLOW FOR THE SILT FENCE FABRIC TO BE LAID IN THE GROUND AND BACKFILLED WITH COMPACTED MATERIAL.

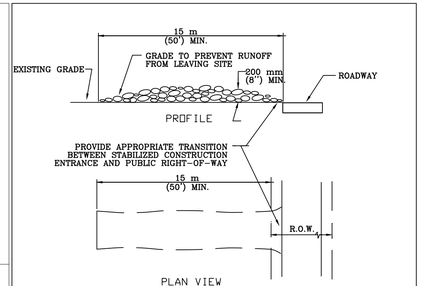
4. SILT FENCE FABRIC SHOULD BE SECURELY FASTENED TO EACH STEEL OR WOOD SUPPORT POST OR TO WOVEN WIRE , WHICH IS IN TURN ATTACHED TO THE STEEL OR WOOD FENCE POST.

5. INSPECTION SHALL BE MADE WEEKLY OR AFTER EACH RAINFALL EVENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTY AS NEEDED.

6. SILT FENCE SHALL BE REMOVED WHEN THE SITE IS COMPLETELY STABILIZED SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.

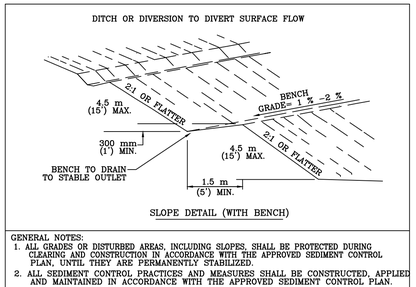
7. ACCUMULATED SILT SHALL BE REMOVED WHEN IT REACHES A DEPTH OF 150 mm (6 inches). THE SILT SHALL BE DISPOSED OF ON AN APPROVED SITE AND IN SUCH A MANNER THAT WILL NOT CONTRIBUTE TO ADDITIONAL SILTATION.

| CITY OF AUSTIN<br>WATERSHED PROTECTION DEPARTMENT | | SILT FENCE | |
|---|---|---|---|
| *RECORD COPY SIGNED BY MORGAN BYARS* | *09/01/2011*<br>ADOPTED | THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD. | STANDARD NO.<br>642S-1 |



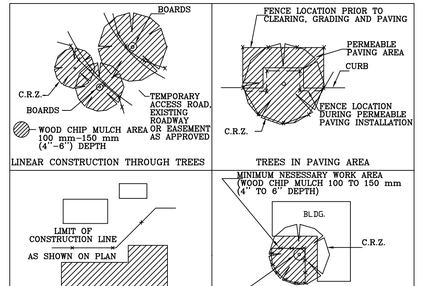

NOTES:
1. STONE SIZE: 75–125 mm (3–5") OPEN GRADED ROCK.
2. LENGTH: AS EFFECTIVE BUT NOT LESS THAN 15 m (50').
3. THICKNESS: NOT LESS THAN 200 mm (8").
4. WIDTH: NOT LESS THAN FULL WIDTH OF ALL POINTS OF INGRESS/EGRESS.
5. WASHING: WHEN NECESSARY, VEHICLE WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC ROADWAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE AND DRAINS INTO AN APPROVED TRAP OR SEDIMENT BASIN. ALL SEDIMENT SHALL BE PREVENTED FROM ENTERING ANY STORM DRAIN, DITCH OR WATERCOURSE USING APPROVED METHODS.
6. MAINTENANCE: THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC ROADWAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND, AS WELL AS REPAIR AND CLEAN OUT OF ANY MEASURE DEVICES USED TO TRAP SEDIMENT. ALL SEDIMENTS THAT IS SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC ROADWAY MUST BE REMOVED IMMEDIATELY.
7. DRAINAGE: ENTRANCE MUST BE PROPERLY GRADED OR INCORPORATE A DRAINAGE SWALE TO PREVENT RUNOFF FROM LEAVING THE CONSTRUCTION SITE.

| CITY OF AUSTIN<br>WATERSHED PROTECTION DEPARTMENT | | STABILIZED CONSTRUCTION ENTRANCE | |
|---|---|---|---|
| *RECORD COPY SIGNED BY J. PATRICK MURPHY* | *5/23/00*<br>ADOPTED | THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD. | STANDARD NO.<br>641S-1 |




GENERAL NOTES:
1. ALL GRADES OR DISTURBED AREAS, INCLUDING SLOPES, SHALL BE PROTECTED DURING CLEARING AND CONSTRUCTION IN ACCORDANCE WITH THE APPROVED SEDIMENT CONTROL PLAN, UNTIL THEY ARE PERMANENTLY STABILIZED.
2. ALL SEDIMENT CONTROL PRACTICES AND MEASURES SHALL BE CONSTRUCTED, APPLIED AND MAINTAINED IN ACCORDANCE WITH THE APPROVED SEDIMENT CONTROL PLAN.
3. TOPSOIL REQUIRED FOR THE ESTABLISHMENT OF VEGETATION SHALL BE STOCKPILED IN AMOUNT NECESSARY TO COMPLETE FINISHED GRADING OF ALL EXPOSED AREAS.
4. AREAS TO BE FILLED SHALL BE CLEARED, GRUBBED AND STRIPPED OF TOPSOIL TO REMOVE TREES, VEGETATION, ROOTS OR OTHER OBJECTIONABLE MATERIAL.
5. AREAS WHICH ARE TO BE TOPSOILED SHALL BE SCARIFIED TO MINIMUM DEPTH OF 75 mm (3") PRIOR TO PLACEMENT OF TOPSOIL.
6. ALL FILLS SHALL BE COMPACTED AS REQUIRED TO REDUCE EROSION, SLIPPAGE, SETTLEMENT, SUBSIDENCE OR OTHER RELATED PROBLEMS. FILL INTENDED TO SUPPORT BUILDINGS, STRUCTURES AND CONDUITS, ETC., SHALL BE COMPACTED IN ACCORDANCE WITH ITEM 132S 'EMBANKMENT' OF THE CITY OF AUSTIN STANDARD SPECIFICATIONS.
7. ALL FILL TO BE PLACED AND COMPACTED IN LAYERS NOT TO EXCEED 200 mm (8") IN THICKNESS.
8. FILL MATERIAL SHALL BE FREE OF BRUSH, RUBBISH, ROCK, LOGS, STUMPS, BUILDING DEBRIS AND OTHER OBJECTIONABLE MATERIALS THAT WOULD INTERFERE WITH OR PREVENT CONSTRUCTION OF SATISFACTORY FILLS.
9. SOFT, MUCKY, OR HIGHLY COMPRESSIBLE MATERIALS SHALL NOT BE INCORPORATED INTO FILLS.
10. ALL TRENCHES SHALL BE KEPT FREE OF SEDIMENT DURING ALL PHASES OF DEVELOPMENT.
11. SEEPS OR SPRINGS ENCOUNTERED DURING CONSTRUCTION SHALL BE HANDLED IN ACCORDANCE WITH THE STANDARDS FOR SUBSURFACE DRAIN OR OTHER APPROVED METHOD.
12. ALL GRADES SHALL BE PERMANENTLY STABILIZED IMMEDIATELY FOLLOWING FINISHED GRADING.

| CITY OF AUSTIN<br>WATERSHED PROTECTION DEPARTMENT | | LANDGRADING | |
|---|---|---|---|
| *RECORD COPY SIGNED BY J. PATRICK MURPHY* | *3/27/00*<br>ADOPTED | THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD. | STANDARD NO.<br>633S-1 |




| CITY OF AUSTIN<br>WATERSHED PROTECTION DEPARTMENT | | TREE PROTECTION FENCE LOCATIONS | |
|---|---|---|---|
| *RECORD COPY SIGNED BY J. PATRICK MURPHY* | *11/15/99*<br>ADOPTED | THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD. | STANDARD NO.<br>610S-1 |

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consulting engineers
Texas Registration Number F-257
2401 DOUBLE CREEK DR, STE 200 ROUND ROCK, TEXAS 78664

# RIVER RANCH COUNTY PARK INTERPRETIVE CENTER

## WILLIAMSON COUNTY, TX

NOT FOR CONSTRUCTION

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW UNDER THE AUTHORITY OF: REYNALDO GONZALEZ JR., PE TEXAS NO: 91803 BINKLEY & BARFIELD, INC. F-257 ON 2/22/19 NOT FOR REGULATORY APPROVAL, PERMITTING, OR CONSTRUCTION.

ISSUE DATE: 2/21/19

REVISIONS

| # | DATE | DESCRIPTION |
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DRAWN: REVIEWED:

100% CONSTRUCTION DOCUMENTS

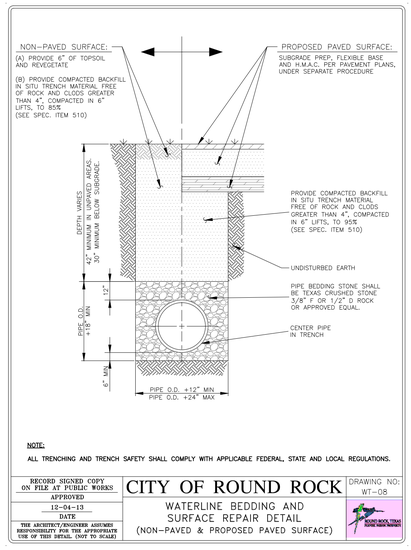
PROJECT NUMBER: 5619

SITE DETAILS (1 OF 2)

SHEET NUMBER

**C6-01**

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NOTE:

ALL TRENCHING AND TRENCH SAFETY SHALL COMPLY WITH APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS.

| RECORD SIGNED COPY ON FILE AT PUBLIC WORKS | CITY OF ROUND ROCK | DRAWING NO: WT-08 |
|---|---|---|
| APPROVED 12-04-13 DATE | WATERLINE BEDDING AND SURFACE REPAIR DETAIL (NON-PAVED & PROPOSED PAVED SURFACE) | ROUND ROCK TEXAS |
| THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR THE APPROPRIATE USE OF THIS DETAIL. (NOT TO SCALE) | | |

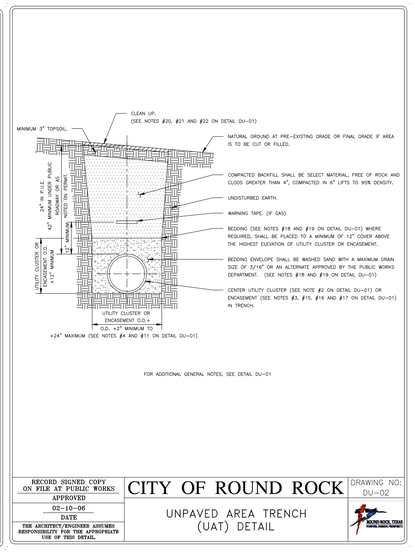
## UTILITY PLACEMENT WITHIN CORR CONTROLLED AREA
## GENERAL NOTES SHEET

1. UTILITY LINE IS A PUBLIC OR PRIVATE POWER, COMMUNICATION, TELEVISION, GAS, FIBER OPTIC AND IRRIGATION (DRY OR PRESSURE) LINE, CABLE, CONDUIT, PIPE OR TUBING.
2. UTILITY CLUSTER IS ANY NUMBER AND MIX OF DIRECT BURIED "DRY" UTILITY LINES IN A VERTICAL, HORIZONTAL OR BUNDLE CONFIGURATION.
3. ENCASEMENT IS ANY NUMBER OF CONDUITS, CASING PIPES (CONCRETE, PVC, CONCRETE BANK, WELDED STEEL, ETC.), AND/OR PROTECTIVE ARMOR BEDDING (CONCRETE, FLOWABLE FILL, ETC.)
4. ALL TRENCH SAFETY SHALL COMPLY WITH APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS.
5. UTILITY WORK SITE IS THE LOCATION WHERE A UTILITY IS MAINTAINED, REPAIRED AND/OR INSTALLED.
6. A COPY OF THE PERMIT IS REQUIRED ON THE UTILITY WORK SITE IN/ON CORR OWNED/LEASED PROPERTY, ROW, CORR EASEMENT OR P/E IMPACTING VEHICLE/PEDESTRIAN TRAFFIC, SAFETY OR CAUSES LIABILITY (TEMPORARY/LONG TERM). THIS EXCLUDES UNACCEPTED SUBDIVISIONS, CIP, STATE OR FEDERAL CONTROLLED PROPERTY, PRIVATELY CONTROLLED EASEMENTS & PRIVATELY OWNED PROPERTY.
7. VARIANCE FROM THESE STANDARDS IS ONLY ALLOWED, IF DETAILED PLANS HAVE WRITTEN APPROVAL BY THE CORR BEFORE CONSTRUCTION STARTS.
8. PUBLIC AREA EXCAVATION MUST BE BARRICADED WITH APPROVED VEHICLE AND PEDESTRIAN TRAFFIC CONTROL DEVICES BEFORE CONSTRUCTION STARTS.
9. INACTIVE (NO PERSONNEL PRESENT) EXCAVATION OUTSIDE OF AN EXISTING PAVEMENT, LEFT OPEN OVERNIGHT, MUST HAVE PEDESTRIAN FENCING & PLATING.
10. INACTIVE EXCAVATION MAY NOT REMAIN OPEN OVER A WEEKEND OR HOLIDAY WITHOUT PRIOR WRITTEN APPROVAL FROM THE CORR AND SAFE GUARDS.
11. TOTAL TRENCH WIDTH SHALL BE THE SUM OF THE OUTSIDE DIMENSION (OD) OF THE UTILITY CLUSTER OR ENCASEMENT PLUS A MINIMUM OF 2" IF THE OD IS LESS THAN 6 1/2", PLUS 4" IF THE OD IS BETWEEN 6 1/2" & 18", PLUS 12" IF THE OD IS MORE THAN 18" WITH A MAXIMUM OF 24".
12. FOR A UTILITY WORK SITE IN AN AREA THAT IS SCHEDULED FOR FUTURE PAVEMENT, SEE: ASPHALT PAVED AREA TRENCH (APAT) DU-03 DETAIL.
13. FOR A UTILITY WORK SITE IN AN AREA THAT HAS EXISTING PAVEMENT, SEE: PROPOSED PAVEMENT AREA TRENCH (PPAT) DU-04) DETAIL.
14. FOR A CROSSING OF A CORR OWNED UTILITY, SEE: UTILITY CROSSING INSTALLATION (UC) DU-05) DETAIL.
15. REQUIRED ENCASEMENT MAY BE SCHEDULE 40 PVC, EXCEPT GAS, WHICH MUST BE SCHEDULE 40 WELDED JOINT STEEL OR SCHEDULE 80 PVC. OTHER TYPES OF ENCASEMENT REQUIRE CORR WRITTEN APPROVAL.
16. ALL ELECTRICAL CONDUCTIVE LINES (OVER 60 VOLTS) MUST BE ENCASED.
17. ALL UTILITY LINES MUST BE ENCASED UNDER EXISTING AND PROPOSED PAVEMENT, CROSSING ABOVE CORR LINES AND UNDER PROTECTED TREES.
18. WASHED SAND BEDDING MUST BE USED IN THE INSTALLATION WHEN WITHIN 10' OF A CORR OWNED UTILITY LINE, EXCEPT IN EXISTING PAVEMENT.
19. REQUIRED WASHED SAND BEDDING IN A TRENCH WITH SIDE WALL CLEARANCE LESS THAN 3" IS SMALL GRAIN (MAXIMUM 1/16") AND IN A TRENCH WITH SIDE WALL CLEARANCE MORE THAN 3" IS LARGE GRAIN (MAXIMUM 3/16"). BEDDING MUST BE CONSOLIDATED TO MINIMIZE AIR VOIDS.
20. ALL OF THE AREA(S) DISTURBED DIRECTLY BY, INDIRECTLY BY OR BECAUSE OF THE UTILITY WORK, WILL BE INCLUDED IN THE CLEAN UP.
21. CLEAN UP INCLUDES DRESS-OUT, EROSION CONTROL, MAINTENANCE/REMOVAL, RESTORATION, DEBRIS REMOVAL/DISPOSAL & PAVEMENT SWEEPING/WASHING.
22. RESTORATION AS A MINIMUM, SHALL INCLUDE, FERTILIZER:
    A) ANY LAWN LIKE AREAS – SOLID SODDING WITH GRASS LIKE EXISTING OR APPROVED BETTER.
    B) GRADES 5% OR LESS – HYDRO-MULCHED.
    C) GRADES ABOVE 5% UP TO 10% – MATTED AND HYDRO-MULCHED.
    D) GRADES ABOVE 10% UP TO 25% – SOLID SODDING WITH GRASS LIKE EXISTING OR APPROVED BETTER.
    E) GRADES ABOVE 25% – DETAIL PLANS AND CORR WRITTEN APPROVAL REQUIRED.

### LEGEND FOR DU SHEETS

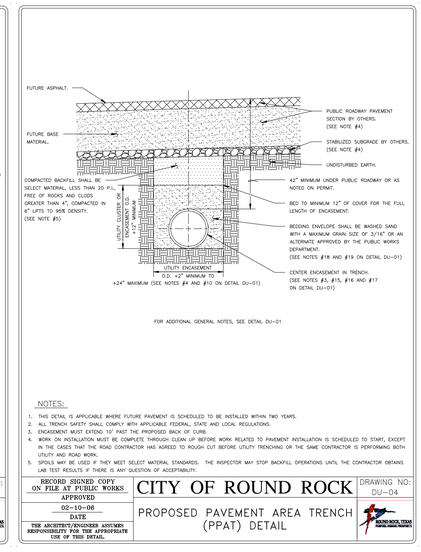
| | |
|---|---|
| PVC | POLYVINYL CHLORIDE PIPE OR CONDUIT |
| OD | OUTSIDE DIAMETER |
| GALS | UNITED STATES GALLONS – UNIT OF VOLUME |
| LBS | UNITED STATES POUNDS – UNIT OF WEIGHT |
| CORR | CITY OF ROUND ROCK |
| PUE | PUBLIC UTILITY EASEMENT |
| SY | UNITED STATES SQUARE YARDS – UNIT OF AREA |
| " | UNITED STATES INCH OR INCHES – UNIT OF LENGTH |
| ' | UNITED STATES FOOT OR FEET – UNIT OF LENGTH |
| ETC | ABBREVIATION FOR ET CETERA, IN HENCE TO BE "AND SO FORTH" |
| ROW | RIGHT OF WAY OR RIGHTS OF WAY |
| LAB | ABBREVIATION FOR LABORATORY |
| ° | UNITED STATES DEGREE – UNIT OF ANGLE |
| TV | TELEVISION |

| RECORD SIGNED COPY ON FILE AT PUBLIC WORKS | CITY OF ROUND ROCK | DRAWING NO: DU-01 |
|---|---|---|
| APPROVED 02-10-06 DATE | DRY UTILITY DETAILS GENERAL NOTES SHEET | ROUND ROCK TEXAS |
| THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR THE APPROPRIATE USE OF THIS DETAIL. | | |




FOR ADDITIONAL GENERAL NOTES, SEE DETAIL DU-01

| RECORD SIGNED COPY ON FILE AT PUBLIC WORKS | CITY OF ROUND ROCK | DRAWING NO: DU-02 |
|---|---|---|
| APPROVED 02-10-06 DATE | UNPAVED AREA TRENCH (UAT) DETAIL | ROUND ROCK TEXAS |
| THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR THE APPROPRIATE USE OF THIS DETAIL. | | |




FOR ADDITIONAL GENERAL NOTES, SEE DETAIL DU-01

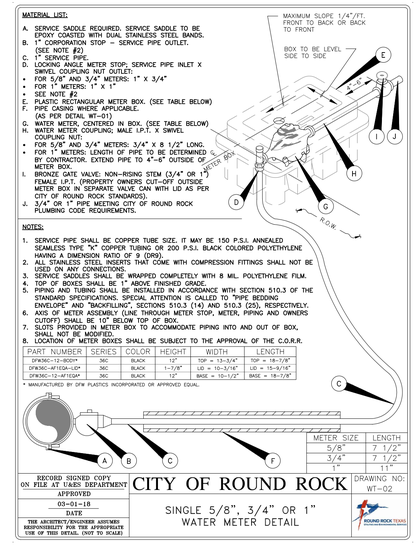
NOTES:

1. THIS DETAIL IS APPLICABLE WHERE FUTURE PAVEMENT IS SCHEDULED TO BE INSTALLED WITHIN TWO YEARS.
2. ALL TRENCH SAFETY SHALL COMPLY WITH APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS.
3. ENCASEMENT MUST EXTEND 10' PAST THE PROPOSED BACK OF CURB.
4. WORK ON INSTALLATION MUST BE COMPLETE THROUGH CLEAN UP BEFORE WORK RELATED TO PAVEMENT INSTALLATION IS SCHEDULED TO START, EXCEPT IN THE CASES THAT THE ROAD CONTRACTOR HAS AGREED TO ROUGH CUT BEFORE UTILITY TRENCHING OR THE SAME CONTRACTOR IS PERFORMING BOTH UTILITY AND ROAD WORK.
5. SPOILS MAY BE USED IF THEY MEET SELECT MATERIAL STANDARDS. THE INSPECTOR MAY STOP BACKFILL OPERATIONS UNTIL THE CONTRACTOR OBTAINS LAB TEST RESULTS IF THERE IS ANY QUESTION OF ACCEPTABILITY.

| RECORD SIGNED COPY ON FILE AT PUBLIC WORKS | CITY OF ROUND ROCK | DRAWING NO: DU-04 |
|---|---|---|
| APPROVED 02-10-06 DATE | PROPOSED PAVEMENT AREA TRENCH (PPAT) DETAIL | ROUND ROCK TEXAS |
| THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR THE APPROPRIATE USE OF THIS DETAIL. | | |

MATERIAL LIST:

A. SERVICE SADDLE REQUIRED. SERVICE SADDLE TO BE EPOXY COASTED WITH DUAL STAINLESS STEEL BANDS.
B. 1" CORPORATION STOP – SERVICE PIPE OUTLET. (SEE NOTE #2)
C. 1" SERVICE PIPE.
D. LOCKING ANGLE METER STOP; SERVICE PIPE INLET X SWIVEL COUPLING NUT OUTLET:
   - FOR 5/8" AND 3/4" METERS: 1" X 3/4"
   - FOR 1" METERS: 1" X 1"
   - SEE NOTE #2
E. PLASTIC RECTANGULAR METER BOX. (SEE TABLE BELOW)
F. PIPE CASING WHERE APPLICABLE. (AS PER DETAIL WT-01)
G. WATER METER, CENTERED IN BOX. (SEE TABLE BELOW)
H. WATER METER COUPLING; MALE I.P.T. X SWIVEL COUPLING NUT:
   - FOR 5/8" AND 3/4" METERS: 3/4" X 8 1/2" LONG.
   - FOR 1" METERS: LENGTH OF PIPE TO BE DETERMINED BY CONTRACTOR. EXTEND PIPE TO 4"–6" OUTSIDE OF METER BOX.
I. BRONZE GATE VALVE: NON–RISING STEM (3/4" OR 1") FEMALE I.P.T. (PROPERTY OWNERS CUT–OFF OUTSIDE METER BOX IN SEPARATE VALVE CAN WITH LID AS PER CITY OF ROUND ROCK STANDARDS).
J. 3/4" OR 1" PIPE MEETING CITY OF ROUND ROCK PLUMBING CODE REQUIREMENTS.




NOTES:

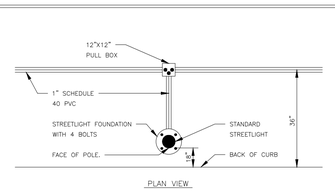
1. SERVICE PIPE SHALL BE COPPER TUBE SIZE. IT MAY BE 150 P.S.I. ANNEALED SEAMLESS TYPE "K" COPPER TUBING OR 200 P.S.I. BLACK COLORED POLYETHYLENE HAVING A DIMENSION RATIO OF 9 (DR9).
2. ALL STAINLESS STEEL INSERTS THAT COME WITH COMPRESSION FITTINGS SHALL NOT BE USED WITH THIS INSTALLATION.
3. SERVICE SADDLE SHALL BE WRAPPED COMPLETELY WITH 8 MIL. POLYETHYLENE FILM.
4. TOP OF BOXES SHALL BE 1" ABOVE FINISHED GRADE.
5. PIPING AND TUBING SHALL BE INSTALLED IN ACCORDANCE WITH SECTION 510.3 OF THE STANDARD SPECIFICATIONS. SPECIAL ATTENTION IS CALLED TO "PIPE BEDDING ENVELOPE" AND "BACKFILLING", SECTIONS 510.3 (14) AND 510.3 (25), RESPECTIVELY.
6. AXIS OF METER ASSEMBLY (LINE THROUGH METER STOP, METER, PIPING AND OWNERS CUTOFF) SHALL BE 10" BELOW TOP OF BOX.
7. SLOTS PROVIDED IN METER BOX TO ACCOMMODATE PIPING INTO AND OUT OF BOX, SHALL NOT BE MODIFIED.
8. LOCATION OF METER BOXES SHALL BE SUBJECT TO THE APPROVAL OF THE C.O.R.R.

| PART NUMBER | SERIES | COLOR | HEIGHT | WIDTH | LENGTH |
|---|---|---|---|---|---|
| DFX36C-12-BODY* | 36C | BLACK | 12" | TOP = 13-3/4" | TOP = 18-7/8" |
| DFX36C-AF12A-LID* | 36C | BLACK | 1-7/8" | LID = 10-3/16" | LID = 15-9/16" |
| DFX36C-12-AF12BA* | 36C | BLACK | 12" | BASE = 10-1/2" | BASE = 18-7/8" |

* MANUFACTURED BY DFW PLASTICS INCORPORATED OR APPROVED EQUAL.

| METER SIZE | LENGTH |
|---|---|
| 5/8" | 7 1/2" |
| 3/4" | 7 1/2" |
| 1" | 11" |

| RECORD SIGNED COPY ON FILE AT TCEQ DEPARTMENT APPROVED 03-01-18 DATE | CITY OF ROUND ROCK | DRAWING NO: WT-02 |
|---|---|---|
| | SINGLE 5/8", 3/4" OR 1" WATER METER DETAIL | ROUND ROCK TEXAS |
| THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR THE APPROPRIATE USE OF THIS DETAIL. (NOT TO SCALE) | | |




NOTE: NORMALLY, CROSSINGS GO UNDER CORR OWNED LINES WITH LESS THAN 60" OF COVER.

### UTILITY MINIMUM CLEARANCE TABLE

| | CORR OWNED LINE SIZE | CROSSING (AS NEAR 90° AS POSSIBLE) | PARALLEL ROUTES |
|---|---|---|---|
| POTABLE WATERLINES | LESS THAN ~ 6" | 12" | 36" |
| | 6" ~ 36" | 18" | 48" |
| | LARGER | 24" | 72" |
| RECYCLE AND WASTEWATER LINES | LESS THAN ~ 6" | 12" | 36" |
| | 6" ~ 36" | 18" | 48" |
| | LARGER | 24" | 60" |
| STORMWATER LINES | LESS THAN ~ 18" | 12" | 24" |
| | 18" ~ 60" | 18" | 36" |
| | LARGER | 24" | 60" |

FOR ADDITIONAL GENERAL NOTES, SEE DETAIL DU-01

NOTES:

1. ALL TRENCH SAFETY SHALL COMPLY WITH APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS.
2. AN ENCASED (SEE NOTE #7) UTILITY LINE/CLUSTER WITH SAND BEDDING, WILL BE ALLOWED TO CROSS OVER A CORR OWNED UTILITY LINE THAT HAS 60" OF COVER OR MORE, PROVIDED THERE IS COMPLIANCE WITH THE CLEARANCE, INSTALLATION AND COVER FROM FINAL SURFACE GRADE SHOWN ON THIS DETAIL. CLEARANCE STANDARDS CAN BE FOUND IN THE UTILITY MINIMUM CLEARANCE TABLE SHOWN ON THIS SHEET AND MINIMUM COVER IS SHOWN ON THE DETAIL SKETCH FOR EACH TYPE OF TRENCH (IN UNPAVED AREAS, IN EXISTING PAVEMENT AND IN AREAS WHERE PAVEMENT IS PROPOSED).
3. IF THE CORR LINE IS LARGE (36"+ POTABLE WATERLINE, RECYCLE LINE OR WASTEWATER LINE, 60"+ STORMWATER LINE) AND/OR HAS LESS THAN 60" OF COVER WITH SPECIAL SITE CONDITIONS, DETAILED PLANS WITH WRITTEN JUSTIFICATION FOR CROSSING OVER A PROPOSED OR EXISTING CORR OWNED LINE, MUST BE SUBMITTED FOR APPROVAL A MINIMUM OF 10 DAYS BEFORE PROPOSED INSTALLATION.
4. NO ENCASEMENT (SAND BEDDING ONLY) IS REQUIRED WHERE THE UTILITY CROSSES UNDER THE CORR OWNED UTILITY LINE, EXCEPT FOR A GAS LINE, OR LINE WITH PRESSURE, WHICH MUST BE ENCASED. CLEARANCE STANDARDS COMPLIANCE REQUIRED.
5. WHERE THERE IS KNOWN GROUND WATER, PLANS MUST BE SUBMITTED, THAT SHOW AN ACCEPTABLE CONTROL OF THE WET CONDITION.
6. ENCASEMENT IN THESE CROSSINGS, MUST BE SCH. 40 STEEL OR SCH. 80 PVC OR GREATER IN ADDITION TO THE CONDUIT ON ELECTRICAL LINES WITH MORE THAN 120V TO GROUND, ALL GAS LINES, ALL FIBER OPTIC CABLES AND ALL TELEPHONE CABLES WITH MORE THAN 100 PRS.

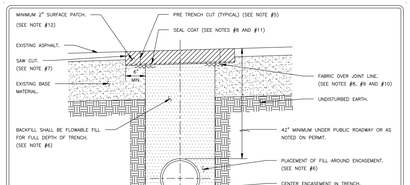
| RECORD SIGNED COPY ON FILE AT PUBLIC WORKS | CITY OF ROUND ROCK | DRAWING NO: DU-05 |
|---|---|---|
| APPROVED 07-11-06 DATE | UTILITY CROSSING INSTALLATION (UC) DETAIL | ROUND ROCK TEXAS |
| THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR THE APPROPRIATE USE OF THIS DETAIL. | | |




NOTES:

1. FOR ADDITIONAL GENERAL NOTES, SEE DETAIL DU-01.
2. SEE "UNPAVED AREA TRENCH (UAT) DU–02) DETAIL".

| RECORD SIGNED COPY ON FILE AT PUBLIC WORKS | CITY OF ROUND ROCK | DRAWING NO: DU-08 |
|---|---|---|
| APPROVED 02-10-06 DATE | INSTALLATION OF STREET LIGHTING ON MAJOR URBAN PAVEMENT WITH 12"X12" PULL BOX DETAIL | ROUND ROCK TEXAS |
| THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR THE APPROPRIATE USE OF THIS DETAIL. | | |




FOR ADDITIONAL GENERAL NOTES, SEE DETAIL DU–01

NOTES:

1. ALL TRENCH SAFETY SHALL COMPLY WITH APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS.
2. STEEL PLATES OF SUITABLE WEIGHT TO SPAN THE TRENCH FOR VEHICLE TRAFFIC, MUST BE AVAILABLE ON SITE BEFORE ANY PAVEMENT IS CUT.
3. STEEL PLATES SHALL BE CONTRACTOR PROVED AND PLACED AS NECESSARY FOR TRENCH SAFETY AND TO ALLOW FOR FLOWABLE FILL CURING TIME.
4. STEEL PLATES SHALL BE ANCHORED IN PLACE WHEN INSTALLED TO ASSURE NO DISPLACEMENT UNDER TRAFFIC.
5. SURFACE SHALL BE CUT PRIOR TO EXCAVATION.
6. FLOWABLE FILL SHALL BE PLACED AROUND THE ENCASEMENT IN A PROCESS TO ASSURE NO DISPLACEMENT FROM BEING CENTERED IN THE TRENCH BOTTOM. FLOWABLE FILL SHALL BE STRUCK OFF AT THE TOP OF THE EXISTING BASE OR 2" BELOW EXISTING FINISHED SURFACE, WHICHEVER IS GREATER.
7. UPON COMPLETION OF THE BACKFILL, MAKE ADDITIONAL SAW CUTS, AS NECESSARY TO REMOVE EXISTING PAVEMENT AT A MINIMUM DEPTH OF 2" TO CREATE A 6" MINIMUM SHOULDER OR TO THE POINT WHERE EXISTING PAVEMENT IS NOT DAMAGED, WHICHEVER IS GREATER. SAW CUTS SHOULD HAVE A MINIMUM NUMBER OF ANGLE POINTS.
8. TACKING MATERIAL SHALL BE AC10PH OR A CORR APPROVED EQUAL.
9. TACK COAT A MINIMUM 12" WIDTH OF NON–WOVEN GEO–TEXTILE FABRIC OVER THE EXISTING BASE AND FLOWABLE FILL JOINT LINE WITH 0.3 GALS/SY, PLACING FABRIC BEFORE TACK SETS.
10. GEO–TEXTILE FABRIC SHALL WITHSTAND 300' FAIRHEWIT (TREVIRA SPUNBOND 011/120, CONTECH C–380W, OR C.O.R.R. APPROVED EQUAL).
11. SINGLE COURSE SEAL COAT THE AREA TO BE HMAC PATCHED, WITH 0.33 GAL/SY TACK AND 3/8" CRUSHED LIMESTONE COVER AT 21 LBS/SY.
12. VACUUM UP LOOSE GRAVEL BEFORE PLACING SURFACE PATCH WITH HMAC HOT LAID, AT A MINIMUM THICKNESS OF 2".
13. TRENCH PAST THE BACK OF CURB TO MATCH THE AREA (SIDEWALK, TOP SOIL, SOD, ETC.), WITH JOINTS NOT TO ALIGN WITH TRENCH WALL.
14. IF SIDEWALK, CURB, CURB AND GUTTER, OR DRIVEWAY REQUIRES REMOVAL, THIS MUST BE REPLACED IN UNITS THAT ARE FROM SCORE JOINT TO SCORE JOINT. FULL DEPTH SAW CUT ALL JOINTS. DRILL AND EPOXY SET #4 DOWELS INTO THE STRUCTURE TO REMAIN AT MAXIMUM OF 18" ON CENTER.
15. ENCASEMENT MUST EXTEND 10' PAST THE BACK OF CURB, UNLESS OTHERWISE STATED IN THE PERMIT. BEDDING AND BACKFILL FROM THE POINT WHERE THE BASE ENDS TO THE END OF THE ENCASEMENT, SHALL ADHERE TO: PROPOSED PAVEMENT AREA TRENCH (PPAT) (DU–04) DETAIL.

| RECORD SIGNED COPY ON FILE AT PUBLIC WORKS | CITY OF ROUND ROCK | DRAWING NO: DU–03 |
|---|---|---|
| APPROVED 02–10–06 DATE | ASPHALT PAVED AREA TRENCH (APAT) DETAIL | ROUND ROCK TEXAS |
| THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR THE APPROPRIATE USE OF THIS DETAIL. | | |

### Texas Commission on Environmental Quality
### Contributing Zone Plan
### General Construction Notes

**Edwards Aquifer Protection Program Construction Notes – Legal Disclaimer**

*The following/listed "construction notes" are intended to be advisory in nature only and do not constitute an approval or conditional approval by the Executive Director (ED), nor do they constitute a comprehensive listing of rules or conditions to be followed during construction. Further actions may be required to achieve compliance with TCEQ regulations found in Title 30, Texas Administrative Code (TAC), Chapters 213 and 217, as well as local ordinances and regulations providing for the protection of water quality. Additionally, nothing contained in the following/listed "construction notes" restricts the powers of the ED, the commission or any other governmental entity to prevent, correct, or curtail activities that result or may result in pollution of the Edwards Aquifer or hydrologically connected surface waters. The holder of any Edwards Aquifer Protection Plan containing "construction notes" is still responsible for compliance with Title 30, TAC, Chapters 213 or any other applicable TCEQ regulation, as well as all conditions of an Edwards Aquifer Protection Plan through all phases of plan implementation. Failure to comply with any condition of the ED's approval, whether or not in contradiction of any "construction notes," is a violation of TCEQ regulations and any violation is subject to administrative rules, orders, and penalties as provided under Title 30, TAC § 213.10 (relating to Enforcement). Such violations may also be subject to civil penalties and injunction. The following/listed "construction notes" in no way represent an approved exception by the ED to any part of Title 30 TAC, Chapters 213 and 217, or any other TCEQ applicable regulation*

1. A written notice of construction must be submitted to the TCEQ regional office at least 48 hours prior to the start of any ground disturbance or construction activities. This notice must include:
   - the name of the approved project;
   - the activity start date; and
   - the contact information of the prime contractor.
2. All contractors conducting regulated activities associated with this project should be provided with complete copies of the approved Contributing Zone Plan (CZP) and the TCEQ letter indicating the specific conditions of its approval. During the course of these regulated activities, the contractor(s) should keep copies of the approved plan and approval letter on-site.
3. No hazardous substance storage tank shall be installed within 150 feet of a water supply source, distribution system, well, or sensitive feature.
4. Prior to beginning any construction activity, all temporary erosion and sedimentation (E&S) control measures must be properly installed and maintained in accordance with the manufacturers specifications. If inspections indicate a control has been used inappropriately, or incorrectly, the applicant must replace or modify the control for site situations. These controls must remain in place until the disturbed areas have been permanently stabilized.
5. Any sediment that escapes the construction site must be collected and properly disposed of before the next rain event to ensure it is not washed into surface streams, sensitive features, etc.
6. Sediment must be removed from the sediment traps or sedimentation basins when it occupies 50% of the basin's design capacity.
7. Litter, construction debris, and construction chemicals exposed to stormwater shall be prevented from being discharged offsite.
8. All excavated material that will be stored on-site must have proper E&S controls.
9. If portions of the site will have a cease in construction activity lasting longer than 14 days, soil stabilization in those areas shall be initiated as soon as possible prior to the 14th day of inactivity. If activity will resume prior to the 21st day, stabilization measures are not required. If drought conditions or inclement weather prevent action by the 14th day, stabilization measures shall be initiated as soon as possible.
10. The following records should be maintained and made available to the TCEQ upon request:
    - the dates when major grading activities occur;
    - the dates when construction activities temporarily or permanently cease on a portion of the site; and
    - the dates when stabilization measures are initiated.
11. The holder of any approved CZP must notify the appropriate regional office in writing and obtain approval from the executive director prior to initiating any of the following:
    A. any physical or operational modification of any best management practices (BMPs) or structure(s), including but not limited to temporary or permanent ponds, dams, berms, silt fences, and diversionary structures;
    B. any change in the nature or character of the regulated activity from that which was originally approved;
    C. any change that would significantly impact the ability to prevent pollution of the Edwards Aquifer; or
    D. any development of land previously identified as undeveloped in the approved contributing zone plan.

| | |
|---|---|
| Austin Regional Office<br>12100 Park 35 Circle, Building A<br>Austin, Texas 78753-1808<br>Phone (512) 339-2929<br>Fax (512) 339-3795 | San Antonio Regional Office<br>14250 Judson Road<br>San Antonio, Texas 78233-4480<br>Phone (210) 490-3096<br>Fax (210) 545-4329 |

**THESE GENERAL CONSTRUCTION NOTES MUST BE INCLUDED ON THE CONSTRUCTION PLANS PROVIDED TO THE CONTRACTOR AND ALL SUBCONTRACTORS.**

TCEQ-0592A (Rev. July 15, 2015) Page 1 of 2

TCEQ-0592A (Rev. July 15, 2015) Page 2 of 2

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**Binkley&Barfield,Inc.**
consulting engineers
Texas Registration Number F-257
2401 DOUBLE CREEK DR, STE 200 ROUND ROCK, TEXAS 78664

# RIVER RANCH COUNTY PARK INTERPRETIVE CENTER
## WILLIAMSON COUNTY, TX

NOT FOR CONSTRUCTION

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW UNDER THE AUTHORITY OF: REYNALDO GONZALEZ JR., PE TEXAS NO: 91803 BINKLEY & BARFIELD, INC. F-257 ON 2/22/19 NOT FOR REGULATORY APPROVAL, PERMITTING, OR CONSTRUCTION.

ISSUE DATE: 2/21/19

REVISIONS

| # | DATE | DESCRIPTION |
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DRAWN: REVIEWED:

100% CONSTRUCTION DOCUMENTS

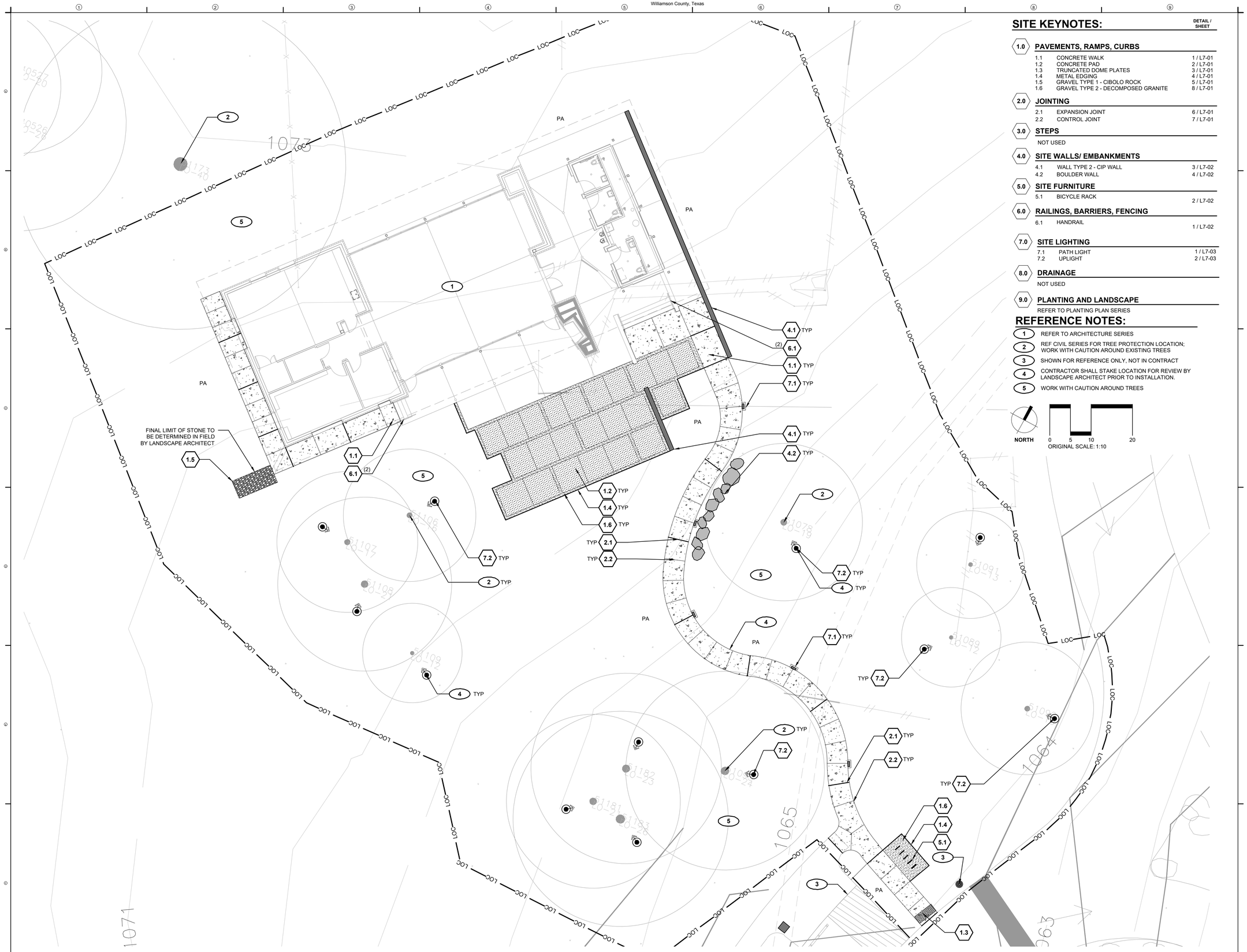
PROJECT NUMBER: 5619

# SITE DETAILS (2 OF 2)

SHEET NUMBER

# C6-02

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## SITE KEYNOTES:

| | | DETAIL / SHEET |
|---|---|---|
| **1.0** | **PAVEMENTS, RAMPS, CURBS** | |
| 1.1 | CONCRETE WALK | 1 / L7-01 |
| 1.2 | CONCRETE PAD | 2 / L7-01 |
| 1.3 | TRUNCATED DOME PLATES | 3 / L7-01 |
| 1.4 | METAL EDGING | 4 / L7-01 |
| 1.5 | GRAVEL TYPE 1 - CIBOLO ROCK | 5 / L7-01 |
| 1.6 | GRAVEL TYPE 2 - DECOMPOSED GRANITE | 8 / L7-01 |
| **2.0** | **JOINTING** | |
| 2.1 | EXPANSION JOINT | 6 / L7-01 |
| 2.2 | CONTROL JOINT | 7 / L7-01 |
| **3.0** | **STEPS** | |
| | NOT USED | |
| **4.0** | **SITE WALLS/ EMBANKMENTS** | |
| 4.1 | WALL TYPE 2 - CIP WALL | 3 / L7-02 |
| 4.2 | BOULDER WALL | 4 / L7-02 |
| **5.0** | **SITE FURNITURE** | |
| 5.1 | BICYCLE RACK | 2 / L7-02 |
| **6.0** | **RAILINGS, BARRIERS, FENCING** | |
| 6.1 | HANDRAIL | 1 / L7-02 |
| **7.0** | **SITE LIGHTING** | |
| 7.1 | PATH LIGHT | 1 / L7-03 |
| 7.2 | UPLIGHT | 2 / L7-03 |
| **8.0** | **DRAINAGE** | |
| | NOT USED | |
| **9.0** | **PLANTING AND LANDSCAPE** | |
| | REFER TO PLANTING PLAN SERIES | |

## REFERENCE NOTES:

1. REFER TO ARCHITECTURE SERIES
2. REF CIVIL SERIES FOR TREE PROTECTION LOCATION; WORK WITH CAUTION AROUND EXISTING TREES
3. SHOWN FOR REFERENCE ONLY, NOT IN CONTRACT
4. CONTRACTOR SHALL STAKE LOCATION FOR REVIEW BY LANDSCAPE ARCHITECT PRIOR TO INSTALLATION.
5. WORK WITH CAUTION AROUND TREES

NORTH

0 5 10 20
ORIGINAL SCALE: 1:10

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**BINKLEY & BARFIELD, 512.292.0006**

**ARCHITECT:**
**McKINNEY YORK, 512.476.0201**

**MEP:**
**HENDRIX CONSULTING, 512.218.0060**

**STRUCTURAL:**
**ENGINEERING 360, 512.244.1966**

# RIVER RANCH COUNTY PARK INTERPRETIVE CENTER

## WILLIAMSON COUNTY, TX

REGISTERED LANDSCAPE ARCHITECT
BLAIRE HEWELL
2455
STATE OF TEXAS

2/22/2019

ISSUE DATE:

REVISIONS

| | DATE | DESCRIPTION |
|---|---|---|

DRAWN: DW REVIEWED: DW

# ISSUE FOR BID

PROJECT NUMBER: 5619

## MATERIALS PLAN

SHEET NUMBER

# L3-01

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## REFERENCE NOTES:

1. REFER TO CIVIL ENGINEER SERIES
2. ALL FINE GRADING ADJACENT TO EXISTING TREES SHALL BE DONE BY HAND
3. CONTRACTOR TO STAKE LOCATION OF SITE FEATURE IN FIELD FOR APPROVAL BY L.A. PRIOR TO INSTALLATION
4. CONTRACTOR SHALL TAPER AND BLEND TO EXISTING CONDITIONS IN FIELD
5. CONTRACTOR SHALL VERIFY ELEVATION AND LOCATION OF EXISTING CONDITIONS IN FIELD
6. CONTRACTOR TO TIE INTO EXISTING CONDITIONS IN FIELD
7. CONTRACTOR TO VERIFY CONDITIONS IN FIELD AND SPACE JOINTS EQUALLY WITH QUANTITY SHOWN IN PLAN
8. REFER TO ARCHITECTURE SERIES
9. REFER TO MATERIALS PLANS AND DETAILS FOR FEATURE DIMENSIONS

## ABBREVIATION LEGEND:

| | |
|---|---|
| PA | PLANTING AREA |
| TYP | TYPICAL |
| NIC | NOT IN CONTRACT |
| STD | SLOPE TO DRAIN |
| ME | MATCH EXISTING |
| FC | FLUSH CONDITION |
| TW | TOP OF WALL |
| BW | BOTTOM OF WALL |
| TB | TOP OF BENCH |

## GENERAL NOTES:

1. DIMENSIONS ON PLAN REPRESENT LOCATIONS OF KEY FEATURES AND ALIGNMENTS; REFER TO DETAILS FOR SPECIFIC DIMENSIONS AND MATERIALS
2. ALL BOULDER LOCATIONS TO BE APPROVED IN FIELD BY L.A. PRIOR TO INSTALLATION

NORTH

0 5 10 20

ORIGINAL SCALE: 1:10

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**MEP:**
**HENDRIX CONSULTING, 512.218.0060**

**STRUCTURAL:**
**ENGINEERING 360, 512.244.1966**

# RIVER RANCH COUNTY PARK INTERPRETIVE CENTER

## WILLIAMSON COUNTY, TX

REGISTERED LANDSCAPE ARCHITECT
CLAIRE HEMPEL
2455
STATE OF TEXAS

2/22/2019

ISSUE DATE:

REVISIONS

| | DATE | DESCRIPTION |
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DRAWN: DW REVIEWED: DW

# ISSUE FOR BID

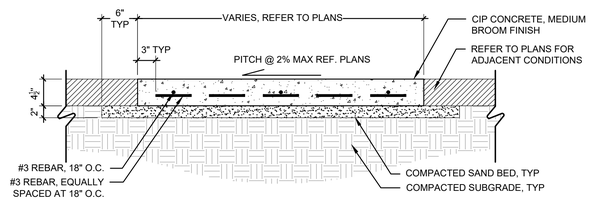
PROJECT NUMBER: 5619

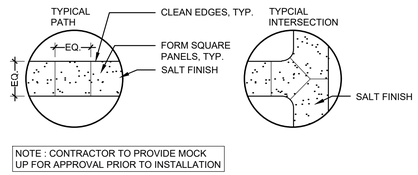
# LAYOUT AND GRADING PLAN

SHEET NUMBER

# L4-01

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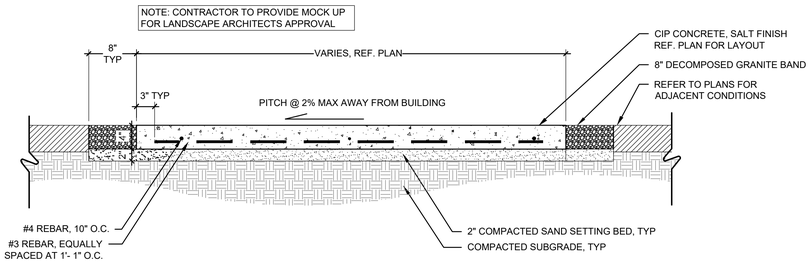




NOTE : CONTRACTOR TO PROVIDE MOCK UP FOR APPROVAL PRIOR TO INSTALLATION

## 1 CONCRETE WALK

1"=1'-0"

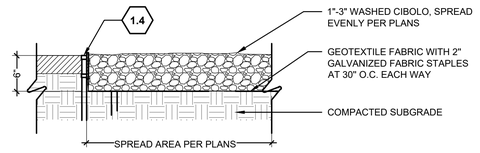
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## 2 CONCRETE PAD

1"=1'-0"

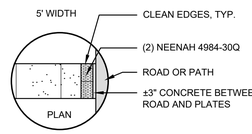
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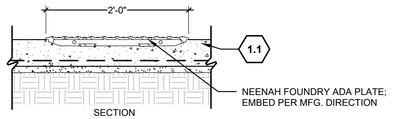



## 5 GRAVEL TYPE 1 - CIBOLO ROCK

1"=1'-0"

1.5



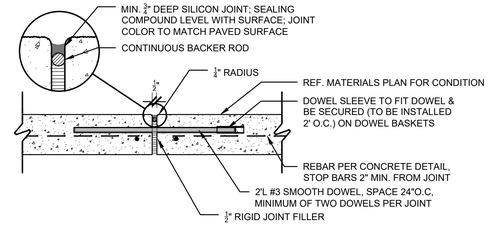




NOTE : EACH APPLICATION VARIES; REFER TO PLANS FOR APPLICATION OF TRUNCATED DOMES

## 3 TRUNCATED DOME PLATES

1"=1'-0"

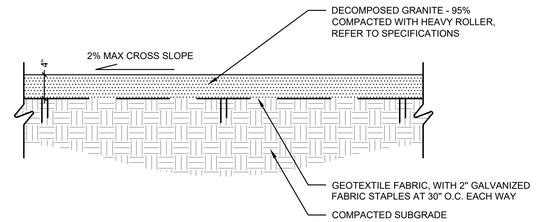
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## 6 EXPANSION JOINT

1-1/2"=1'-0"

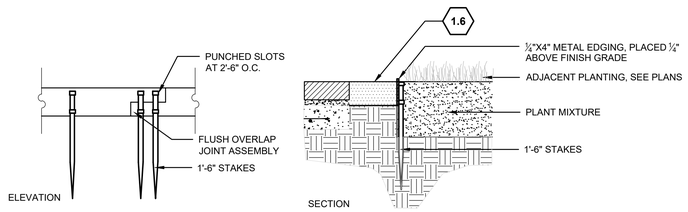
2.1




## 8 GRAVEL TYPE 2 - DECOMP. GRANITE

1"=1'-0"

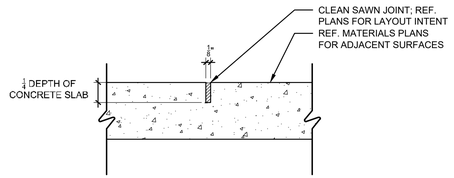
1.6




## 4 METAL EDGING

1"=1'-0"

1.4




## 7 CONTROL JOINT

1-1/2"=1'-0"

2.2

## SITE KEYNOTES:

DETAIL / SHEET

**1.0 PAVEMENTS, RAMPS, CURBS**

| | | |
|---|---|---|
| 1.1 | CONCRETE WALK | 1 / L7-01 |
| 1.2 | CONCRETE PAD | 2 / L7-01 |
| 1.3 | TRUNCATED DOME PLATES | 3 / L7-01 |
| 1.4 | METAL EDGING | 4 / L7-01 |
| 1.5 | GRAVEL TYPE 1 - CIBOLO ROCK | 5 / L7-01 |
| 1.6 | GRAVEL TYPE 2 - DECOMPOSED GRANITE | 8 / L7-01 |

**2.0 JOINTING**

| | | |
|---|---|---|
| 2.1 | EXPANSION JOINT | 6 / L7-01 |
| 2.2 | CONTROL JOINT | 7 / L7-01 |

**3.0 STEPS**

NOT USED

**4.0 SITE WALLS/ EMBANKMENTS**

| | | |
|---|---|---|
| 4.1 | WALL TYPE 2 - CIP WALL | 3 / L7-02 |
| 4.2 | BOULDER WALL | 4 / L7-02 |

**5.0 SITE FURNITURE**

| | | |
|---|---|---|
| 5.1 | BICYCLE RACK | 2 / L7-02 |

**6.0 RAILINGS, BARRIERS, FENCING**

| | | |
|---|---|---|
| 6.1 | HANDRAIL | 1 / L7-02 |

**7.0 SITE LIGHTING**

| | | |
|---|---|---|
| 7.1 | PATH LIGHT | 1 / L7-03 |
| 7.2 | UPLIGHT | 2 / L7-03 |

**8.0 DRAINAGE**

NOT USED

**9.0 PLANTING AND LANDSCAPE**

REFER TO PLANTING PLAN SERIES

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**MEP:**
**HENDRIX CONSULTING, 512.218.0060**

**STRUCTURAL:**
**ENGINEERING 360, 512.244.1966**

# RIVER RANCH COUNTY PARK INTERPRETIVE CENTER

## WILLIAMSON COUNTY, TX




2/22/2019

ISSUE DATE:

REVISIONS

| | DATE | DESCRIPTION |
|---|---|---|
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ISSUE FOR BID

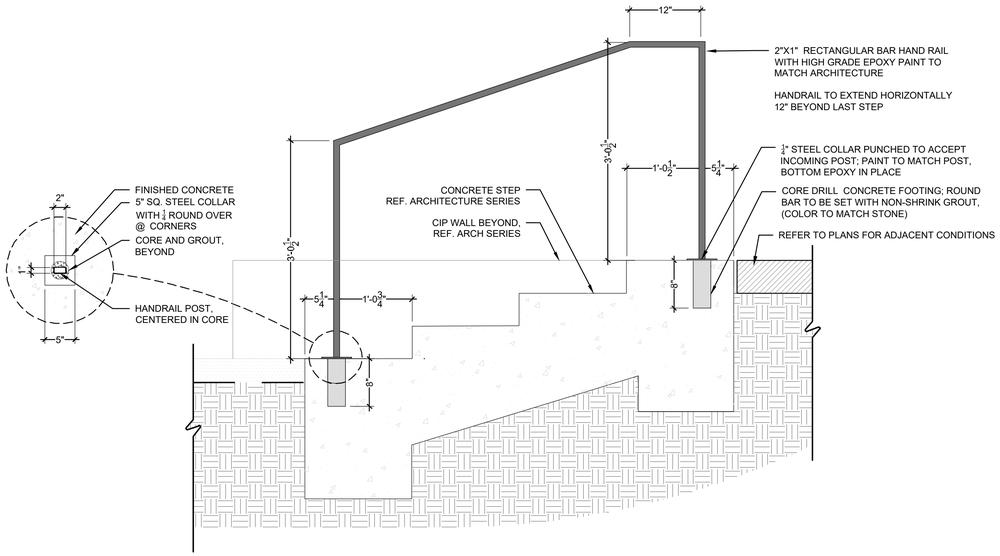
PROJECT NUMBER: 5619

SITE DETAILS

SHEET NUMBER

**L7-01**

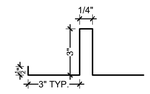
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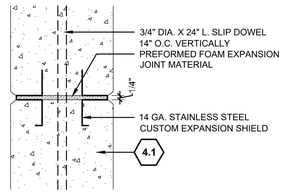

## 1 HANDRAIL

3/4"=1'-0"

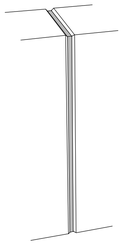
6.1




TYPICAL CROSS SECTION THROUGH EXPANSION SHIELD




PLAN VIEW - SECTION



EXTERIOR AXON OF COMPLETED JOINT

## SITE KEYNOTES:

DETAIL / SHEET

**1.0 PAVEMENTS, RAMPS, CURBS**

| | | |
|---|---|---|
| 1.1 | CONCRETE WALK | 1 / L7-01 |
| 1.2 | CONCRETE PAD | 2 / L7-01 |
| 1.3 | TRUNCATED DOME PLATES | 3 / L7-01 |
| 1.4 | METAL EDGING | 4 / L7-01 |
| 1.5 | GRAVEL TYPE 1 - CIBOLO ROCK | 5 / L7-01 |
| 1.6 | GRAVEL TYPE 2 - DECOMPOSED GRANITE | 8 / L7-01 |

**2.0 JOINTING**

| | | |
|---|---|---|
| 2.1 | EXPANSION JOINT | 6 / L7-01 |
| 2.2 | CONTROL JOINT | 7 / L7-01 |

**3.0 STEPS**

NOT USED

**4.0 SITE WALLS/ EMBANKMENTS**

| | | |
|---|---|---|
| 4.1 | WALL TYPE 2 - CIP WALL | 3 / L7-02 |
| 4.2 | BOULDER WALL | 4 / L7-02 |

**5.0 SITE FURNITURE**

| | | |
|---|---|---|
| 5.1 | BICYCLE RACK | 2 / L7-02 |

**6.0 RAILINGS, BARRIERS, FENCING**

| | | |
|---|---|---|
| 6.1 | HANDRAIL | 1 / L7-02 |

**7.0 SITE LIGHTING**

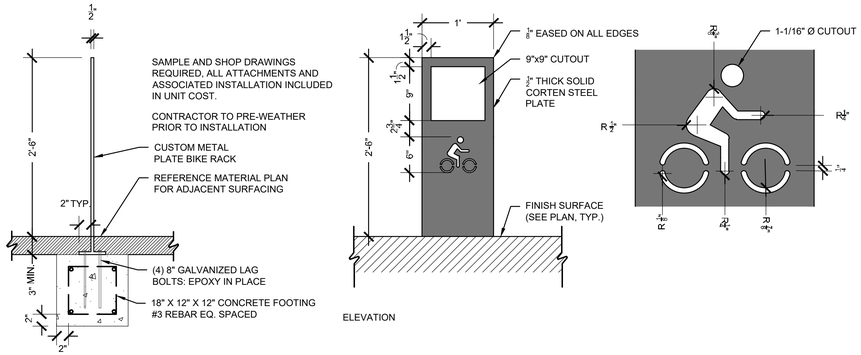
| | | |
|---|---|---|
| 7.1 | PATH LIGHT | 1 / L7-03 |
| 7.2 | UPLIGHT | 2 / L7-03 |

**8.0 DRAINAGE**

NOT USED

**9.0 PLANTING AND LANDSCAPE**

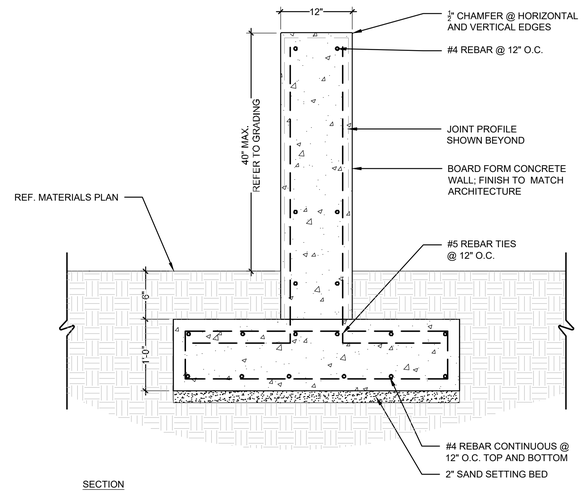
REFER TO PLANTING PLAN SERIES




## 2 BICYCLE RACK

1"=1'-0"

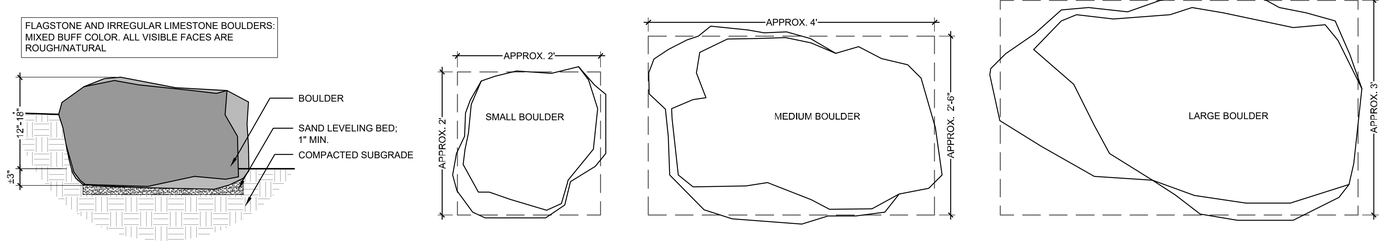
5.1




## 3 WALL TYPE 2 - CIP WALL

1"=1'-0"

4.2




## 4 BOULDER WALL

1"=1'-0"

4.2

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**ARCHITECT:**
**McKINNEY YORK, 512.476.0201**

**MEP:**
**HENDRIX CONSULTING, 512.218.0060**

**STRUCTURAL:**
**ENGINEERING 360, 512.244.1966**

# RIVER RANCH COUNTY PARK INTERPRETIVE CENTER

## WILLIAMSON COUNTY, TX

REGISTERED LANDSCAPE ARCHITECT
CLAIRE HENZEL
2455
STATE OF TEXAS

2/22/2019

ISSUE DATE:

REVISIONS

| | DATE | DESCRIPTION |
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ISSUE FOR BID

PROJECT NUMBER: 5619

SITE DETAILS

SHEET NUMBER

**L7-02**

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Bollard - asymmetric shielded light distribution

**BEGA**

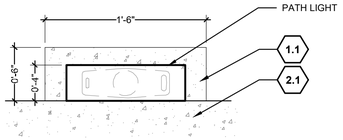
**Application**
Bollards with shielded light distribution are ideal for providing a high level of illuminance directly in front of the luminaire while maintaining exceptional glare control.
**Materials**
Luminaire housing constructed of die-cast and extruded marine grade, copper free (≤ 0.3% copper content) A360.0 aluminum alloy
Clear safety glass
Reflector made of pure anodized aluminum
Silicone applied robotically to casting, plasma treated for increased adhesion
Mechanically captive stainless steel fasteners
Anchorage constructed of galvanized steel
**NRTL** listed to North American Standards, suitable for wet locations
Protection class IP 65
Weight: 17.6 lbs
**Electrical**

| | |
|---|---|
| Operating voltage | 120-277V AC |
| Minimum start temperature | -40° C |
| LED module wattage | 12.3 W |
| System wattage | 17.4 W |
| Controllability | 0-10V dimmable |
| Color rendering index | Ra > 90 |
| Luminaire lumens | 1100 lumens (3000K) |
| Lifetime at Ta = 15° C | 50,000 h (L70) |

**LED color temperature**
☐ 4000K - Product number + **K4**
☐ 3500K - Product number + **K35**
☑ 3000K - Product number + **K3**
☐ 2700K - Product number + **K27**
**BEGA** can supply you with suitable LED replacement modules for up to 20 years after the purchase of LED luminaires - see website for details

**Finish**
All BEGA standard finishes are matte, textured polyester powder coat with minimum 3 mil thickness.
Available colors ☑ Black (BLK) ☐ White (WHT) ☐ RAL:
☐ Bronze (BRZ) ☐ Silver (SLV) ☐ CUS:

Type:
BEGA Product:
Project:
Modified:




PLAN

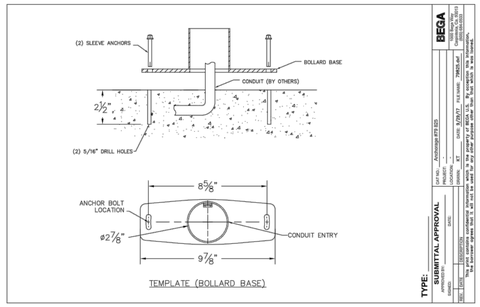
**Mounting options**
☐ **Direct Burial Anchorage Kit** 71 890
See individual accessory spec sheet for details.






**Bollard** · asymmetric shielded light distribution

| | LED | A | B | C | Anchorage |
|---|---|---|---|---|---|
| **84671** | 12.3 W | 13⅜ | 15¾ | 4 | **79825** |




**BEGA** 1000 BEGA Way, Carpinteria, CA 93013 (805) 684-0533 info@bega-us.com

Due to the dynamic nature of lighting products and the associated technologies, luminaire data on this sheet is subject to change at the discretion of BEGA North America. For the most current technical data, please refer to bega-us .com
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# 1 PATH LIGHT

1/2"=1'-0"

7.1

## SITE KEYNOTES:

DETAIL / SHEET

**1.0 PAVEMENTS, RAMPS, CURBS**

| | | |
|---|---|---|
| 1.1 | CONCRETE WALK | 1 / L7-01 |
| 1.2 | CONCRETE PAD | 2 / L7-01 |
| 1.3 | TRUNCATED DOME PLATES | 3 / L7-01 |
| 1.4 | METAL EDGING | 4 / L7-01 |
| 1.5 | GRAVEL TYPE 1 - CIBOLO ROCK | 5 / L7-01 |
| 1.6 | GRAVEL TYPE 2 - DECOMPOSED GRANITE | 8 / L7-01 |

**2.0 JOINTING**

| | | |
|---|---|---|
| 2.1 | EXPANSION JOINT | 6 / L7-01 |
| 2.2 | CONTROL JOINT | 7 / L7-01 |

**3.0 STEPS**

NOT USED

**4.0 SITE WALLS/ EMBANKMENTS**

| | | |
|---|---|---|
| 4.1 | WALL TYPE 2 - CIP WALL | 3 / L7-02 |
| 4.2 | BOULDER WALL | 4 / L7-02 |

**5.0 SITE FURNITURE**

| | | |
|---|---|---|
| 5.1 | BICYCLE RACK | 2 / L7-02 |

**6.0 RAILINGS, BARRIERS, FENCING**

| | | |
|---|---|---|
| 6.1 | HANDRAIL | 1 / L7-02 |

**7.0 SITE LIGHTING**

| | | |
|---|---|---|
| 7.1 | PATH LIGHT | 1 / L7-03 |
| 7.2 | UPLIGHT | 2 / L7-03 |

**8.0 DRAINAGE**

NOT USED

**9.0 PLANTING AND LANDSCAPE**

REFER TO PLANTING PLAN SERIES

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# RIVER RANCH COUNTY PARK INTERPRETIVE CENTER

WILLIAMSON COUNTY, TX



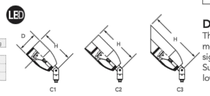
# PINE

WINSCAPE® LED Landscape Light

| | |
|---|---|
| CATALOG NUMBER | |
| NOTES | |
| TYPE | |

Specifications

| | |
|---|---|
| D: | Ø5-3/8" (137mm) + Mounting |
| H: | 9" (229mm) w/C1 |
| | 11" (279mm) w/C2 |
| | 14-7/8" (378mm) w/C3 |




## DESCRIPTION

The Pine Series accent light is suitable for a variety of mounting applications including ground, wall, tree, sign and architectural accents.
Suitable for wet locations. Dimmable using a standard low voltage magnetic dimmer.

**ORDERING INFORMATION** EXAMPLE: PINE 9LED38 120 NSP KM JBA IHL C2 BL

| Series* | Source* | LED Color | Voltage* | Distribution | Lens | Mounting | Mounting Accessories* |
|---|---|---|---|---|---|---|---|
| PINE | 9LED38 | 30K | 120 | NSP Spot | FLC Flat Clear | KM Knuckle Mount | **Independent Mounting** JBA Aluminum J-Box; JBB Bronze J-Box Architectural; ARJB J-Box, Aluminum 12"-48"; CN4 Rectangular Canopy; CN5 5" Round Canopy; WMC Wall Mount Cover; WMSA Wall Mount with Splice Access; STK Mounting Stake; TRA Tree Mounted J-Box, Aluminum; TRB Tree Mounted J-Box, Bronze |
| | | 40K | 277 | NFL Narrow Flood | WSL Watershed | | **Independent Mounting** _TRA5 Tree Mounted J-Box with Aluminum mounting strap, available with 1-4 JBoxes per strap; _TRB5 Tree Mounted J-Box with Bronze mounting strap, available with 1-4 JBoxes per strap; PM60A Adjustable Post Mount; PM60C Post Mount with Conduit; PM60D Post Mount with Open Bottom; **Stems**[1] S3 3" Stem; S6 6" Stem; S__ 12" - 24" stems, available in 6" increments |
| | | 50K | | FL Flood | | | |

| Options[1] | | External Caps* | Finish* | |
|---|---|---|---|---|
| **Internal Louver** | **Internal Filters** | C1 Short Flush | **All Material** | **All Material** |
| IHL Honeycomb Louver | FA Amber | C2 Recessed Lens | BL Black Textured | DNA Natural Aluminum |
| **Internal Accessory** | FG Green | C3 45° Angle Cut | BRS Bronze Smooth | NBS[3] Natural Bronze Smooth |
| L1 Prismatic Lens | FGD Green Dichroic | | BRT Bronze Textured | VET Verde Textured |
| L2 Linear Spread Lens | FLB Light Blue | | CHS Chrome Smooth | WH White Textured |
| L3 Softening Lens | FM Mercury Vapor | | DBL Black Smooth | WHS White Smooth |
| | FMB Medium Blue | | DDB Designer Bronze | CF Custom Finish |
| | FMBD Medium Blue Dichroic | | | |
| | FR Red | | | |
| | FRD Red Dichroic | | | |

**FEATURES & SPECIFICATIONS**

**MATERIAL**: Body and cap cast from 356-T6 Aluminum, knuckle machined from 6061-T6 Aluminum.
**LIGHT SOURCE**: LED, 12 watts
**VOLTAGE**: 120 or 277
**DISTRIBUTION**: See ordering guide.
**LENS**: Cut from heat strengthened borosilicate glass for superior clarity and strength.
**MOUNTING**: Adjustable knuckle is 1/2" NPT.
**ELECTRICAL**: Integral low voltage AC LED driver. Dimmable with a standard low voltage magnetic dimmer.
**FINISH**: Super durable polyester TGIC powder coat finish standard). Optional Zinc undercoat for harsh environments.
**FEATURES**: Field replaceable lens. Any combination of up to 3 lens accessories/color filter/shielding can be specified in any cap style and are held securely by a removable stainless steel clip ring. Fixture comes standard with the Watershed™ Lens.
**LISTING**: UL cUL: Wet Location.
**WARRANTY**: 5-year limited warranty. Complete warranty terms located at www.acuitybrands.com/CustomerResources/Terms_and_conditions.aspx
**NOTE**: Actual performance may differ as a result of end-user environment and application.
All values are design or typical values, measured under laboratory conditions at 25 °C.
Specifications subject to change without notice.

*Required Fields
Notes:
1. S3, S6, S12, S18 and S24 avilable on the PM60A, PM60C or P60D only.
2. Up to 3 Optional Items can be specified.
3. NBS paint uses specialty pigments to give a natural appearance that may vary by fixture.

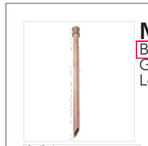
HYDREL WINSCAPE®

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Phone: 866.533.9901 • Fax: 866.533.5291

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Rev. 12/14/15
PINE_LED

# 2 UPLIGHT

NTS



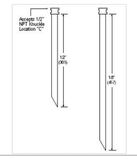
# MS/MSB

Black Iron or Brass
Ground Mounting Spike
Low Voltage

| | |
|---|---|
| CATALOG NUMBER | |
| NOTES | |
| TYPE | |

Specifications

| | |
|---|---|
| W: | 2-1/2" |
| | 63mm |
| H: | 12" - 18" |
| | 305mm - 457mm |




## DESCRIPTION

Ground spikes are ideal for portable applications where fixtures may need to be moved. These spikes are for low voltage applications only.

**ORDERING INFORMATION** EXAMPLE: MSB12 12C

| Model[1] | Fixture Opening |
|---|---|
| MS12 12" steel mounting spike | 12C Accepts 1/2" NPT threaded fixture |
| MS18 18" steel mounting spike | |
| MSB12 12" brass mounting spike | |
| MSB18 18" brass mounting spike | |

**FEATURES & SPECIFICATIONS**

**MATERIAL**: Black Iron or Red Brass
**MODELS**: MS12 - 12" iron mounting spike
MS18 - 18" iron mounting spike
MSB12 - 12" brass mounting spike
MSB18 - 18" brass mounting spike
**WIRING**: Silicone-filled wire nuts are provided with the spikes to allow for watertight electrical connections via the wiring hole provided at the top of the spike.
**FIXTURE MOUNTING**: Located atop the spike, the opening accepts a ½" NPT threaded fixture.
**FINISH**: Standard spikes are unpainted galvanized steel or brass.

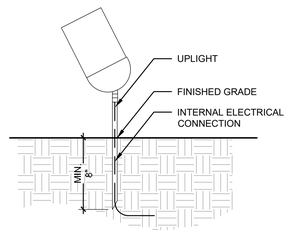
Notes:
1 This part is to be used with LOW VOLTAGE FIXTURES ONLY.

**NOTE:** Hydrel Reserves The Right To Modify Specification Without Notice. Any dimension on this sheet is to be assumed as a reference dimension. "Used for information purposes only. It does not govern manufacturing or inspection requirements." (ANSI Y14.5-1973)

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6/16/14
MS_MSB




ELEVATON

7.2

DISTRICT LANDSCAPE ARCHITECT
CLAIRE HENSEL
2455
STATE OF TEXAS

2/22/2019

ISSUE DATE:

REVISIONS

| | DATE | DESCRIPTION |
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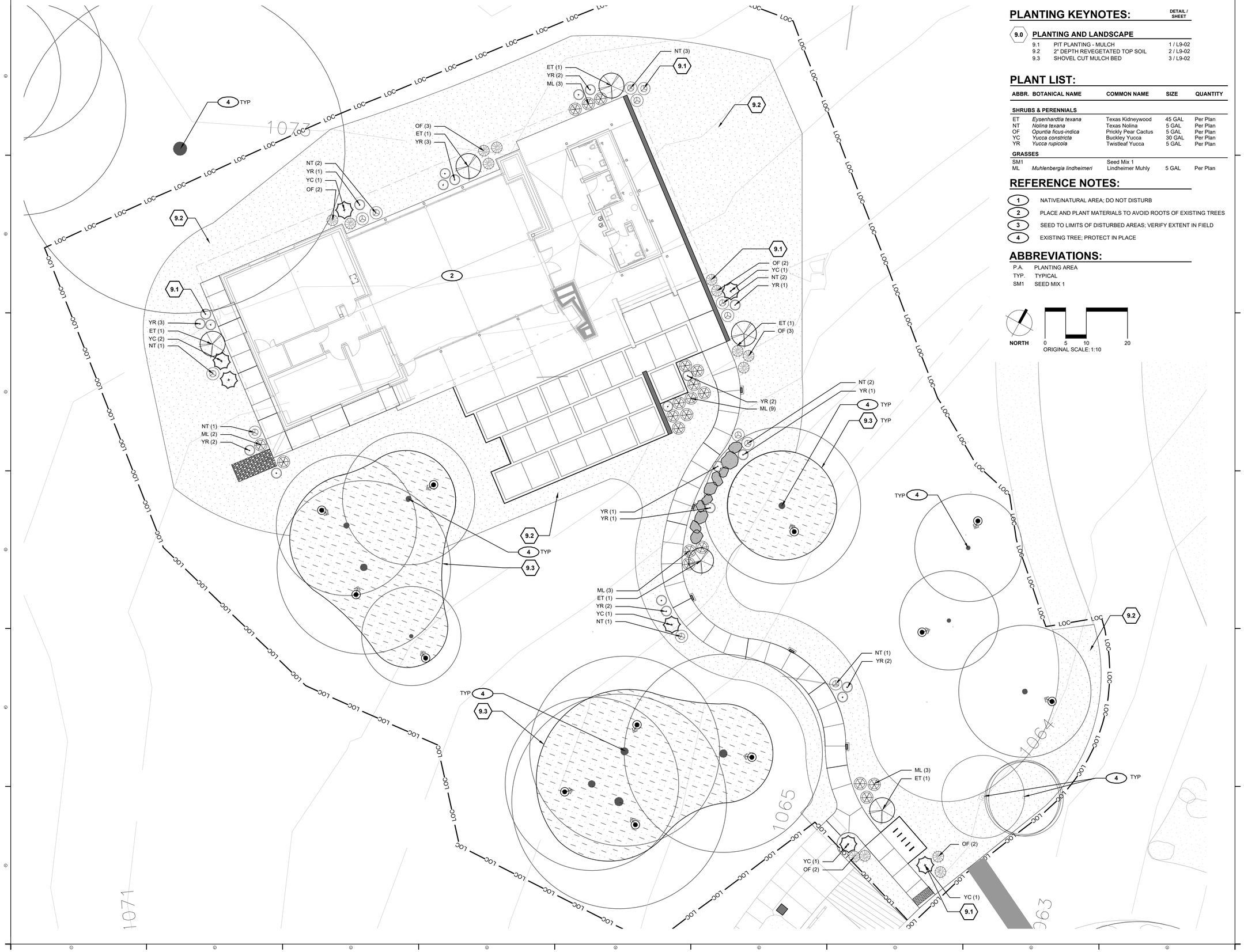
PROJECT NUMBER: 5619

SITE DETAILS

SHEET NUMBER

**L7-03**

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## PLANTING KEYNOTES:

| | | DETAIL / SHEET |
|---|---|---|
| 9.0 | **PLANTING AND LANDSCAPE** | |
| 9.1 | PIT PLANTING - MULCH | 1 / L9-02 |
| 9.2 | 2" DEPTH REVEGETATED TOP SOIL | 2 / L9-02 |
| 9.3 | SHOVEL CUT MULCH BED | 3 / L9-02 |

## PLANT LIST:

| ABBR. | BOTANICAL NAME | COMMON NAME | SIZE | QUANTITY |
|---|---|---|---|---|
| **SHRUBS & PERENNIALS** | | | | |
| ET | *Eysenhardtia texana* | Texas Kidneywood | 45 GAL | Per Plan |
| NT | *Nolina texana* | Texas Nolina | 5 GAL | Per Plan |
| OF | *Opuntia ficus-indica* | Prickly Pear Cactus | 5 GAL | Per Plan |
| YC | *Yucca constricta* | Buckley Yucca | 30 GAL | Per Plan |
| YR | *Yucca rupicola* | Twistleaf Yucca | 5 GAL | Per Plan |
| **GRASSES** | | | | |
| SM1 | | Seed Mix 1 | | |
| ML | *Muhlenbergia lindheimeri* | Lindheimer Muhly | 5 GAL | Per Plan |

## REFERENCE NOTES:

1. NATIVE/NATURAL AREA; DO NOT DISTURB
2. PLACE AND PLANT MATERIALS TO AVOID ROOTS OF EXISTING TREES
3. SEED TO LIMITS OF DISTURBED AREAS; VERIFY EXTENT IN FIELD
4. EXISTING TREE; PROTECT IN PLACE

## ABBREVIATIONS:

| | |
|---|---|
| P.A. | PLANTING AREA |
| TYP. | TYPICAL |
| SM1 | SEED MIX 1 |

NORTH

0 5 10 20

ORIGINAL SCALE: 1:10

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## WILLIAMSON COUNTY, TX

REGISTERED LANDSCAPE ARCHITECT
CLAIRE HEWLETT
2455
STATE OF TEXAS

2/22/2019

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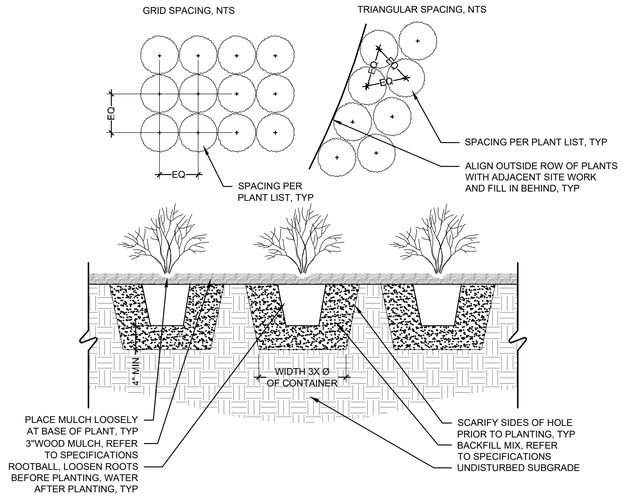
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## PLANTING PLAN

SHEET NUMBER

# L8-01

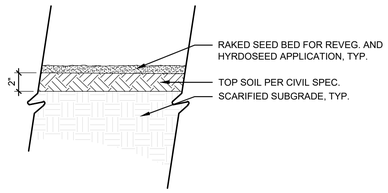
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## 1 PIT PLANTING - MULCH

1"=1'-0"

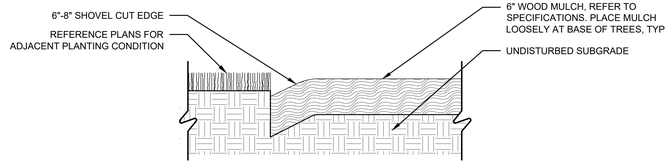
9.1




## 2 2" DEPTH VEGETATIVE TOPSOIL

1"=1'-0"

9.2




## 3 MULCH IN SHOVEL CUT BED

1"=1'-0"

9.3

## PLANTING KEYNOTES:

| | | DETAIL / SHEET |
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| **GRASSES** | | | | |
| SM1 | | Seed Mix 1 | | |

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WILLIAMSON COUNTY, TX




2/22/2019

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PROJECT NUMBER: 5619

PLANTING DETAILS

SHEET NUMBER

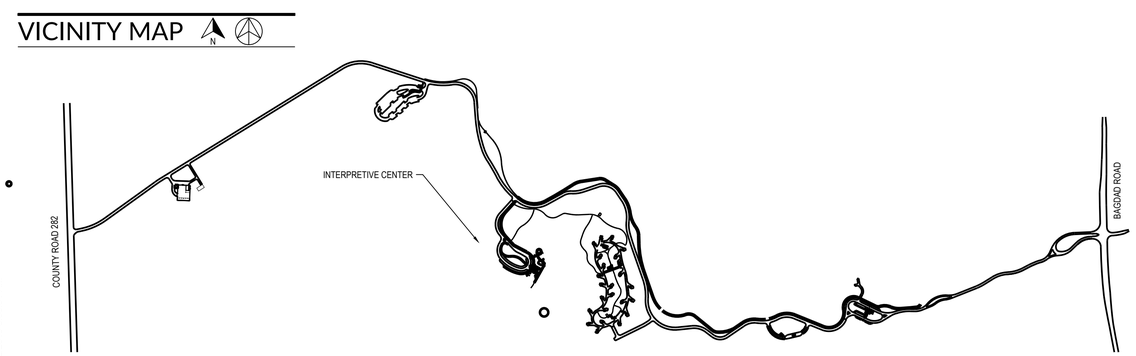
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# ABBREVIATIONS

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| AB | AIR BARRIER | CONC | CONCRETE | FO | FACE OF | MACH | MACHINE | SECT | SECTION |
| ABV | ABOVE | COND | CONDITION | FP | FIREPROOFED, FIREPROOFING | MAS | MASONRY | SF | SQUARE FOOT, SQUARE FEET |
| ACM | ASBESTOS CONTAINING MATERIAL | CONST | CONSTRUCTION | FRJ | FIRE RESISTIVE JOINT | MAX | MAXIMUM | SFRM | SPRAY APPLIED FIRE-RESISTIVE |
| ACOUS | ACOUSTICAL | CONT | CONTINUOUS | FRM | FRAME, FRAMED, FRAMING | MB | MARKERBOARD | | MATERIAL |
| ACR | ACRYIC | CORR | CORRIDOR | FRT | FIRE RETARDANT TREATED | MBR | MEMBER | SGL | SINGLE |
| AD | AREA DRAIN | CPR | COPPER | FSTN | FASTENER | MECH | MECHANICAL | SHT | SHEET |
| ADH | ADHESIVE | CPT | CARPET, CARPETED | FT | FOOT, FEET | MEMB | MEMBRANE | SHWR | SHOWER |
| ● ADJ | ADJUSTABLE | CRS | COURSE, COURSES | FTF | FLOOR-TO-FLOOR | MEP | MECHANICAL, ELECTRICAL, AND | SIM | SIMILAR |
| AFF | ABOVE FINISHED FLOOR | CS | COUNTERSUNK | FTW | FLOOR-TO-WALL | | PLUMBING | SLNT | SEALANT |
| AHJ | AUTHORITY HAVING JURISDICTION | CU | CUBIC | FUR | FURRING | MFR | MANUFACTURER, MANUFACTURED | SOF | SOFFIT |
| ALT | ALTERNATE | CW | CURTAINWALL | FURN | FURNITURE | MIFRC | MASTIC AND INTUMESCENT FIRE | SQ | SQUARE |
| ALUM | ALUMINUM | CY | CUBIC YARD | FUT | FUTURE | | RESISTIVE COATING | SS | STAINLESS STEEL |
| ANC | ANCHOR, ANCHORED | D | DEEP, DEPTH | FXD | FIXED | MIN | MINIMUM | STL | STEEL |
| ANOD | ANODIZED | DATACOM | DATA AND COMMUNICATION | GA | GAUGE | MIR | MIRROR | STND | STAINED |
| ANSI | AMERICAN NATIONAL STANDARDS | DBL | DOUBLE | GALV | GALVANIZED | MISC | MISCELLANEOUS | STOR | STORAGE, STOREFRONT |
| | INSTITUTE | DEG | DEGREE, DEGREES | GL | GLASS, GLAZING | MNRL | MINERAL | STRUCT | STRUCTURAL |
| AP | ACCESS PANEL | DF | DRINKING FOUNTAIN | GR | GUARD, GUARDRAIL | MOD | MODIFIED | SURF | SURFACE |
| APC | ARCHITECTURAL PRECAST | DIA | DIAMETER | GYP | GYPSUM | MTD | MOUNTED | SUSP | SUSPEND, SUSPENDED |
| | CONCRETE | DIM | DIMENSION | HARAW | HOT FLUID-APPLIED RUBBERIZED | MTL | METAL | SYS | SYSTEM |
| APPROX | APPROXIMATE | DISP | DISPENSER | | ASPHALT WATERPROOFING | N | NORTH | T | TREAD |
| ARCH | ARCHITECT, ARCHITECTURAL | DIST | DISTANCE | HB | HOSE BIBB | NIC | NOT IN CONTRACT | T&G | TONGUE AND GROOVE |
| ASPH | ASPHALT, ASPHALTIC | DN | DOWN | HC | HANDICAPPED | NO | NUMBER | TAS | TEXAS ACCESSIBILITY |
| ASSY | ASSEMBLY | DP | DIMPOINT, DAMPPROOFING | HDOW | HEAD-OF-WALL | NSMF | NON-STRUCTURAL METAL | | STANDARDS |
| ASTM | AMERICAN SOCIETY FOR TESTING | DR | DOOR | HDR | HEADER | | FRAMING | TB | TACKBOARD |
| | AND MATERIALS | DRN | DRAIN | HDWR | HARDWARE | NTS | NOT TO SCALE | TBP | TILE BACKER PANEL |
| ATTEN | ATTENUATION | DS | DOWNSPOUT | HM | HOLLOW METAL | OC | ON CENTER | TEL | TELEPHONE |
| AUTO | AUTOMATIC | DTL | DETAIL | HOR | HORIZONTAL | OD | OUTSIDE DIAMETER, OVERFLOW | TEMP | TEMPORARY |
| AV | AUDIO VISUAL | DW | DISHWASHER | HR | HOUR, HANDRAIL | | DRAIN | THRU | THROUGH |
| BD | BOARD | DWG | DRAWING | HT | HEIGHT | OH | OPPOSITE HAND | TME | TO MATCH EXISTING |
| BEL | BELOW | DWR | DRAWER | HTR | HEATER | OPCI | OWNER PROVIDED, CONTRACTOR | TOC | TOP OF CONCRETE |
| BIT | BITUMEN, BITUMINOUS | EA | EACH | HVAC | HEATING, VENTILATING, AND AIR | | INSTALLED | TODT | TOP OF DOUBLE TEE |
| ● BLDG | BUILDING | EIFS | EXTERIOR INSULATION AND FINISH | | CONDITIONING | OPOI | OWNER PROVIDED, OWNER | TOST | TOP OF STEEL |
| BLKG | BLOCKING | | SYSTEM | HVY | HEAVY | | INSTALLED | TOW | TOP OF WALL |
| BM | BEAM | EJ | EXPANSION JOINT | HWH | HOT WATER HEATER | PERF | PERFORATED | TRK | TRACK |
| BMJ | BUILDING MOVEMENT JOINT | EL | ELEVATION | ID | INSIDE DIAMETER | PL | PLATE | TV | TELEVISION |
| BN | BULLNOSE | ELEC | ELECTRIC, ELECTRICAL | IN | INCH | PLAM | PLASTIC LAMINATE | TWF | THROUGH WALL FLASHING |
| BODT | BOTTOM OF DOUBLE TEE | ELEV | ELEVATOR | INCL | INCLUDE, INCLUDED, INCLUDING | PLAS | PLASTER | TYP | TYPICAL |
| BOST | BOTTOM OF STEEL | ENCL | ENCLOSURE | INSUL | INSULATE, INSULATION | PLBG | PLUMBING | UIO | UNLESS INDICATED OTHERWISE |
| BOW | BOTTOM-OF-WALL | EQ | EQUAL | INT | INTERIOR | PLYWD | PLYWOOD | UL | UNDERWRITERS LABORATORIES |
| BR | BATHROOM | EQUIP | EQUIPMENT | INV | INVERT | PR | PAIR | UNDRLAY | UNDERLAYMENT |
| BRKT | BRACKET | ETR | EXISTING TO REMAIN | JAN | JANITOR, JANITOR CLOSET | PROV | PROVIDE | UNF | UNFINISHED |
| BTM | BOTTOM | EW | EACH WAY | JBOX | JUNCTION BOX | PT | PRESSURE TREATED | VB | VAPOR BARRIER |
| BTW | BETWEEN | EWC | ELECTRIC WATER COOLER | JST | JOIST | PTD | PAINTED | VERT | VERTICAL |
| BVL | BEVELED | EXH | EXHAUST | JT | JOINT | PTN | PARTITION | VEST | VESTIBULE |
| CB | CHALKBOARD | EXP | EXPANSION | KD | KILN DRIED | QTR | QUARTER | VIF | VERIFY IN FIELD |
| CDM | CAVITY DRAINAGE MATERIAL | EXST | EXISTING | KDAT | KILN DRIED AFTER TREATMENT | R | RISER | VNR | VENEER |
| CEM | CEMENT, CEMENTITIOUS | EXT | EXTERIOR | KIT | KITCHEN | RAD | RADIUS | W | WIDE, WIDTH |
| CEN | CENTER | FAB | FABRICATE, FABRICATED, | KS | KNEE SPACE | RCP | REFLECTED CEILING PLAN | W/ | WITH |
| CF | CUBIC FOOT, CUBIC FEET | | FABRICATOR | L | LONG, LENGTH | RD | ROOF DRAIN | W/D | WASHER AND DRYER |
| CFL | COUNTERFLASHING | FACP | FIRE ALARM CONTROL PANEL | LAD | LADDER | REF | REFER, REFERENCE | W/O | WITHOUT |
| CFMF | COLD FORMED METAL FRAMING | FD | FLOOR DRAIN | LAM | LAMINATE, LAMINATED | REINF | REINFORCED | WB | WALL BOARD |
| CG | CORNER GUARD | FDV | FIRE DEPARTMENT VALVE | LAT | LATERAL | REM | REMOVE | WC | WATER CLOSET |
| CH | CHANNEL | FE | FIRE EXTINGUISHER | LAV | LAVATORY | REQD | REQUIRED | WD | WOOD |
| CIV | CIVIL | FEC | FIRE EXTINGUISHER CABINET | LB, # | POUND | RESIL | RESILIENT | WNDW | WINDOW |
| CJ | CONTROL JOINT | FF | FINISHED FLOOR | LBS | POUNDS | REV | REVISION | WP | WORKPOINT, WATERPROOFING |
| CL | CENTER LINE | FHC | FIRE HOSE CABINET | LF | LINEAR FOOT, LINEAR FEET | RFG | ROOFING | WS | WATERSTOP |
| ● CLG | CEILING | FHVC | FIRE HOSE AND VALVE CABINET | LIN | LINEAR | RM | ROOM | WTW | WALL-TO-WALL |
| CLOS | CLOSET | FBLKG | FIREBLOCKING | LLH | LONG LEG HORIZONTAL | RO | ROUGH OPENING | WWF | WELDED WIRE FABRIC |
| CLR | CLEAR | FIN | FINISH, FINISHED | LLV | LONG LEG VERTICAL | RR | RESTROOM, RAILROAD | WWM | WELDED WIRE MESH |
| CMU | CONCRETE MASONRY UNIT | FIXT | FIXTURE | LOC | LOCATE, LOCATION | SAB | SOUND ATTENUATION BLANKET | YD | YARD |
| CNTR | COUNTER | FLEX | FLEXIBLNE | LS | LANDSCAPE, LANDSCAPING | SALV | SALVAGE | | |
| CO | CLEAN OUT | FLR | FLOOR, FLOORING | LT | LIGHT | SBR | SEALANT & BACKER ROD | | |
| COL | COLUMN | FLSHG | FLASHING | LVL | LEVEL | SCHED | SCHEDULE, SCHEDULED | | |
| COMP | COMPRESSIBLE, COMPRESSED | FNDN | FOUNDATION | LVR | LOUVER | SD | SIDE | | |

# VICINITY MAP






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# MATERIALS LEGEND

CAVITY DRAINAGE MATERIAL

CONCRETE BLOCK

STONE

CONCRETE

EARTH

JOINT FORMING MATERIAL

PLYWOOD

WOOD

ALUMINUM

STEEL

WALL BOARD

PLASTER

# SYMBOLS LEGEND

EXECUTIVE OFFICE 510 — ROOM NAME & NUMBER REFERENCE

1 10/10/10 — REVISION REFERENCE - SEE REVISION SCHEDULE IN TITLEBLOCK OF THE SHEET WHERE REFERENCE IS INDICATED

DIMENSION POINT SYMBOL - DIMENSIONS INDICATED IN PLAN AND SECTION DRAWINGS REFERENCE EXACT LOCATIONS INDICATED BY DIMENSION POINT SYMBOLS WHEN USED IN DETAIL DRAWINGS

WORK POINT SYMBOL - DIMENSIONS INDICATED IN PLAN AND SECTION DRAWINGS REFERENCE EXACT LOCATIONS INDICATED BY WORK POINT SYMBOLS WHEN USED IN DETAIL DRAWINGS

FINISH START POINT SYMBOL - LOCATION INDICATES A SEPARATION POINT OF TWO FINISHES OR AN ORIGIN POINT FOR ONE FINISH WHERE A FULL FORMAT PATTERN STARTS AND PROCEEDS IN THE DIRECTION OF THE ARROW

DIRECTION SYMBOL - ARROWS INDICATE DIRECTION OF GRAIN, PLANK, OR SPAN

LEVEL 1 / TOSL 100'-0" — ELEVATION SYMBOL

100'-0" — SPOT ELEVATION SYMBOL

1" — ELEVATION CHANGE SYMBOL

1 / A101 — EXTERIOR ELEVATION REFERENCE

1 / A101 — BUILDING SECTION REFERENCE

1 / A101 — WALL SECTION REFERENCE

1/A101 / 1/A102 — MATCHLINE REFERENCE

8/A922 — DETAIL REFERENCE

1 / A101 — DETAIL REFERENCE

TITLE / SCALE| A101 01 — DRAWING TITLE - THE DRAWING NUMBER REFERS TO THE DRAWING, THE SHEET NUMBER REFERS TO THE SHEET FROM WHICH THE DRAWING IS FIRST REFERENCED

4 ◄ A101 ► 2 / 3 — INTERIOR ELEVATION REFERENCE

X / Y (X) — PHOTOGRAPH REFERENCE - INDICATES APPROXIMATE LOCATION AND DIRECTION OF REFERENCED PHOTOGRAPH

W PT-1 / B RA-1 / F T-1 — ROOM FINISH CALLOUT - SPACE WHERE CALLOUT IS LOCATED HAS WALL FINISH PT-1, BASE RA-1, AND FLOOR FINISH T-1 ON ALL SURFACES, UNLESS INDICATED OTHERWISE

PT-1 — SURFACE FINISH CALLOUT - SURFACE THAT CALLOUT IS LOCATED ON OR IS POINTING TO HAS FINISH PT-1

14C — PARTITION & CEILING CALLOUT - NUMBER INDICATES PARTITION OR CEILING TYPE, LETTER INDICATES SIZE ACCORDING TO PARTITION SIZE SCHEDULE

EW-1 — CONSTRUCTION ASSEMBLY CALLOUT

PS-1 — SIGN CALLOUT

W-1 — FENESTRATION CALLOUT

SE-1 — FURNITURE & FURNISHINGS REFERENCE

100 — EQUIPMENT REFERENCE

A — ACCESSORIES REFERENCE

100 — DOOR REFERENCE

1 — KEY NOTE REFERENCE - SEE KEY NOTES ON THE SHEET WHERE REFERENCE IS INDICATED

A.1 — EXISTING COLUMN GRID TAG

A.1 — NEW COLUMN GRID TAG

CONFERENCE / A - 15 / 100 SF | 7 — OCCUPANCY DESCRIPTION; OCCUPANCY TYPE : OCCUPANT LOAD FACTOR; OCCUPANT LOAD TOTAL; FLOOR AREA

100 / 150 / PANIC — EGRESS DIRECTION; EXIT LOAD (OCCUPANTS); EXIT CAPACITY (OCCUPANTS); PANIC HARDWARE (WHERE OCCURS)

100 — EGRESS DIRECTION; OCCUPANTS

N — TRUE NORTH; PLAN NORTH

# DRAWING INDEX


ARCHITECTURAL

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S 1.1 FOUNDATION PLAN
S 1.2 ROOF FRAMING PLAN
S 2.1 DETAILS
S 2.2 DETAILS
S 2.3 DETAILS
S 2.4 DETAILS

MECHANICAL, ELECTRICAL, PLUMBING

E000 SCHEDULES, NOTES, AND LEGENDS - ELECTRICAL
E001 SCHEDULES - ELECTRICAL
E002 DETAILS - ELECTRICAL
E210 FLOOR PLAN - LIGHTING
E310 FLOOR PLAN - POWER
M000 SCHEDULES, NOTES, AND LEGENDS - MECHANICAL
M001 SCHEDULES - MECHANICAL
M002 DETAILS - MECHANICAL
M003 DETAILS - MECHANICAL
M004 DETAILS - MECHANICAL
M210 FLOOR PLAN - MECHANICAL
P000 SCHEDULES, NOTES, AND LEGENDS - PLUMBING
P001 DETAILS - PLUMBING
P210 FLOOR PLAN - PLUMBING


# PROJECT NOTES

1. WALL DIMENSIONS ARE TO THE FACE OF STUD, UNLESS INDICATED OTHERWISE.
2. THE PLAN ELEVATION OF 100'-0" SHALL BE EQUAL TO AN ACTUAL SURVEY ELEVATION ABOVE SEA LEVEL AS DEFINED BY LANDSCAPE ARCHITECT.
3. ALL ACTIVE A/V EQUIPMENT NOT SPECIFICALLY INDICATED IN DRAWINGS, OR EQUIPMENT INDICATED IN DRAWINGS TO BE "BY OTHERS" SHALL BE OWNER PURCHASED AND OWNER INSTALLED. OWNER INSTALLATION WORK MAY OCCUR DURING CONSTRUCTION. CONTRACTOR TO COORDINATE INSTALLATION TIMES WITH OWNER AND ASSURE OWNER ACCESS IS ACCOMMODATED AS NEEDED. POWER AND PATHWAYS (INCLUDING A/V CONDUIT AND BACKBONES) INDICATED IN DRAWINGS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
4. ANY REFERENCE TO NORTH, EAST, SOUTH, OR WEST IN THE ARCHITECTURAL DRAWINGS IS INDICATIVE OF PLAN NORTH, PLAN EAST, PLAN SOUTH, OR PLAN WEST, RESPECTIVELY. REFER TO LANDSCAPE FOR TRUE NORTH.

# GENERAL NOTES

1. DIMENSIONS GOVERN. DO NOT SCALE DRAWINGS.
2. THE INTENT OF THE CONTRACT DOCUMENTS IS TO INCLUDE ALL ITEMS NECESSARY FOR THE PROPER EXECUTION AND COMPLETION OF THE WORK BY THE CONTRACTOR. THE CONTRACT DOCUMENTS ARE COMPLEMENTARY, AND WHAT IS REQUIRED BY ONE SHALL BE AS BINDING AS IF REQUIRED BY ALL; PERFORMANCE BY THE CONTRACTOR SHALL BE REQUIRED ONLY TO THE EXTENT CONSISTENT WITH THE CONTRACT DOCUMENTS AND REASONABLY INFERABLE FROM THEM AS BEING NECESSARY TO PRODUCE THE INDICATED RESULTS.
3. UNLESS OTHERWISE STATED IN THE CONTRACT DOCUMENTS, WORDS THAT HAVE WELL-KNOWN TECHNICAL OR CONSTRUCTION INDUSTRY MEANINGS ARE USED IN THE DRAWINGS IN ACCORDANCE WITH SUCH RECOGNIZED MEANINGS.
4. 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.
5. EXECUTION OF THE CONTRACT BY THE CONTRACTOR IS A REPRESENTATION THAT THE CONTRACTOR HAS VISITED THE SITE, BECOME GENERALLY FAMILIAR WITH THE LOCAL CONDITIONS UNDER WHICH THE WORK IS TO BE PERFORMED AND CORRELATED PERSONAL OBSERVATIONS WITH REQUIREMENTS OF THE CONTRACT DOCUMENTS.
6. BECAUSE THE CONTRACT DOCUMENTS ARE COMPLEMENTARY, THE CONTRACTOR SHALL, BEFORE STARTING EACH PORTION OF THE WORK, CAREFULLY STUDY AND COMPARE THE VARIOUS CONTRACT DOCUMENTS RELATIVE TO THAT PORTION OF THE WORK, AS WELL AS THE INFORMATION FURNISHED BY THE OWNER, SHALL TAKE FIELD MEASUREMENTS OF ANY EXISTING CONDITIONS RELATED TO THAT PORTION OF THE WORK, AND SHALL OBSERVE ANY CONDITIONS AT THE SITE AFFECTING IT. THESE OBLIGATIONS ARE FOR THE PURPOSE OF FACILITATING COORDINATION AND CONSTRUCTION BY THE CONTRACTOR AND ARE NOT FOR THE PURPOSE OF DISCOVERING ERRORS, OMISSIONS, OR INCONSISTENCIES IN THE CONTRACT DOCUMENTS; HOWEVER, THE CONTRACTOR SHALL PROMPTLY REPORT TO THE ARCHITECT ANY ERRORS, INCONSISTENCIES OR OMISSIONS DISCOVERED BY OR MADE KNOWN TO THE CONTRACTOR AS A REQUEST FOR INFORMATION IN SUCH FORM AS THE ARCHITECT MAY REQUIRE. IT IS RECOGNIZED THAT THE CONTRACTOR'S REVIEW IS MADE IN THE CONTRACTOR'S CAPACITY AS A CONTRACTOR AND NOT AS A LICENSED DESIGN PROFESSIONAL, UNLESS OTHERWISE SPECIFICALLY PROVIDED IN THE CONTRACT DOCUMENTS.
7. THE CONTRACTOR IS NOT REQUIRED TO ASCERTAIN THAT THE CONTRACT DOCUMENTS ARE IN ACCORDANCE WITH APPLICABLE LAWS, STATUTES, ORDINANCES, CODES, RULES AND REGULATIONS, OR LAWFUL ORDERS OF PUBLIC AUTHORITIES, BUT THE CONTRACTOR SHALL PROMPTLY REPORT TO THE ARCHITECT ANY NONCONFORMITY DISCOVERED BY OR MADE KNOWN TO THE CONTRACTOR AS A REQUEST FOR INFORMATION IN SUCH FORM AS THE ARCHITECT MAY REQUIRE.
8. THE ARCHITECT SHALL BE DEEMED THE AUTHOR AND OWNER OF THEIR INSTRUMENTS OF SERVICE, INCLUDING THE DRAWINGS AND SPECIFICATIONS, AND WILL RETAIN ALL COMMON LAW, STATUTORY AND OTHER RESERVED RIGHTS, INCLUDING COPYRIGHTS. THE CONTRACTOR, SUBCONTRACTORS, SUB-SUBCONTRACTORS, AND MATERIAL OR EQUIPMENT SUPPLIERS SHALL NOT OWN OR CLAIM A COPYRIGHT IN THE INSTRUMENTS OF SERVICE. SUBMITTAL OR DISTRIBUTION TO MEET OFFICIAL REGULATORY REQUIREMENTS OR FOR OTHER PURPOSES IN CONNECTION WITH THIS PROJECT IS NOT TO BE CONSTRUED AS PUBLICATION IN DEROGATION OF THE ARCHITECT'S RESERVED RIGHTS.
9. THE CONTRACTOR, SUBCONTRACTORS, SUB-SUBCONTRACTORS AND MATERIAL OR EQUIPMENT SUPPLIERS ARE AUTHORIZED TO USE AND REPRODUCE THE INSTRUMENTS OF SERVICE PROVIDED TO THEM SOLELY AND EXCLUSIVELY FOR EXECUTION OF THE WORK. ALL COPIES MADE UNDER THIS AUTHORIZATION SHALL BEAR THE COPYRIGHT NOTICE, IF ANY, SHOWN ON THE INSTRUMENTS OF SERVICE. THE CONTRACTOR, SUBCONTRACTORS, SUB-SUBCONTRACTORS, AND MATERIAL OR EQUIPMENT SUPPLIERS MAY NOT USE THE INSTRUMENTS OF SERVICE ON OTHER PROJECTS OR FOR ADDITIONS TO THIS PROJECT OUTSIDE THE SCOPE OF THE WORK WITHOUT THE SPECIFIC WRITTEN CONSENT OF THE OWNER, AND ARCHITECT.


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# RIVER RANCH COUNTY PARK INTERPRETIVE CENTER

WILLIAMSON COUNTY, TX

REGISTERED ARCHITECT CHARLES A. YORK 17821 STATE OF TEXAS 02/22/19

ISSUE DATE: Feb 22, 2019

REVISIONS

| # | DATE | DESCRIPTION |
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DRAWN: REVIEWED:

## 100% CONSTRUCTION DOCUMENTS

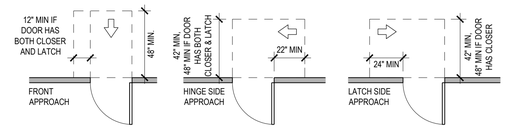
PROJECT NUMBER: 5619

## GENERAL INFORMATION

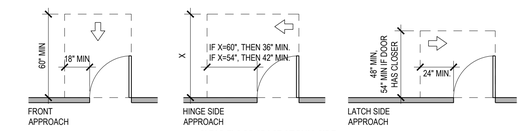
SHEET NUMBER

# A-000

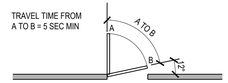
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CLEAR FLOOR SPACE AT PUSH SIDE

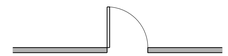



CLEAR FLOOR SPACE AT PULL SIDE




DOOR CLOSERS AND GATE CLOSERS SHALL BE ADJUSTED SO THAT FROM AN OPEN POSITION OF 90 DEGREES, THE TIME REQUIRED TO MOVE THE DOOR TO A POSITION OF 12 DEGREES FROM THE LATCH IS 5 SECONDS MINIMUM.

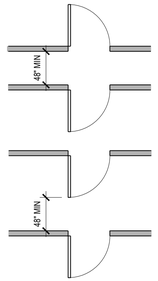
DOOR CLOSERS



THE MAXIMUM FORCE FOR PUSHING OR PULLING OPEN A DOOR SHALL BE AS FOLLOWS:

1. FIRE DOORS: MIN ALLOWED BY APPROPRIATE AUTHORITY
2. INTERIOR HINGED DOORS: 5 LBF
3. SLIDING OR FOLDING DOORS: 5 LBF

DOOR OPENING FORCE




CLEAR FLOOR SPACE @ DOORS IN SERIES

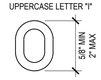
UPPERCASE LETTER "I" SHALL HAVE A STROKE THICKNESS NO MORE THAN 15% OF CHARACTER HEIGHT




WIDTH OF UPPERCASE LETTER "O" SHALL BE NO LESS THAN 55% OF THE HEIGHT OF UPPERCASE LETTER "I"

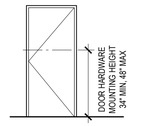



WIDTH OF UPPERCASE LETTER "O" SHALL BE NO MORE THAN 110% OF THE HEIGHT OF UPPERCASE LETTER "I"




REFER TO TAS 703 FOR ADDITIONAL SIGNAGE REQUIREMENTS

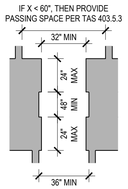
CHARACTER PROPORTIONS



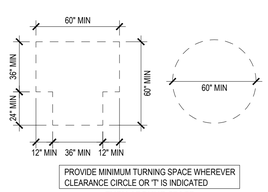

NOTE: LEVER OPERATED MECHANISMS, PUSH TYPE HARDWARE, AND U-SHAPED HANDLES ARE ACCEPTABLE DESIGNS. HARDWARE REQUIRED FOR ACCESSIBLE DOOR PASSAGE SHALL BE MOUNTED 48" MAX AFF.

MOUNTING LOCATIONS

DOORS & SIGNAGE

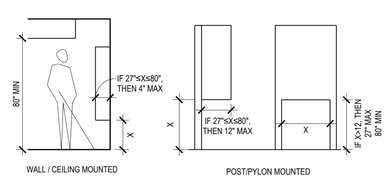



ACCESSIBLE ROUTE WIDTH




PROVIDE MINIMUM TURNING SPACE WHEREVER CLEARANCE CIRCLE OR "T" IS INDICATED

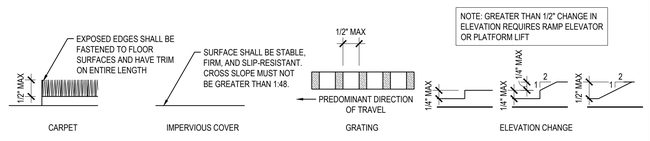
TURN AROUND SPACE




WALL / CEILING MOUNTED

POST/PYLON MOUNTED

PROTRUSIONS/OVERHANGS




CARPET

IMPERVIOUS COVER

GRATING

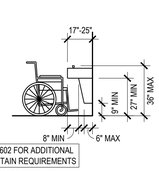
ELEVATION CHANGE

GROUND SURFACES

CLEARANCES

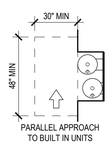


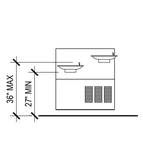

CLEAR FLOOR SPACE @ ACCESSIBLE DRINKING FOUNTAIN OR WATER COOLER



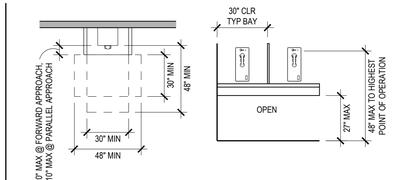

REFER TO TAS 602 FOR ADDITIONAL DRINKING FOUNTAIN REQUIREMENTS

DRINKING FOUNTAINS

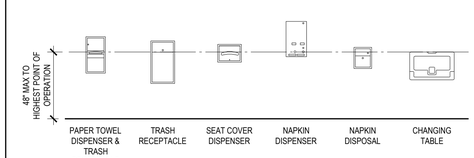



ELECTRIC WATER COOLERS

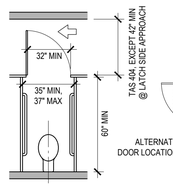



PUBLIC TELEPHONES

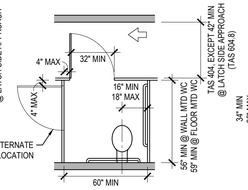



ACCESSORIES

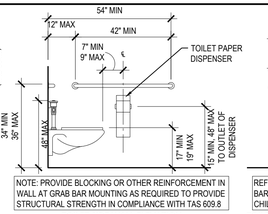
TYP MOUNTING & CLEARANCES




AMBULATORY STALL

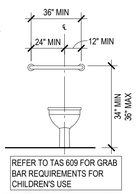



TOILET COMPARTMENT



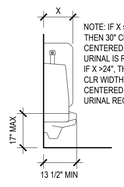

NOTE: PROVIDE BLOCKING OR OTHER REINFORCEMENT IN WALL AT GRAB BAR MOUNTING AS REQUIRED TO PROVIDE STRUCTURAL STRENGTH IN COMPLIANCE WITH TAS 609.8

TOILET SIDE WALL ELEVATION

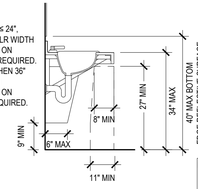



REFER TO TAS 609 FOR GRAB BAR REQUIREMENTS FOR CHILDREN'S USE

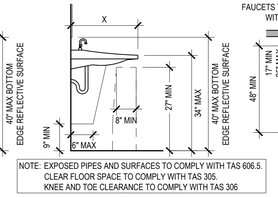
TOILET REAR WALL ELEVATION




URINAL ELEVATION

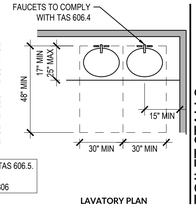



SINK COUNTER ELEVATION



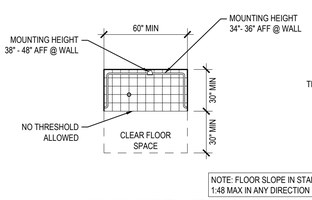

NOTE: EXPOSED PIPES AND SURFACES TO COMPLY WITH TAS 606.5. CLEAR FLOOR SPACE TO COMPLY WITH TAS 305. KNEE AND TOE CLEARANCE TO COMPLY WITH TAS 306

LAVATORY ELEVATION



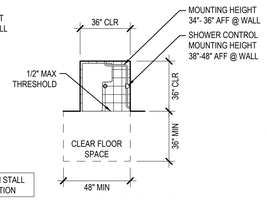

LAVATORY PLAN

TOILET STALLS, LAVATORIES, WATER CLOSETS, & SINKS

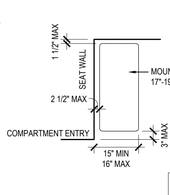



NOTE: FLOOR SLOPE IN STALL 1:48 MAX IN ANY DIRECTION

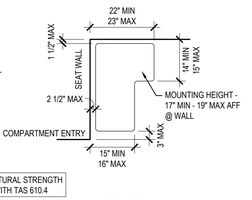
30" X 60" SHOWER STALL SIZE




36" X 36" SHOWER STALL SIZE



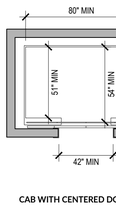

RECTANGULAR SEAT




NOTE: STRUCTURAL STRENGTH TO COMPLY WITH TAS 610.4

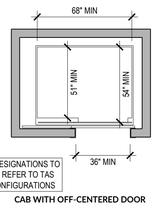
L-SHAPED SEAT

SHOWER SIZES, CLEARANCES, & SEATS

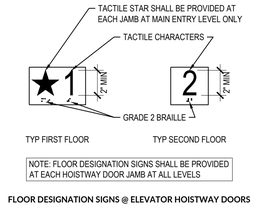



NOTE: ALL ELEVATOR DESIGNATIONS TO COMPLY WITH TAS 407 - REFER TO TAS 407 FOR OTHER CAB CONFIGURATIONS

CAB WITH CENTERED DOOR

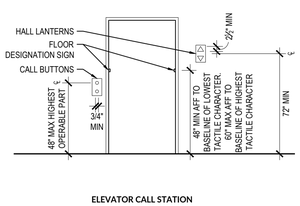



CAB WITH OFF-CENTERED DOOR

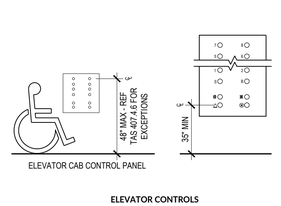



NOTE: FLOOR DESIGNATION SIGNS SHALL BE PROVIDED AT EACH HOISTWAY DOOR JAMB AT ALL LEVELS

FLOOR DESIGNATION SIGNS @ ELEVATOR HOISTWAY DOORS




ELEVATOR CALL STATION




ELEVATOR CONTROLS

ELEVATORS

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# GENERAL NOTES

1. CONTRACTOR IS RESPONSIBLE FOR VERIFYING INSTALLATION IS IN COMPLIANCE WITH 2012 TEXAS ACCESSIBILITY STANDARDS.
2. THE MINIMUM COMPLIANCE REQUIRED BY ACCESSIBILITY STANDARDS INCLUDES BUT IS NOT LIMITED TO THE INFORMATION SHOWN WITHIN.
3. NOT ALL CONDITIONS OR CONFIGURATIONS SHOWN ON THIS SHEET MAY BE REQUIRED BY THIS PROJECT.
4. NOTIFY ARCHITECT IF CONFLICTS BETWEEN TYPICAL ACCESSIBILITY DETAILS AND DETAILS SHOWN ELSEWHERE ARE DISCOVERED.
5. ALL DIMENSIONS SHOWN ON THIS SHEET ARE TO THE FINISHED FACE. CONTRACTOR SHALL MAKE ALLOWANCES FOR THICKNESSES OF FINISHES SPECIFIED.
6. A COPY OF TEXAS ACCESSIBILITY STANDARDS IS AVAILABLE AT THE ARCHITECT'S OFFICE UPON REQUEST. CONTRACTOR SHALL KEEP A COPY ON SITE AT ALL TIMES.

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# RIVER RANCH COUNTY PARK INTERPRETIVE CENTER

## WILLIAMSON COUNTY, TX

REGISTERED ARCHITECT CHARLES A. YORK 17821 STATE OF TEXAS
02/22/19

ISSUE DATE: Feb 22, 2019

REVISIONS

| # | DATE | DESCRIPTION |
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DRAWN: REVIEWED:

100% CONSTRUCTION DOCUMENTS

PROJECT NUMBER: 5619

ACCESSIBILITY - STANDARDS

SHEET NUMBER

A-001

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# CODE SUMMARY

APPLICABLE CODES

| | |
|---|---|
| BUILDING CODE: | 2012 INTERNATIONAL BUILDING CODE (IBC) |
| ENERGY CODE: | 2012 INTERNATIONAL ENERGY CONSERVATION CODE (IECC) |
| ELECTRICAL CODE: | 2014 REVISED NATIONAL ELECTRICAL CODE (NEC) |
| FIRE CODE: | 2009 INTERNATIONAL FIRE CODE (IFC) |
| MECHANICAL CODE: | 2012 UNIFORM MECHANICAL CODE (UMC) |
| PLUMBING CODE: | 2012 UNIFORM PLUMBING CODE (UPC) |
| ACCESSIBILITY: | 2012 TDLR TEXAS ACCESSIBILITY STANDARDS |

# BUILDING CODE ANALYSIS

| SECTION # | SECTION | REMARK |
|---|---|---|
| 302.1 | OCCUPANCY CLASSIFICATION | GROUP A-3 AND B |
| TABLE 503 | ALLOWABLE HEIGHT | 40 FT FOR TYPE V-B |
| TABLE 503 | ALLOWABLE NUMBER OF STORIES | GROUP A-3: 1 |
| TABLE 506.2 | ALLOWABLE AREA | GROUP A-3: 6,000 SF |
| TABLE 503 | ACTUAL AREA | 3582 SF (2770 SF, COVERED AREA 812 SF)<br>4836 SF - BUILDING AREA COVERED BY HORIZONTAL PROJECTION OF ROOF |
| 508.3 | NONSEPARATED OCCUPANCIES | THE ALLOWABLE BUILDING AREA AND HEIGHT OF THE BUILDING SHALL BE BASED ON THE MOST RESTRICTIVE ALLOWANCES FOR THE OCCUPANCY GROUPS UNDER CONSIDERATION FOR THE TYPE OF CONSTRUCTION OF THE BUILDING IN ACCORDANCE WITH SECTION 503.1. |
| TABLE 509 | INCIDENTAL USES | NONE |
| 602 | CONSTRUCTION CLASSIFICATION | V-B |
| TABLE 601 | FIRE RESISTANCE OF BUILDING ELEMENTS | TYPE V-B: 0 HOURS FOR ALL BUILDING ELEMENTS |
| TABLE 602 | FIRE RESISTANCE OF EXTERIOR WALLS | TYPE V-B, FIRE SEPARATION DISTANCE ≥ 30 FT = 0 HOURS |
| 718.2 | FIREBLOCKING | FIREBLOCKING CONSISTING OF 2" NOMINAL LUMBER, ½" GYPSUM BOARD, BATTS OR BLANKETS OF MINERAL WOOL/MINERAL FIBER INSTALLED IN SUCH A MANNER AS TO BE SECURELY RETAINED IN PLACE, OR CELLULOSE INSULATION INSTALLED AS TESTED SHALL BE INSTALLED IN THE FOLLOWING LOCATIONS: |
| | | 1. CONCEALED WALL SPACES VERTICALLY AT THE CEILING AND FLOOR LEVELS AND HORIZONTALLY AT INTERVALS NOT EXCEEDING 10 FT. |
| | | 2. CONNECTIONS BETWEEN CONCEALED VERTICAL STUD WALL OR PARTITION SPACES AND CONCEALED HORIZONTAL SPACES CREATED BY AN ASSEMBLY OR FLOOR JOISTS OR TRUSSES, AND BETWEEN CONCEALED VERTICAL AND HORIZONTAL SPACES SUCH AS OCCUR AT SOFFITS, DROP CEILINGS, COVE CEILINGS, AND SIMILAR LOCATIONS. |
| | | 3. BETWEEN STAIR STRINGERS AND THE TOP AND BOTTOM OF THE RUN. |
| | | 4. WITHIN CONCEALED SPACES OF EXTERIOR WALL COVERINGS, AT MAXIMUM INTERVALS OF 20 FEET IN EITHER DIMENSION. NO CONCEALED SPACE SHALL EXCEED 100 SF BETWEEN FIREBLOCKING. |
| | | 5. THE ANNULAR SPACE AROUND VENTS, PIPES, AND DUCTS AT CEILINGS AND FLOOR LEVELS SHALL BE FIREBLOCKED. NONCOMBUSTIBLE PENETRATING ITEMS ARE PERMITTED WHEN CONNECTING NOT MORE THAN FIVE STORIES, PROVIDED THAT THE ANNULAR SPACE IS FILLED WITH AN APPROVED NONCOMBUSTIBLE MATERIAL OR WITH A FILL, VOID, OR CAVITY MATERIAL THAT IS TESTED AND CLASSIFIED FOR USE IN THROUGH-PENETRATION FIRESTOP SYSTEMS. COMBUSTIBLE PENETRATING ITEMS ARE PERMITTED WHEN CONNECTING NOT MORE THAN TWO STORIES, PROVIDED THAT THE ANNULAR SPACE IS FILLED WITH AN APPROVED MATERIAL TO RESIST THE FREE PASSAGE OF FLAME AND THE PRODUCTS OF COMBUSTION. |
| | | 6. ANY FIREBLOCK THAT IS PENETRATED BY ANY MATERIAL (PIPE, CONDUIT, ETC.) SHALL BE PROTECTED WITH A MATERIAL THAT IS EQUAL TO OR GREATER THAN THE BURN TIME OF THE FIREBLOCK MATERIAL. |
| 718.3 | DRAFTSTOPPING IN FLOOR/CEILING ASSEMBLIES | NOT REQUIRED. THERE IS NO COMBUSTIBLE CONCEALED FLOOR CONSTRUCTION |
| 718.4 | DRAFTSTOPPING IN ATTICS AND CONCEALED ROOF SPACES | NOT REQUIRED. ONLY REQUIRED WHEN ANY HORIZONTAL ROOF AREA EXCEEDS 3,000 SF. ATTIC OVER CLASSROOM/ CONFERENCE/ OFFICE AND CONCEALED ROOF AREA OVER EXHIBIT GALLERY = 2,905 SF. |
| TABLE 803.9 | INTERIOR WALL AND CEILING FINISH REQUIREMENTS BY OCCUPANCY | GROUP A-3 AND B: ROOMS AND ENCLOSED SPACES, NONSPRINKLERED - CLASS C MINIMUM |
| 903.1 [F] | AUTOMATIC SPRINKLER SYSTEM | GROUP A-3 NOT REQUIRED<br>GROUP B: NOT REQUIRED |
| 906.1 [F] | PORTABLE FIRE EXTINGUISHERS | REQUIRED IN OCCUPANCY GROUPS A AND B |
| TABLE 906.1 [F] | ADDITIONAL PORTABLE FIRE EXTINGUISHERS | NONE REQUIRED |
| 907.1 [F] | FIRE ALARM | GROUP A-3 NOT REQUIRED<br>GROUP B: NOT REQUIRED |
| 1004.1 | OCCUPANT LOAD | EXHIBIT GALLERY: 30 NET SF PER OCCUPANT, 1489 NET SF / 30 = 49.7 = 50 OCCUPANTS<br>CLASSROOM: 20 NET SF PER OCCUPANT, 557 NET SF / 20 = 27.9 = 28 OCCUPANTS<br>CONFERENCE ROOM: 15 NET SF PER OCCUPANT, 239 NET SF / 15 = 15.9 = 16 OCCUPANTS<br>OFFICE: 100 GROSS SF PER OCCUPANT, 117 GROSS SF / 100 = 1.17 = 2 OCCUPANTS<br><br>TOTAL BUILDING OCCUPANT LOAD: 96 OCCUPANTS |
| TABLE 1016.2 | EXIT ACCESS TRAVEL DISTANCE | GROUP A-3 WITHOUT SPRINKLER SYSTEM: 200 FT<br>GROUP B WITHOUT SPRINKLER SYSTEM: 200 FT |
| TABLE 1505.1 | MINIMUM ROOF COVERING CLASSIFICATION | TYPE V-B: CLASS C |

*BUILDING AREA DEFINED IN IBC 2012 AS THE AREA MEASURED WITHIN THE PERIMETER FORMED BY THE INSIDE SURFACE OF THE EXTERIOR WALLS, EXCLUSIVE OF VENT SHAFTS AND COURTS.

**AREAS OF THE BUILDING NOT PROVIDED WITH SURROUNDING WALLS SHALL BE INCLUDED IN THE BUILDING AREA IF SUCH AREAS ARE INCLUDED WITHIN THE HORIZONTAL PROJECTION OF THE ROOF OR FLOOR ABOVE.

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# RIVER RANCH COUNTY PARK INTERPRETIVE CENTER

## WILLIAMSON COUNTY, TX

REGISTERED ARCHITECT
CHARLES A. YORK
17821
STATE OF TEXAS
02/22/19

ISSUE DATE: Feb 22, 2019

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PROJECT NUMBER: 5619

CODE ANALYSIS

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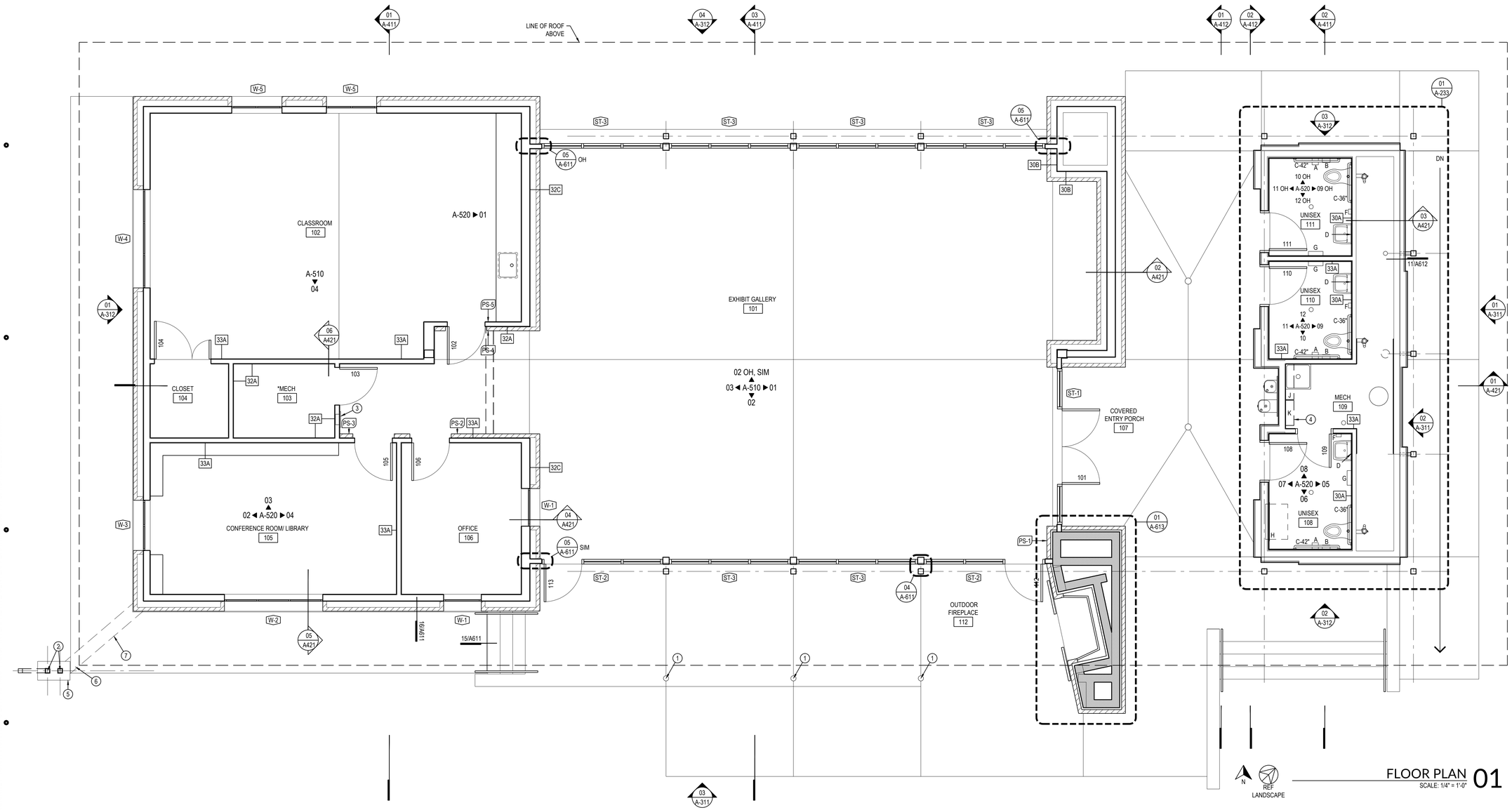
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## # KEY NOTES

1. FLOOR LIGHT - REF MEP
2. COLUMNS TO SUPPORT GUTTER
3. SEMI-RECESSED FIRE EXTINGUISHER CABINET
4. 4 SHELVES - REF BATH ACCESSORIES SCHEDULE
5. CONCRETE COLUMN FOOTING, MATCH DEPTH, REINFORCEMENT, AND BUILDING PAD IN STRUCTURAL
6. 3/4" EJ @ FOOTING
7. 12" WIDE X 2'6" TALL CONCRETE BEAM, MATCH REINFORCEMENT AND BUILDING PAD IN STRUCTURAL, INSTALL 1/2" RIGID INSULATION BETWEEN BEAM AND CONCRETE SIDEWALK ABOVE




FLOOR PLAN 01
SCALE: 1/4" = 1'-0"

N

REF LANDSCAPE

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# RIVER RANCH COUNTY PARK INTERPRETIVE CENTER

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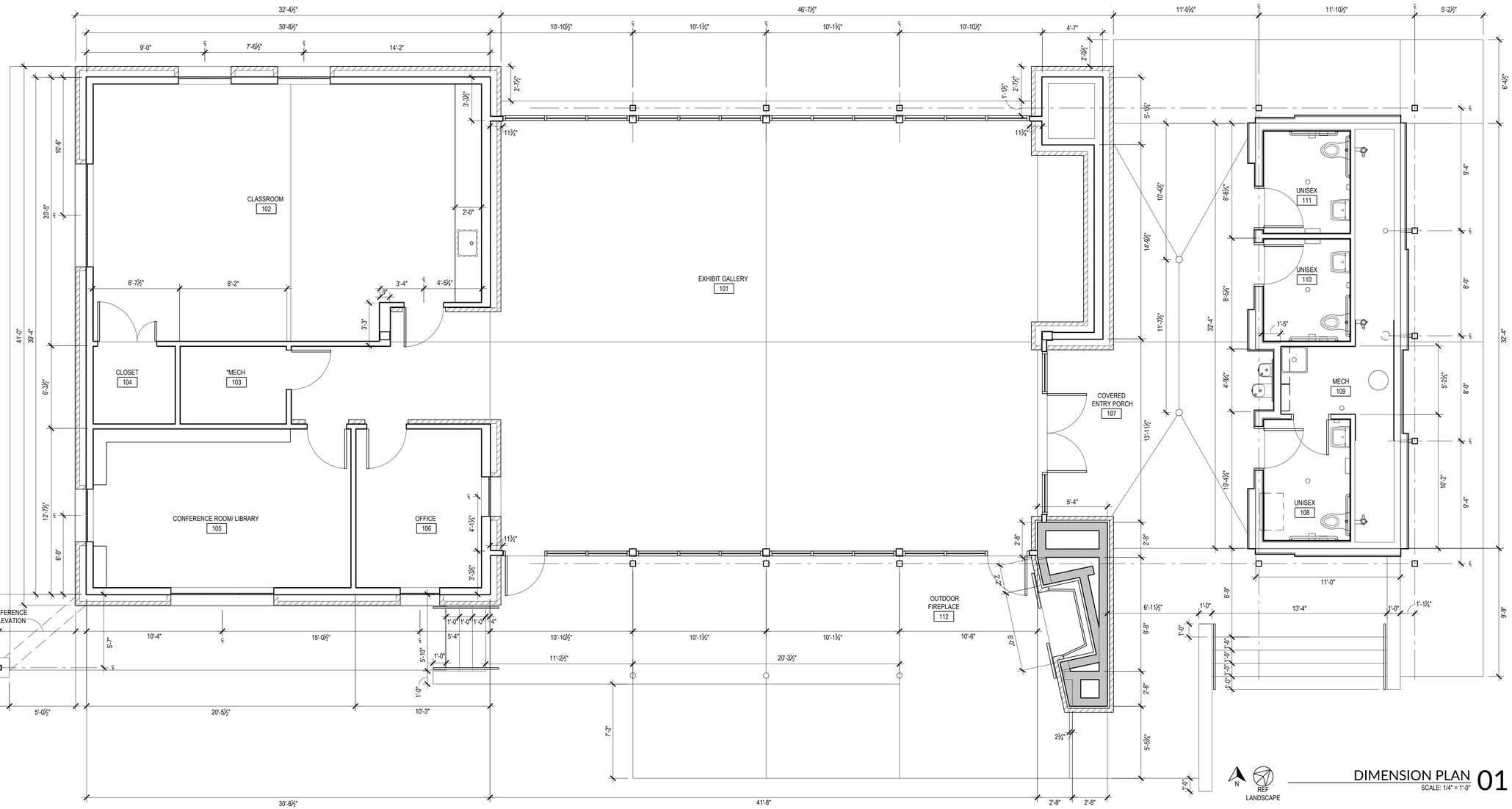
FLOOR PLAN

SHEET NUMBER

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REF LANDSCAPE

DIMENSION PLAN 01

SCALE: 1/4" = 1'-0"

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# RIVER RANCH COUNTY PARK INTERPRETIVE CENTER

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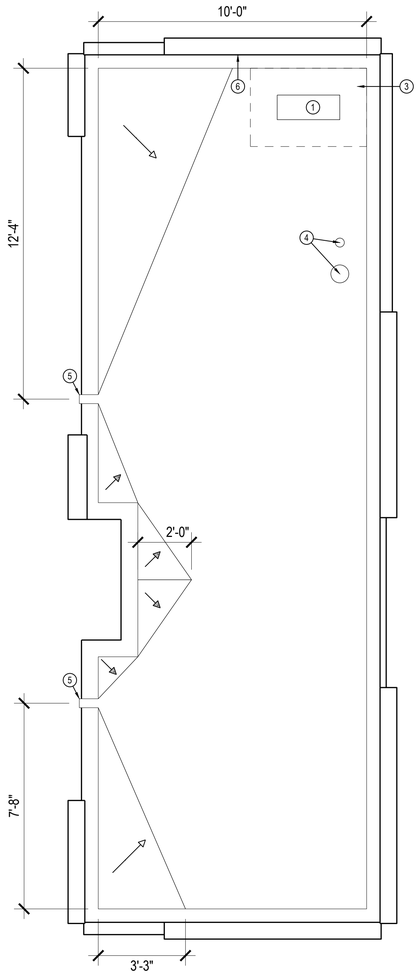
DIMENSION PLAN

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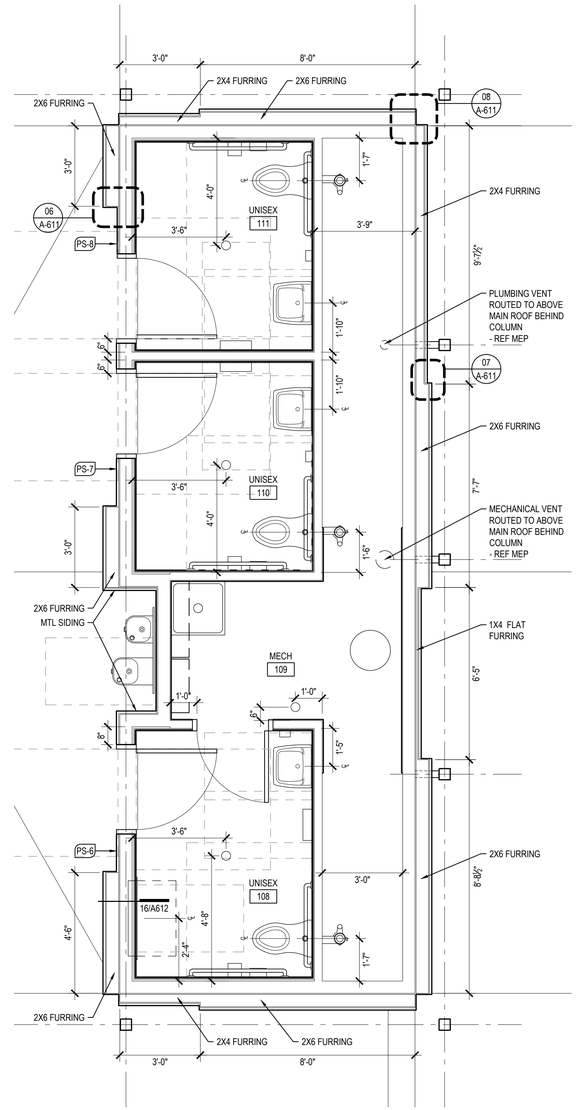



BATHROOMS
ROOF PLAN
SCALE: 3/8" = 1'-0"

02

N

REF
LANDSCAPE




BATHROOMS
FLOOR PLAN
SCALE: 3/8" = 1'-0"

01

N

REF
LANDSCAPE

## KEY NOTES

1. ROOF MOUNTED CONDENSER AND CONDENSER BASE - REF MEP
2. PROVIDE 4" TAPERED INSULATION AT LOWEST POINT
3. ADDITIONAL MEMBRANE FLASHING WEAR LAYER OR WALKING PADS, EXTEND 12" BEYOND RUNNERS FOR CONDENSING UNIT
4. MECH AND PLUMBING VENT- REF MEP, PROVIDE PREFABRICATED TPO BOOT
5. MTL SCUPPER, PTD TO MATCH MTL ROOF, PROJECT 1" BEYOND MTL SIDING
6. 6" LEG ON INTERIOR SIDE OF SHT MTL PARAPET CAP

## ROOF LEGEND

TAPERED INSULATION, 1/8" PER 1'-0"

TAPERED INSULATION CRICKET, 1/4" PER 1'-0"

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# RIVER RANCH COUNTY PARK INTERPRETIVE CENTER

## WILLIAMSON COUNTY, TX

REGISTERED ARCHITECT
CHARLES A. YORK
17821
STATE OF TEXAS

02/22/19

ISSUE DATE: Feb 22, 2019

REVISIONS

| # | DATE | DESCRIPTION |
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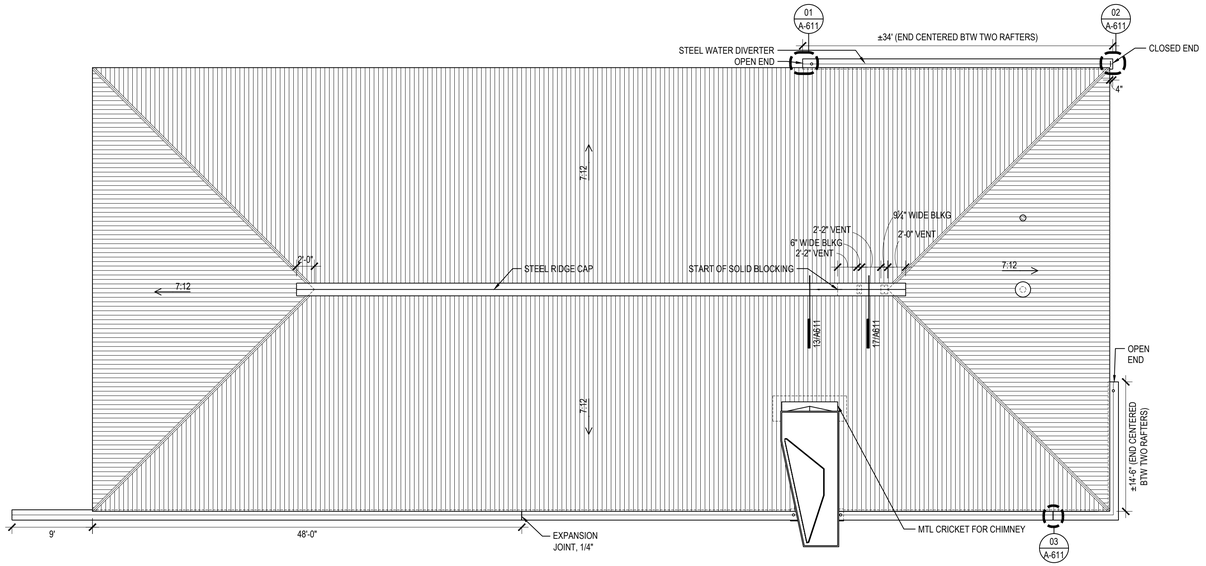
BATHROOMS
FLOOR PLAN AND
BATHROOMS
ROOF PLAN

SHEET NUMBER

A-233

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N REF LANDSCAPE

## ROOF PLAN 02

SCALE: 1/8" = 1'-0"

## ROOF LEGEND

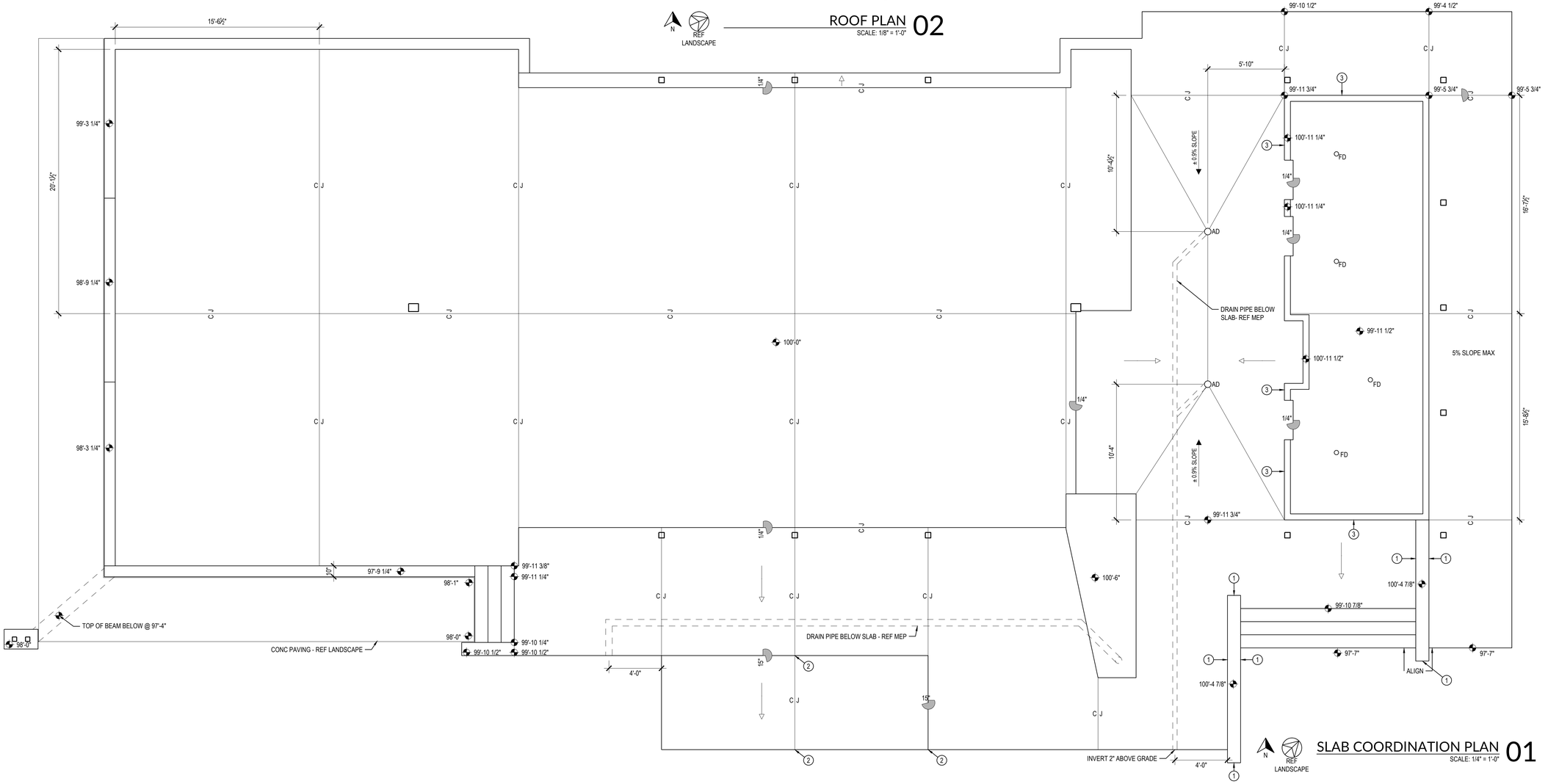
X:12 → SLOPE = X:12

## # KEY NOTES

1. VERTICAL SURFACE TO BE BOARD FORMED CONCRETE, BOARDS TO BE 2X NO. 2 PRIME KILN-DRIED SYP S4S WITH A MINIMUM 8' LENGTH, CUT TO 6" WIDTHS AND RADIUS CUT CORNERS TO MATCH MILLED CORNERS, ALIGN HORIZONTAL JOINTS VERTICALLY WITH STAIR TREADS, SEAL BUTT-JOINTS BETWEEN BOARDS WITH SILICONE, STAGGER BUTT-JOINTS A MINIMUM OF 3'-0", MITER BOARDS AT INSIDE CORNERS
2. CONTROL JOINT IN VERTICAL FACE OF CONCRETE
3. GROUT-CLEANED RUBBED FINISH

## SLAB LEGEND

- SLOPE = 1% SLOPE
- SLOPE
- X:12 → SLOPE = X:12
- 1" ELEVATION CHANGE SYMBOL
- 100'-0" SPOT ELEVATION SYMBOL




N REF LANDSCAPE

## SLAB COORDINATION PLAN 01

SCALE: 1/4" = 1'-0"

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## SLAB PLAN AND ROOF PLAN

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# ELEC AND MECH LEGEND

ELECTRICAL AND TELECOM

- RECESSED CAN
- SURFACE MOUNTED WALL LIGHT
- SURFACE MOUNTED CEILING LIGHT
- SUSPENDED CEILING LIGHT
- TROFFER, 2X2
- STEP LIGHT
- TRACK LIGHT
- TROFFER, 2X4
- LINEAR
- EMERGENCY LIGHT
- PROJECTOR
- SPEAKER, OPOI
- DATA OUTLET
- CEILING RECEPTACLE
- EXIT SIGN
- MOTION SENSOR

MECHANICAL

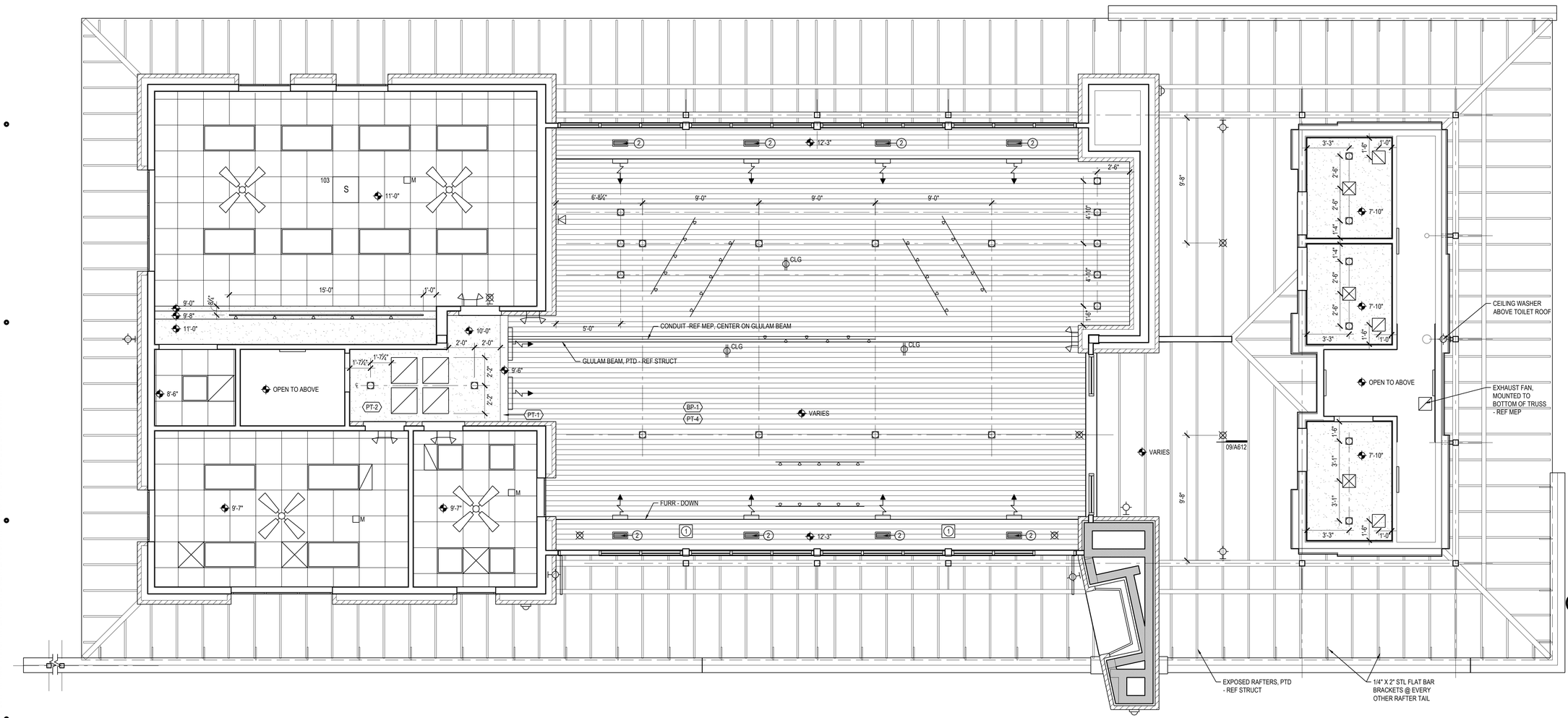
- FAN
- CLG MTD AIR REGISTER, SUPPLY
- CLG MTD AIR REGISTER, RETURN
- WALL MTD AIR REGISTER, SUPPLY
- WALL MTD AIR REGISTER, RETURN
- EXHAUST FAN

# CEILING LEGEND

- SUSPENDED GYPSUM CEILING
- WOOD CEILING
- 2X2 ACOUSTIC PANEL CEILING

# KEY NOTES

1. CONCEALED EGRESS LIGHT - MEP
2. SUPPLY DIFFUSER ON BOTTOM OF FURR-DOWN - REF MEP




N

REF LANDSCAPE

REFLECTED CEILING PLAN 01

SCALE: 1/4" = 1'-0"

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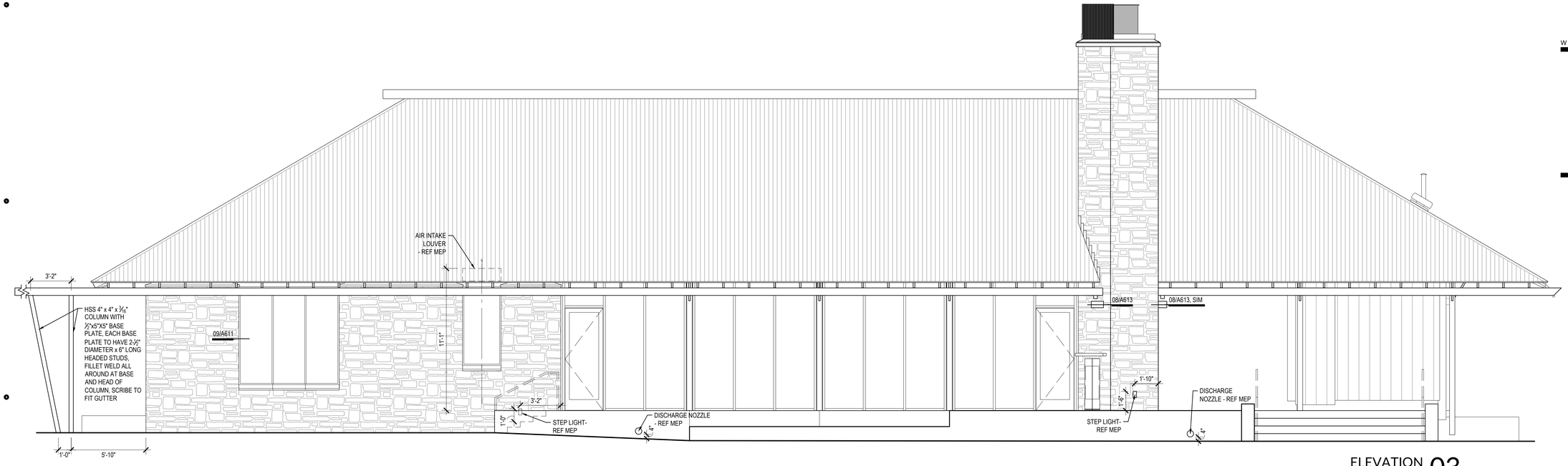
REFLECTED CEILING PLAN

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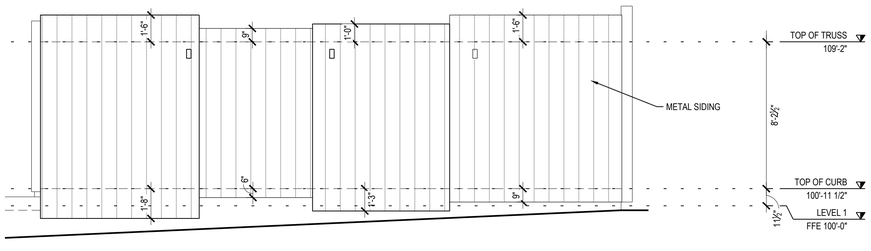
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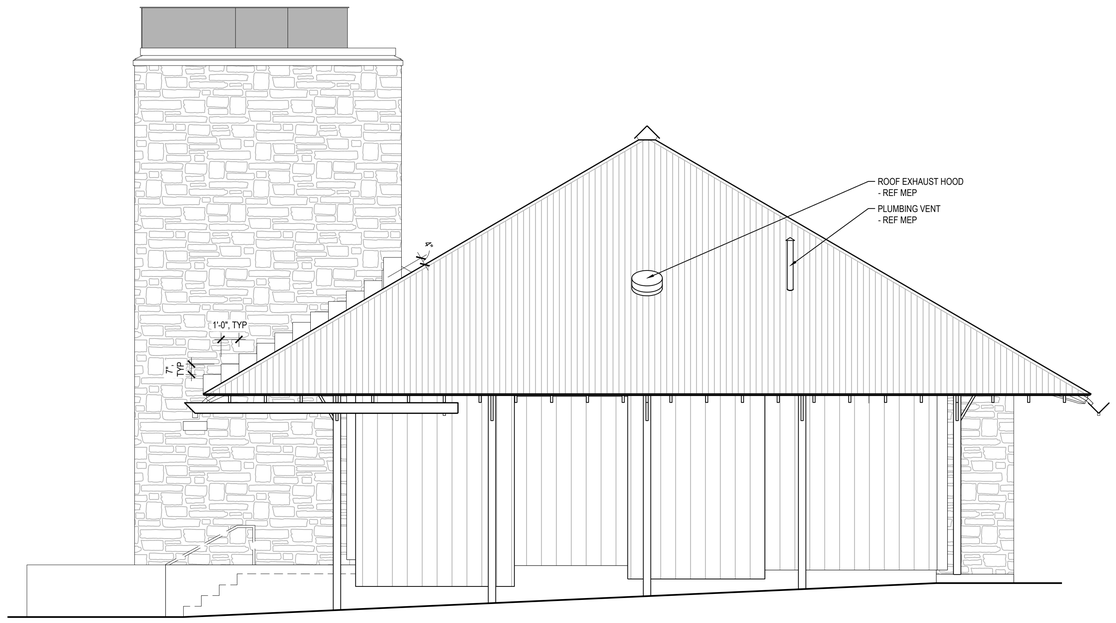
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ELEVATION 03
SCALE: 1/4" = 1'-0" | A231




ELEVATION 02
SCALE: 1/4" = 1'-0" | A231




ELEVATION 01
SCALE: 1/4" = 1'-0" | A231

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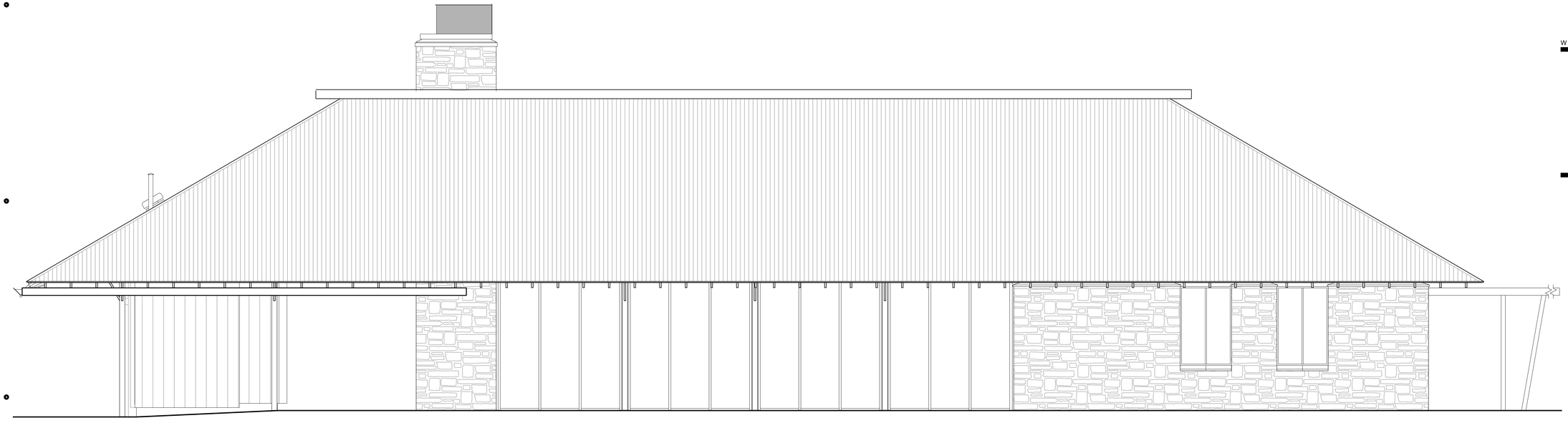
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SHEET NUMBER

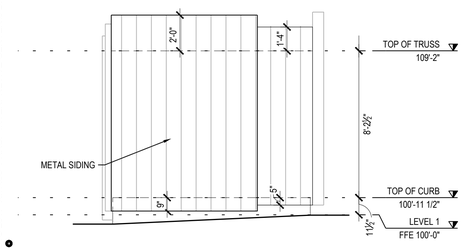
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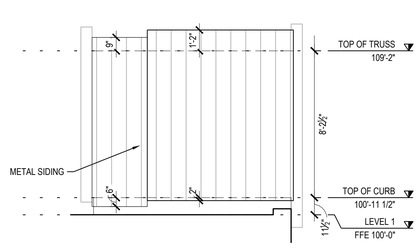
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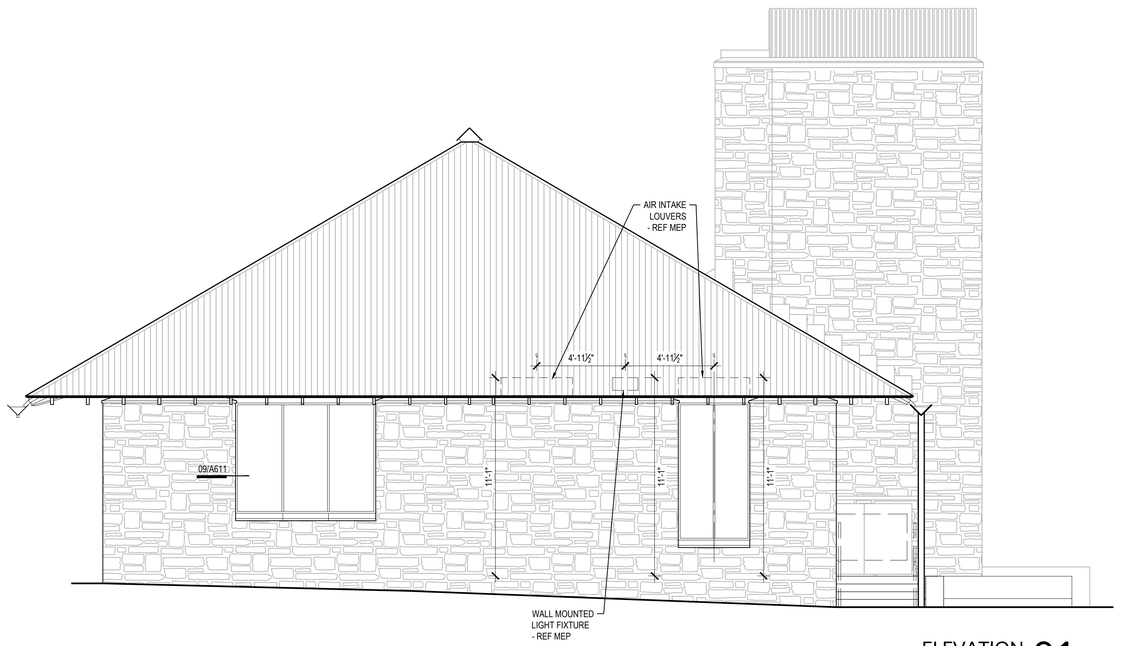
ELEVATION 04
SCALE: 1/4" = 1'-0" | A231




ELEVATION 03
SCALE: 1/4" = 1'-0" | A231




ELEVATION 02
SCALE: 1/4" = 1'-0" | A231




ELEVATION 01
SCALE: 1/4" = 1'-0" | A231

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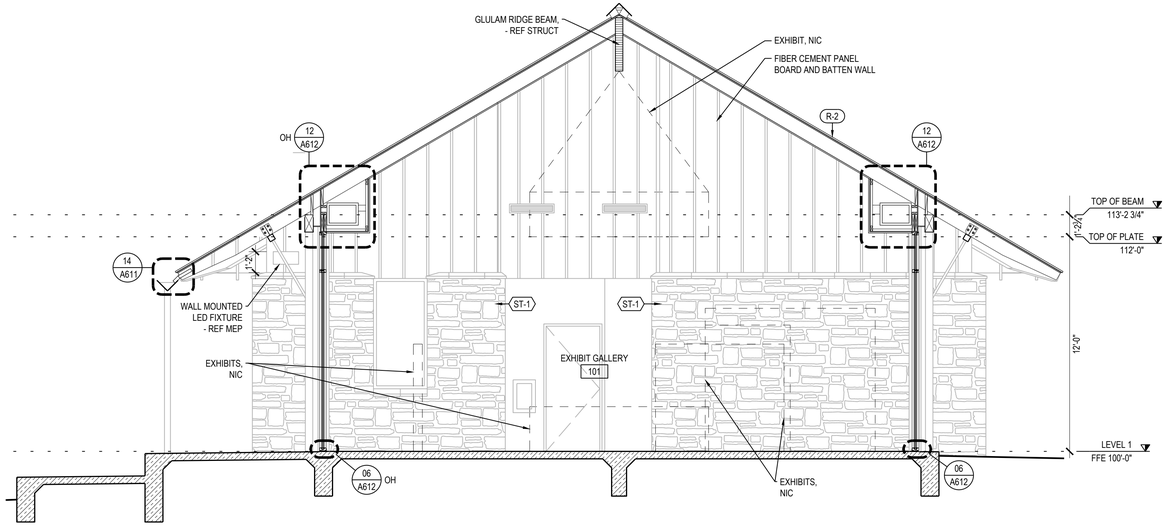
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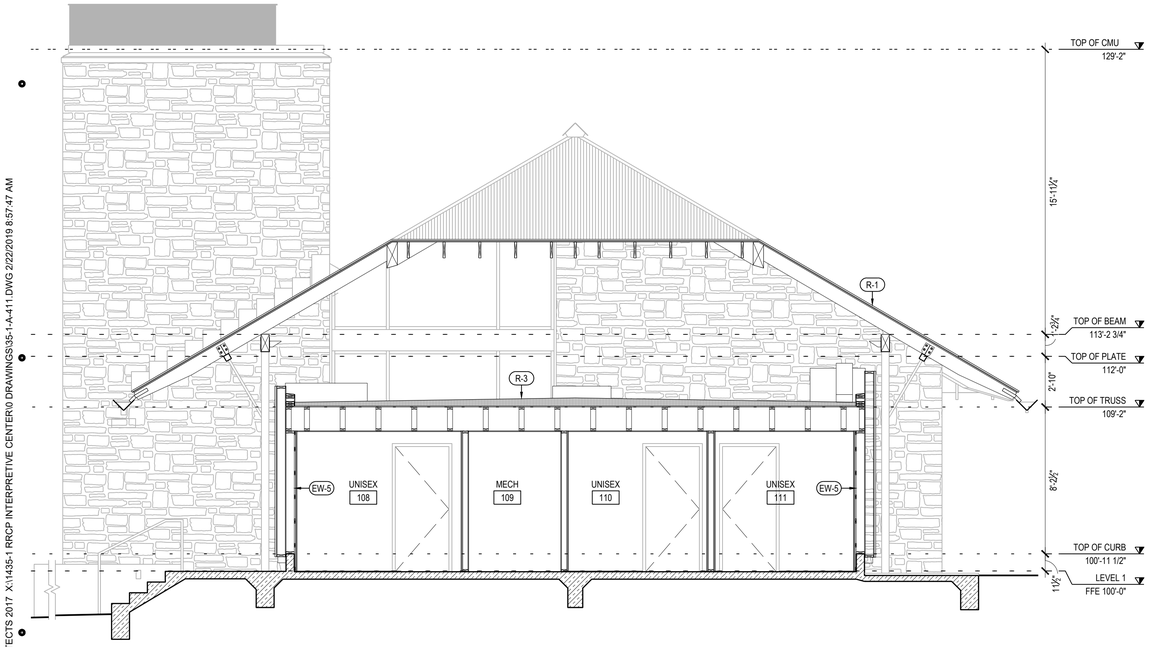
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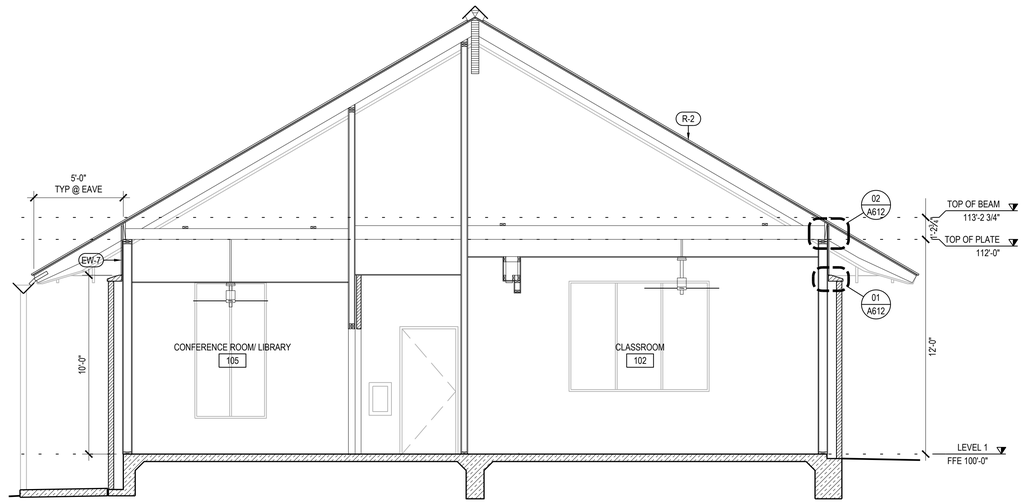
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SECTION 03
SCALE: 1/4" = 1'-0" | A231




SECTION 02
SCALE: 1/4" = 1'-0" | A231




SECTION 01
SCALE: 1/4" = 1'-0" | A231

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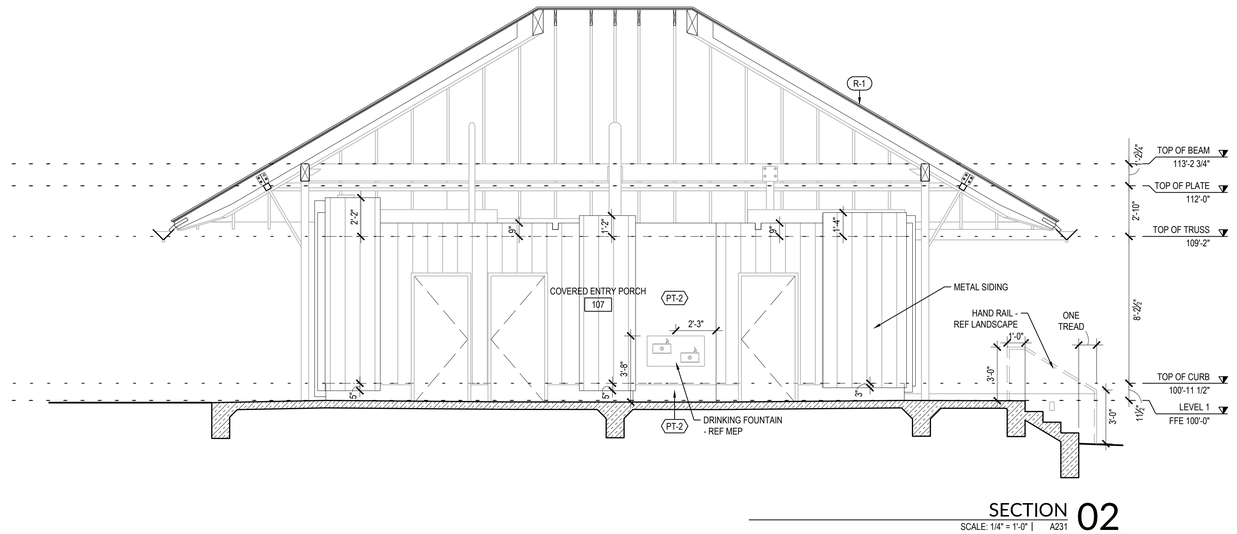
BUILDING SECTIONS

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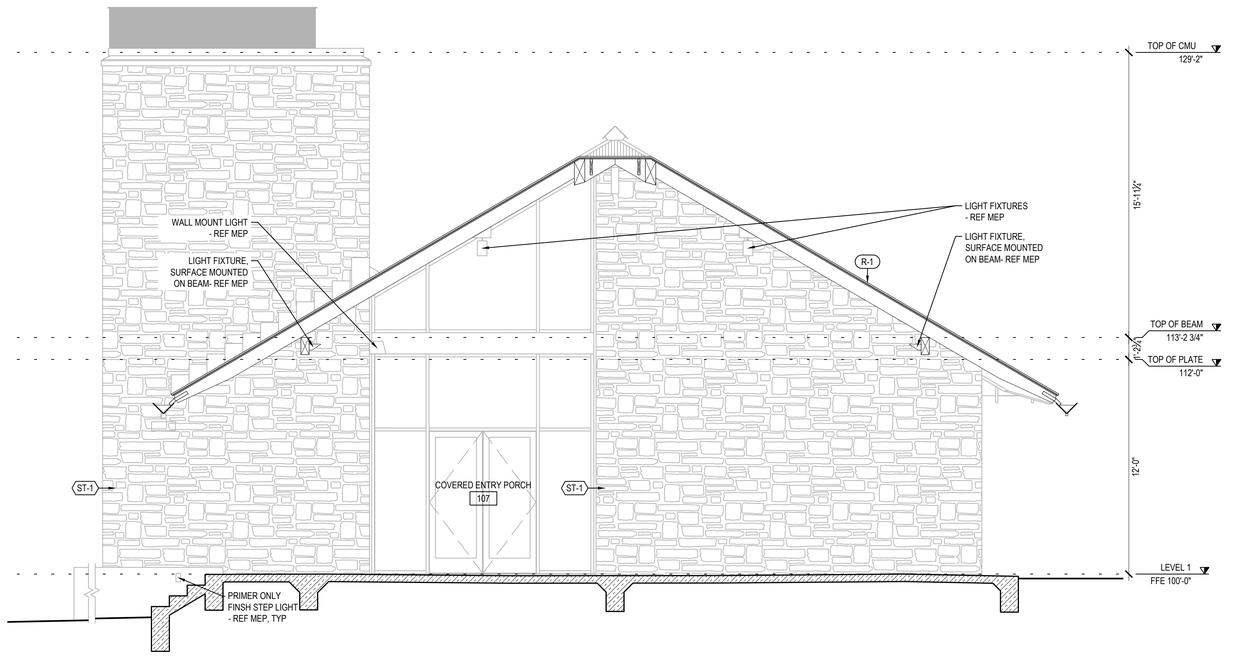
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SECTION 02
SCALE: 1/4" = 1'-0" | A231




SECTION 01
SCALE: 1/4" = 1'-0" | A231

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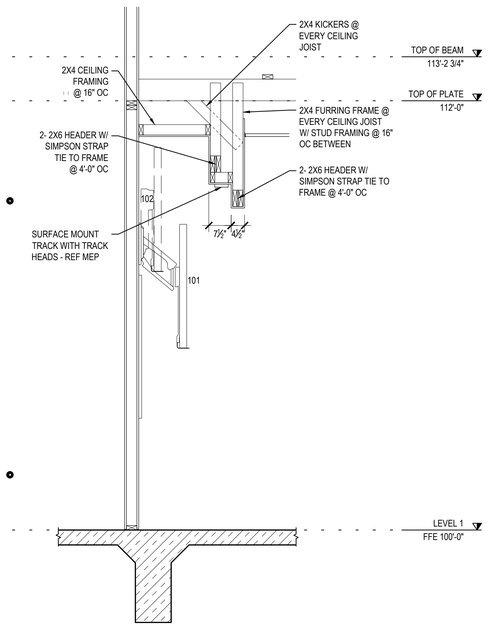
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A-412

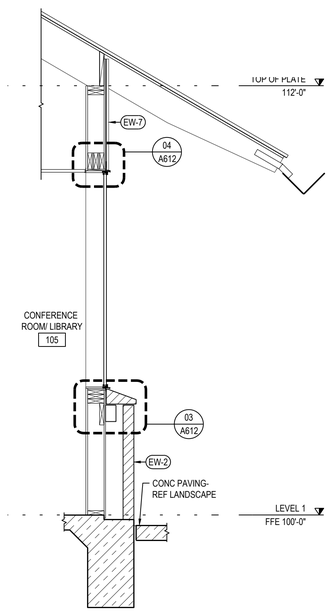
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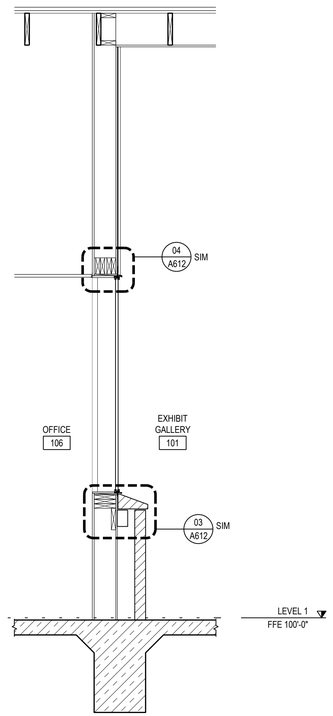

## WALL SECTION @ CLASSROOM- SOUTH 06

SCALE: 1/2" = 1'-0" | A231



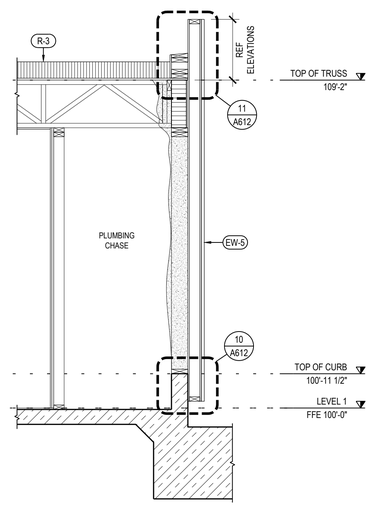

## WALL SECTION @ CONFERENCE ROOM 05

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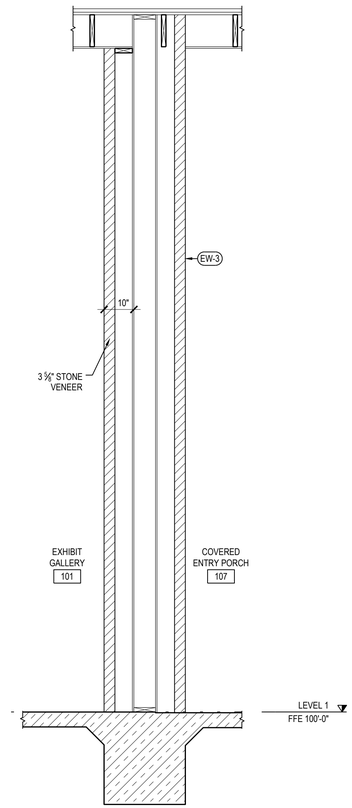

## WALL SECTION @ EXHIBIT GALLERY AND OFFICE 04

SCALE: 1/2" = 1'-0" | A231



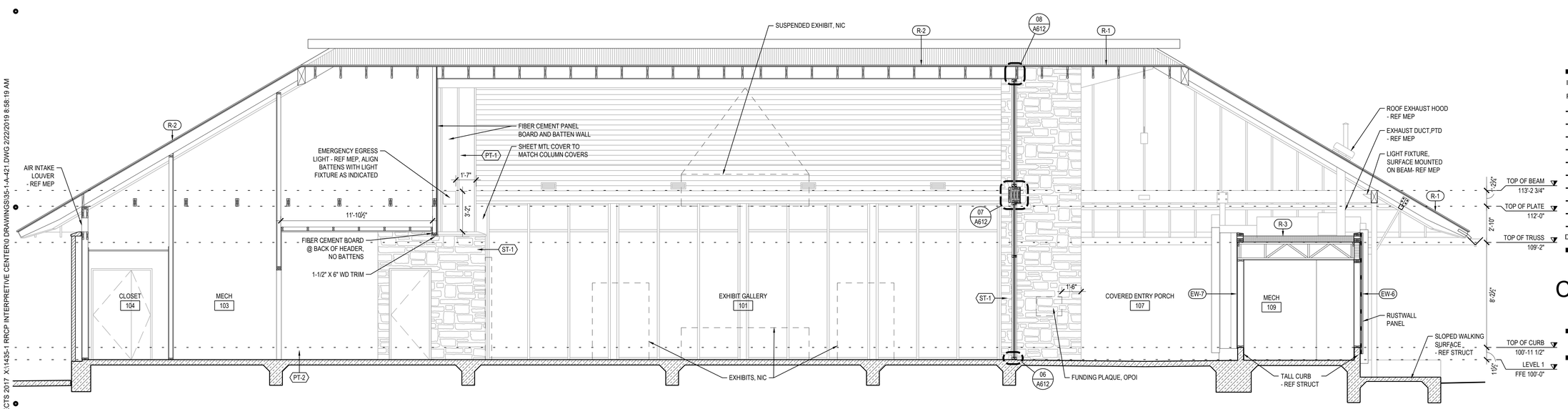

## WALL SECTION @ BATHROOM 03

SCALE: 1/2" = 1'-0" | A231




## WALL SECTION @ EXHIBIT GALLERY- EAST 02

SCALE: 1/2" = 1'-0" | A231




## SECTION 01

SCALE: 1/4" = 1'-0" | A231

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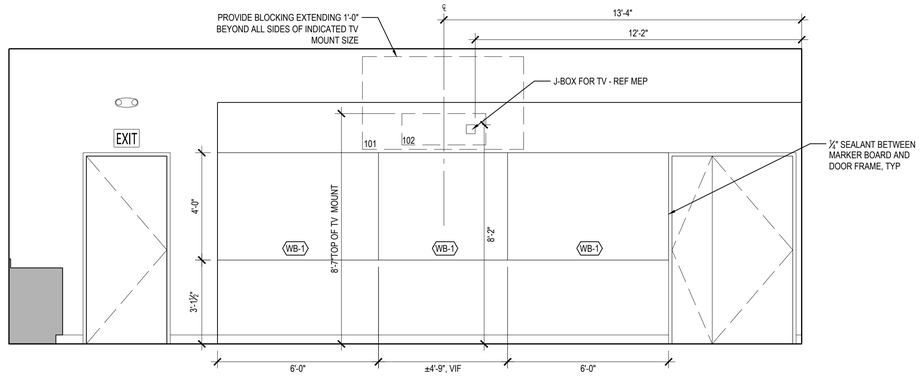
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BUILDING & WALL SECTIONS

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CLASSROOM - SOUTH 04
SCALE: 3/8" = 1'-0" | A231

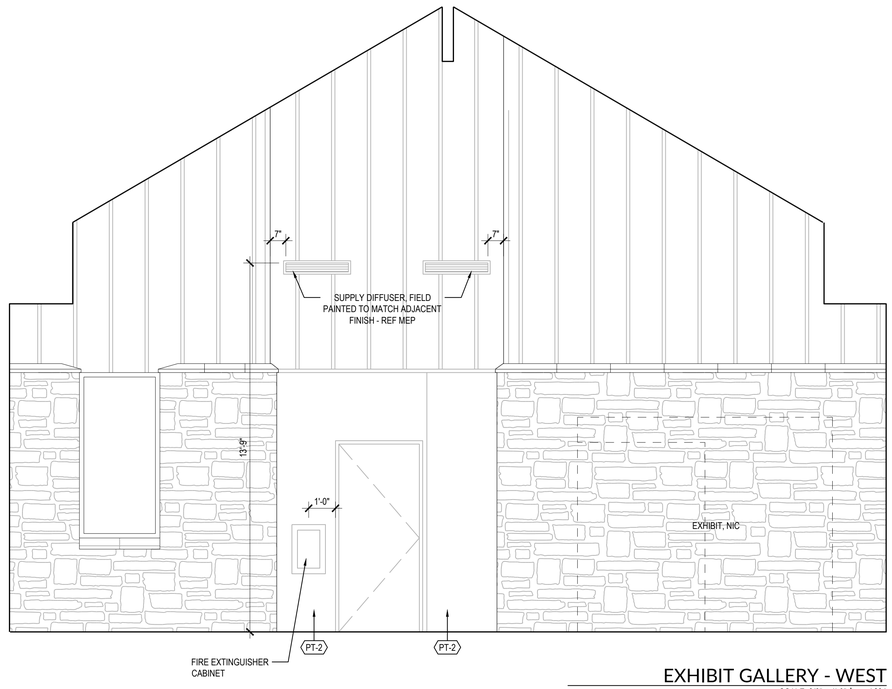



EXHIBIT GALLERY - WEST 03
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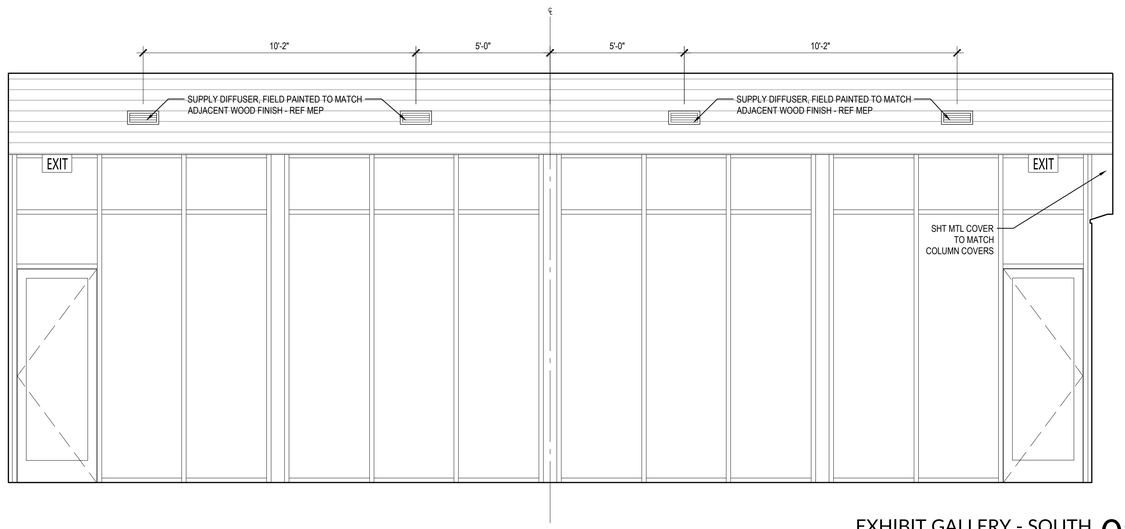



EXHIBIT GALLERY - SOUTH 02
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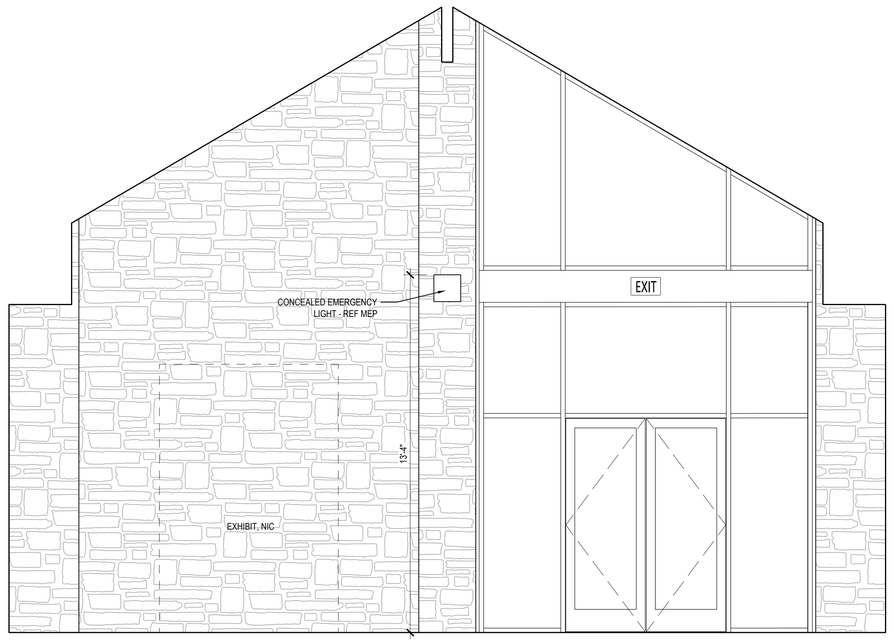



EXHIBIT GALLERY - EAST 01
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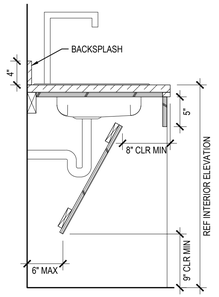
INTERIOR ELEVATIONS

SHEET NUMBER

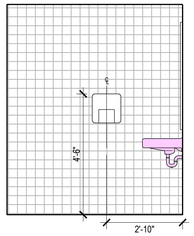
A-510

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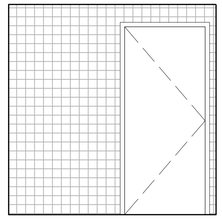
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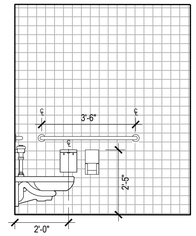

SECTION - CLASS ROOM SINK 13
SCALE: 1" = 1'-0"



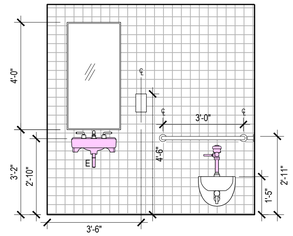

UNISEX 110 - NORTH 12
SCALE: 3/8" = 1'-0" | A231



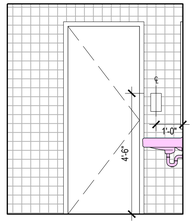
UNISEX 110 - WEST 11
SCALE: 3/8" = 1'-0" | A231



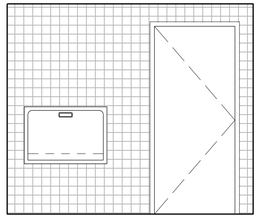

UNISEX 110 - SOUTH 10
SCALE: 3/8" = 1'-0" | A231



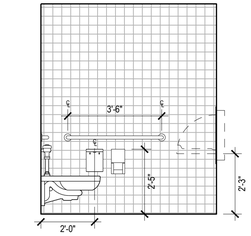

UNISEX 110 - EAST 09
SCALE: 3/8" = 1'-0" | A231



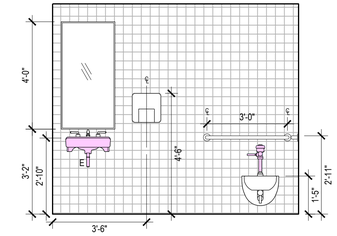

UNISEX 108 - NORTH 08
SCALE: 3/8" = 1'-0" | A231



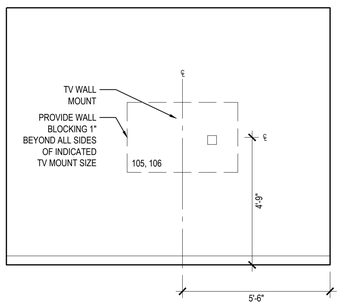
UNISEX 108 - WEST 07
SCALE: 3/8" = 1'-0" | A231



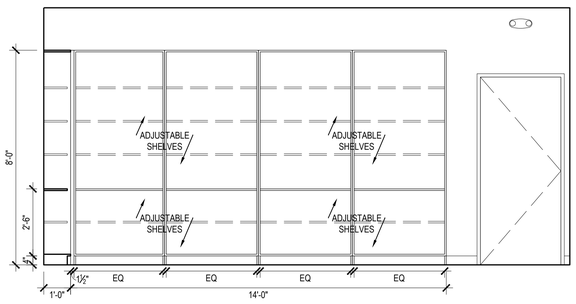

UNISEX 108 - SOUTH 06
SCALE: 3/8" = 1'-0" | A231



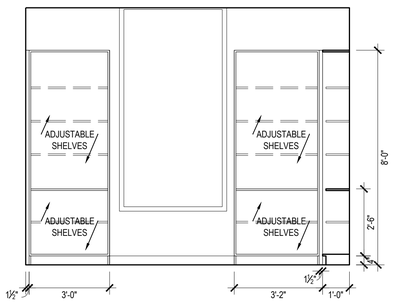

UNISEX 108 - EAST 05
SCALE: 3/8" = 1'-0" | A231



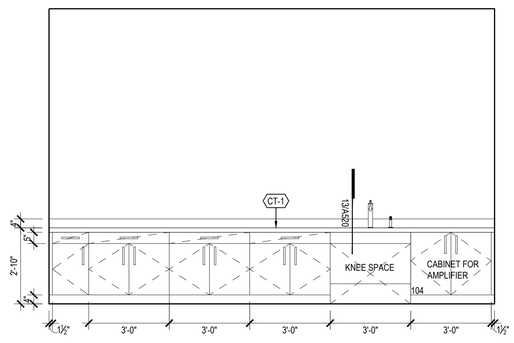

CONFERENCE ROOM/ LIBRARY - EAST 04
SCALE: 3/8" = 1'-0" | A231




CONFERENCE ROOM/ LIBRARY - NORTH 03
SCALE: 3/8" = 1'-0" | A231




CONFERENCE ROOM/ LIBRARY - WEST 02
SCALE: 3/8" = 1'-0" | A231




CLASSROOM - EAST 01
SCALE: 3/8" = 1'-0" | A231

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# RIVER RANCH COUNTY PARK INTERPRETIVE CENTER

WILLIAMSON COUNTY, TX

REGISTERED ARCHITECT CHARLES A. YORK 17821 STATE OF TEXAS
02/22/19

ISSUE DATE: Feb 22, 2019

REVISIONS

| # | DATE | DESCRIPTION |
|---|---|---|

DRAWN: REVIEWED:

100% CONSTRUCTION DOCUMENTS

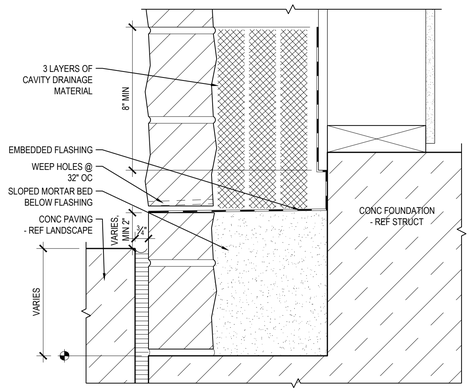
PROJECT NUMBER: 5619

INTERIOR ELEVATIONS

SHEET NUMBER

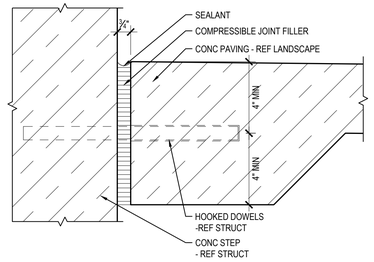
A-520

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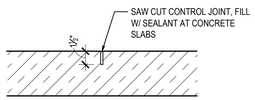

SECTION DETAIL-
BLDG TO PAVEMENT JOINT 16

SCALE: 3" = 1'-0" | A231



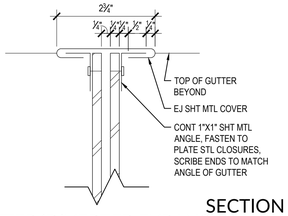

SECTION DETAIL-
STEP TO PAVEMENT JOINT 15

SCALE: 3" = 1'-0" | A231



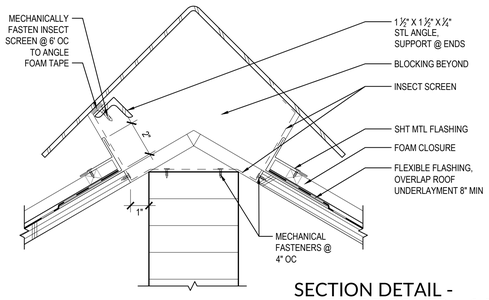

CONTROL JOINT, TYP 19

SCALE: 1-1/2" = 1'-0" |



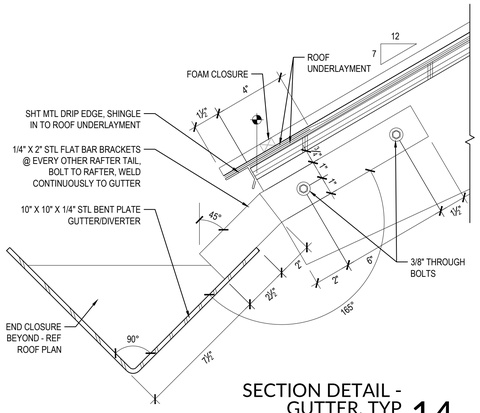

SECTION DETAIL -
GUTTER/DIVERTER EXPANSION JOINT COVER 18

SCALE: 6" = 1'-0" | A611



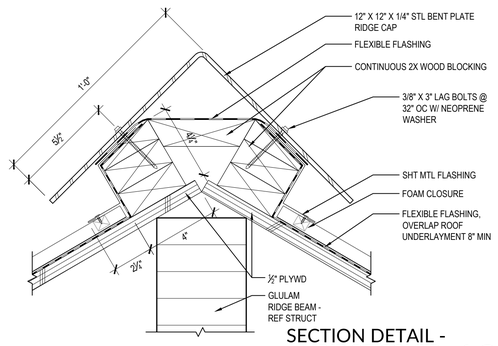

SECTION DETAIL -
RIDGE COVER 17

SCALE: 3" = 1'-0" | A-234



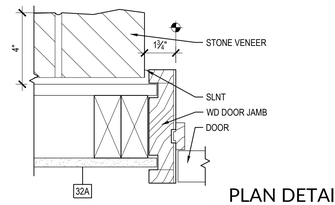

SECTION DETAIL -
GUTTER, TYP 14

SCALE: 3" = 1'-0" | A-411



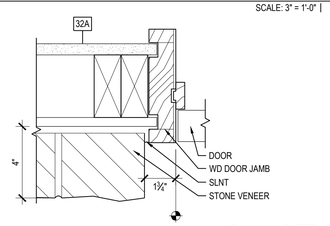

SECTION DETAIL -
RIDGE COVER 13

SCALE: 3" = 1'-0" | A-234



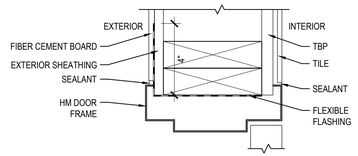

PLAN DETAIL -
WD DOOR JAMB 12

SCALE: 3" = 1'-0" | A-800



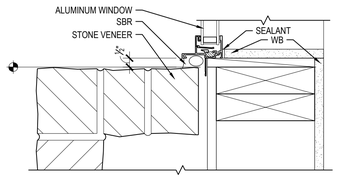

PLAN DETAIL -
WD DOOR JAMB 11

SCALE: 3" = 1'-0" | A-800



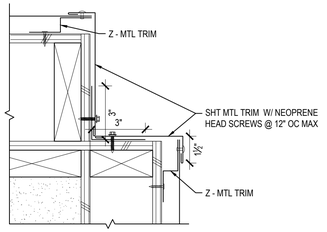

PLAN DETAIL -
HM DOOR JAMB @ BATHROOMS, TYP 10

SCALE: 3" = 1'-0" | A-800



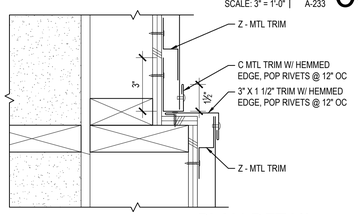

PLAN DETAIL -
ALUM WNDW JAMB @ STONE VENEER, TYP 09

SCALE: 3" = 1'-0" | A-311



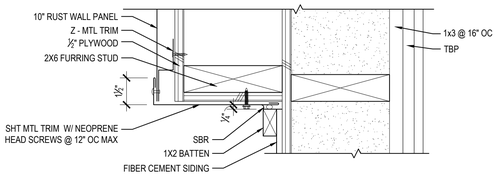

PLAN DETAIL -
RUST PANEL @ BATHROOMS 08

SCALE: 3" = 1'-0" | A-233



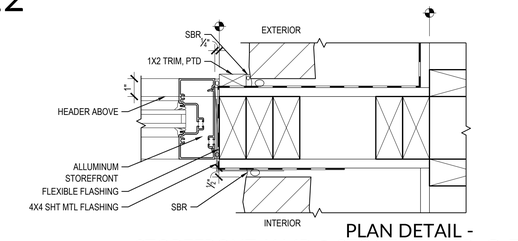

PLAN DETAIL -
RUST PANEL @ BATHROOMS 07

SCALE: 3" = 1'-0" | A-233



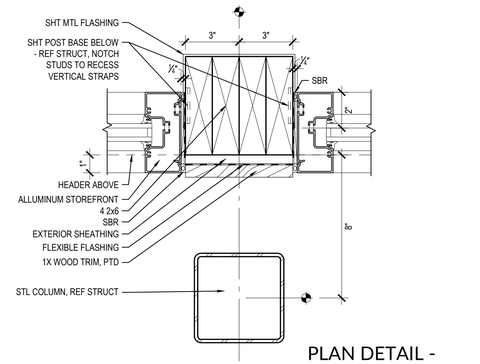

PLAN DETAIL -
RUST PANEL @ BATHROOMS 06

SCALE: 3" = 1'-0" | A-233



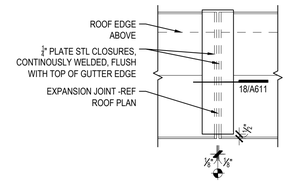

PLAN DETAIL -
STOREFRONT JAMB @ STONE VENEER 05

SCALE: 3" = 1'-0" | A-231



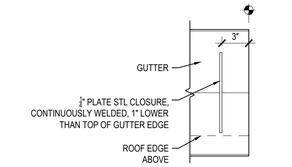

PLAN DETAIL -
COLUMN AND STOREFRONT JAMB 04

SCALE: 3" = 1'-0" | A-231



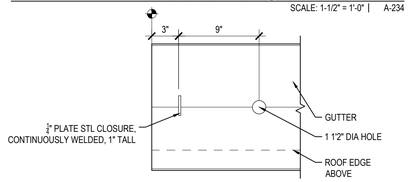

PLAN DETAIL - TYP GUTTER/
DIVERTER EXPANSION JOINT 03

SCALE: 1-1/2" = 1'-0" | A-234




PLAN DETAIL - GUTTER/
DIVERTER @ CLOSED END 02

SCALE: 1-1/2" = 1'-0" | A-234




PLAN DETAIL - GUTTER/
DIVERTER @ OPEN END 01

SCALE: 1-1/2" = 1'-0" | A-234

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CONTACT: WILL WOOD

# RIVER RANCH COUNTY PARK INTERPRETIVE CENTER

## WILLIAMSON COUNTY, TX

REGISTERED ARCHITECT CHARLES A. YORK 17821 STATE OF TEXAS 02/22/19

ISSUE DATE: Feb 22, 2019

REVISIONS

| # | DATE | DESCRIPTION |
|---|---|---|

DRAWN: REVIEWED:

100% CONSTRUCTION DOCUMENTS

PROJECT NUMBER: 5619

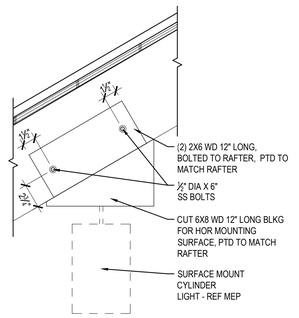
DETAILS

SHEET NUMBER

A-611

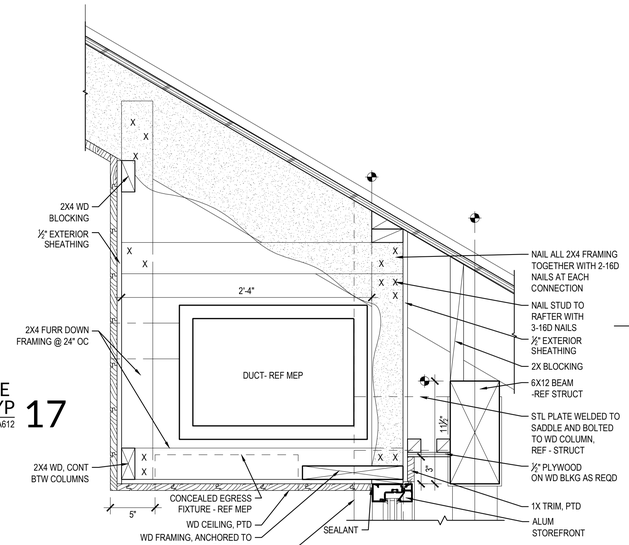
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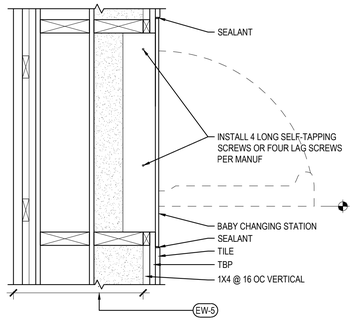

## SECTION DETAIL - SURFACE MOUNT LIGHT FIXTURE ON RAFTER, TYP 17

SCALE: 1-1/2" = 1'-0" | A612



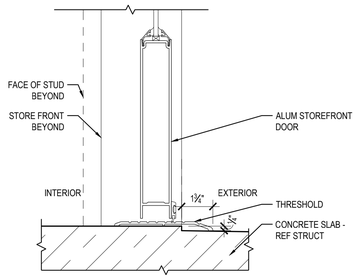

## SECTION DETAIL - FURR OUT FOR DUCT 12

SCALE: 1-1/2" = 1'-0" | A-411



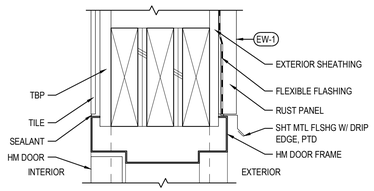

## SECTION DETAIL - BABY CHANGING STATION 16

SCALE: 1-1/2" = 1'-0" | A233



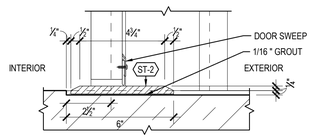

## SECTION DETAIL - STOREFRONT DOOR SILL, TYP 15

SCALE: 3" = 1'-0" | A-800



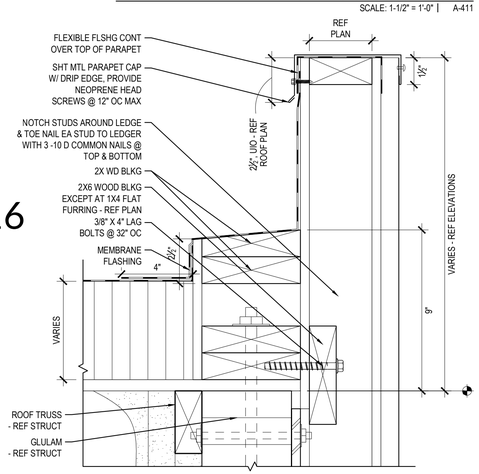

## SECTION DETAIL - BATHROOMS HM DOOR HEAD, TYP 14

SCALE: 3" = 1'-0" | A-800



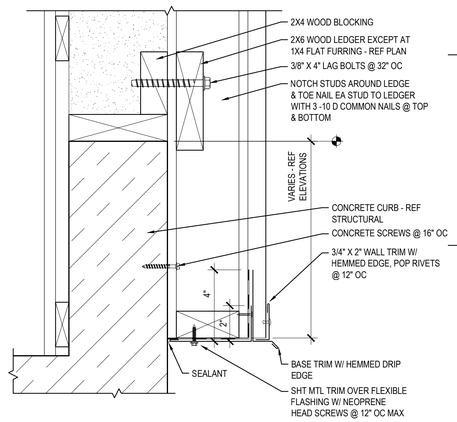

## SECTION DETAIL - HM DOOR SILL, TYP 13

SCALE: 3" = 1'-0" | A-800



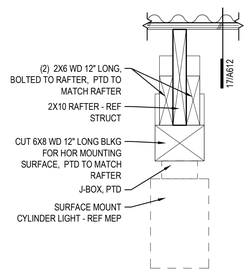

## SECTION DETAIL - RUST PANEL @ ROOF 11

SCALE: 1-1/2" = 1'-0" | A-421



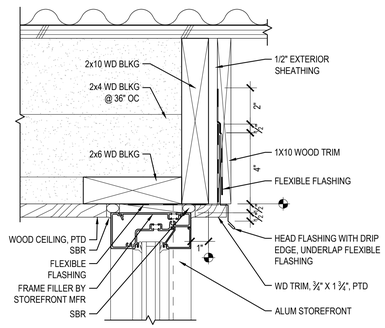

## SECTION DETAIL - RUST PANEL @ CURB 10

SCALE: 3" = 1'-0" | A-421



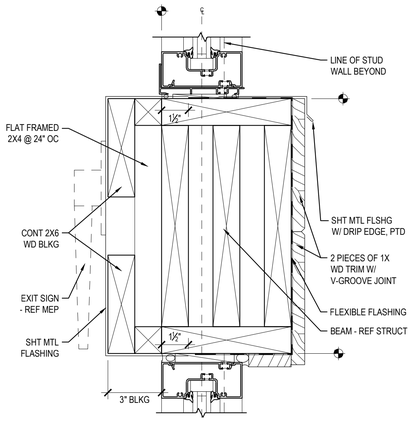

## SECTION DETAIL - SURFACE MOUNT LIGHT FIXTURE ON RAFTER, TYP 09

SCALE: 1-1/2" = 1'-0" | A241



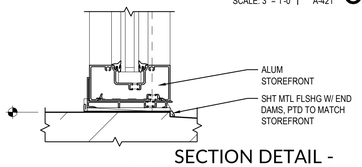

## SECTION DETAIL - STOREFRONT HEAD @ CEILING 08

SCALE: 3" = 1'-0" | A-421



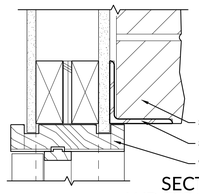

## SECTION DETAIL - STOREFRONT HEAD @ BEAM 07

SCALE: 3" = 1'-0" | A-421



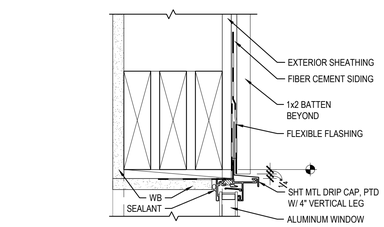

## SECTION DETAIL - STOREFRONT SILL, TYP 06

SCALE: 3" = 1'-0" | A-421



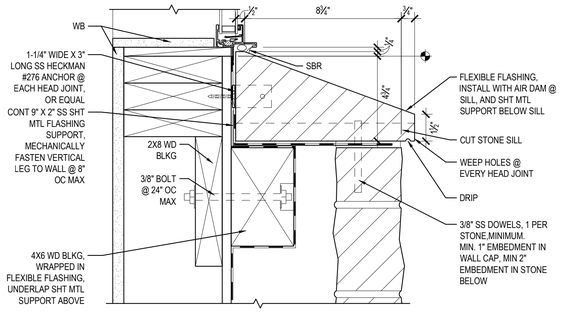

## SECTION DETAIL - WD DOOR HEAD, TYP 05

SCALE: 3" = 1'-0" | A-800



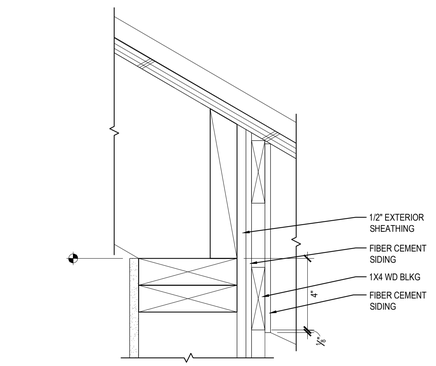

## SECTION DETAIL - ALUM WINDOW HEAD, TYP 04

SCALE: 3" = 1'-0" | A-421



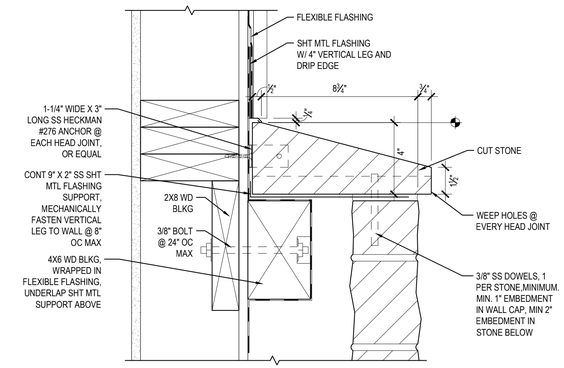

## SECTION DETAIL - ALUM WINDOW SILL, TYP 03

SCALE: 3" = 1'-0" | A-421




## SECTION DETAIL - ROOF BLOCKING, TYP 02

SCALE: 3" = 1'-0" | A-411




## SECTION DETAIL - TOP OF STONE WALL, TYP 01

SCALE: 3" = 1'-0" | A-411

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# RIVER RANCH COUNTY PARK INTERPRETIVE CENTER

WILLIAMSON COUNTY, TX

REGISTERED ARCHITECT CHARLES A. YORK 17821 STATE OF TEXAS

02/22/19

ISSUE DATE: Feb 22, 2019

REVISIONS

| # | DATE | DESCRIPTION |
|---|---|---|
| | | |

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PROJECT NUMBER: 5619

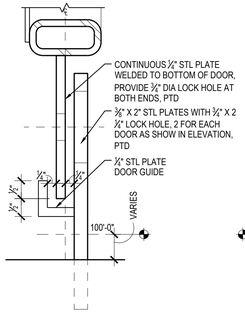
DETAILS

SHEET NUMBER

A-612

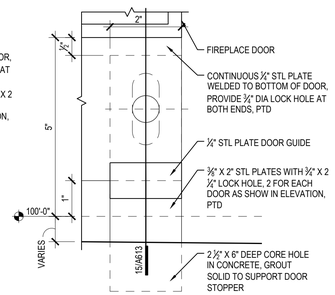
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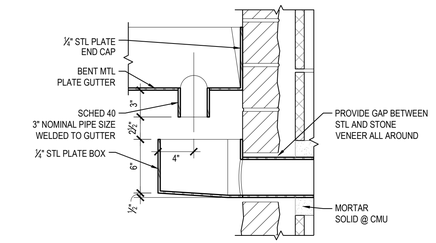

## SECTION - FIREPLACE DOOR STOPPER 15

SCALE: 6" = 1'-0" | A611



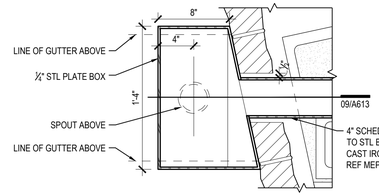

## ELEVATION - FIREPLACE DOOR STOPPER 14

SCALE: 6" = 1'-0" | A611



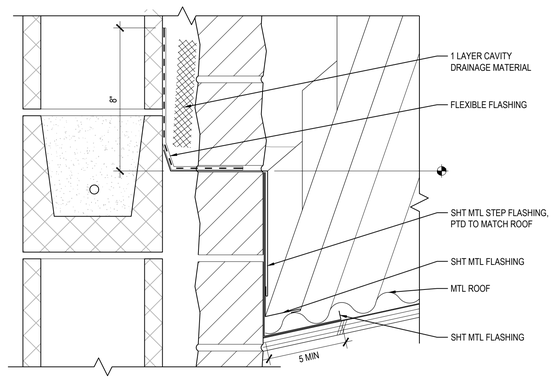

## SECTION DETAIL- TERMINATION OF GUTTER @ FIREPLACE 09

SCALE: 1-1/2" = 1'-0" | A613



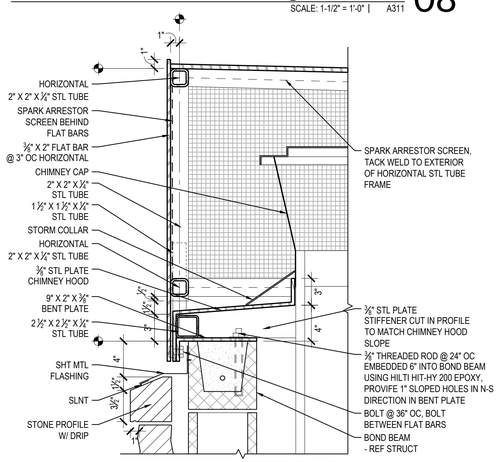

## PLAN DETAIL- TERMINATION OF GUTTER @ FIREPLACE 08

SCALE: 1-1/2" = 1'-0" | A311



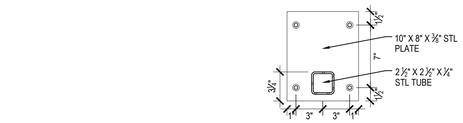

## SECTION DETAIL - ROOF @ FIREPLACE CHIMNEY 13

SCALE: 3" = 1'-0" | A-613



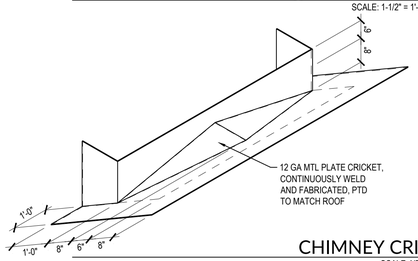

## SECTION DETAIL - CHIMNEY CAP & SPARK ARRESTOR 07

SCALE: 1-1/2" = 1'-0" | A-613



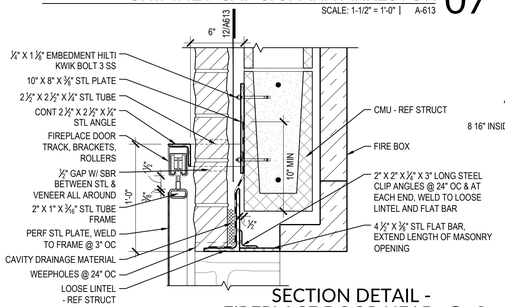

## SECTION DETAIL - MOUNTING BRACKET @ FIERPLACE DOOR 12

SCALE: 1-1/2" = 1'-0" | A-613



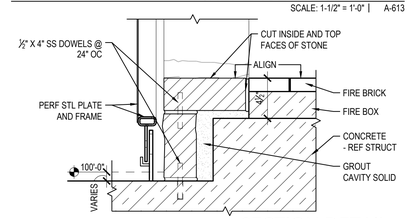

## CHIMNEY CRICKET 11

SCALE: NTS |



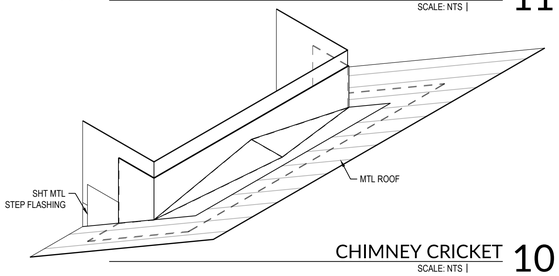

## SECTION DETAIL - FIREPLACE DOOR HEAD 06

SCALE: 1-1/2" = 1'-0" | A-613



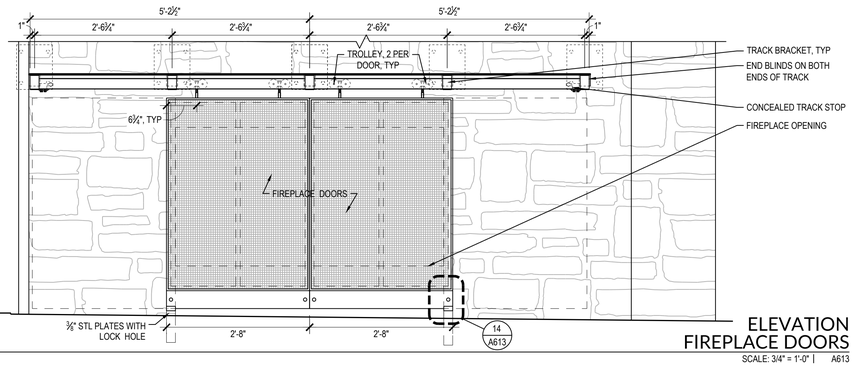

## SECTION DETAIL - FIREPLACE DOOR SILL 05

SCALE: 1-1/2" = 1'-0" | A-613



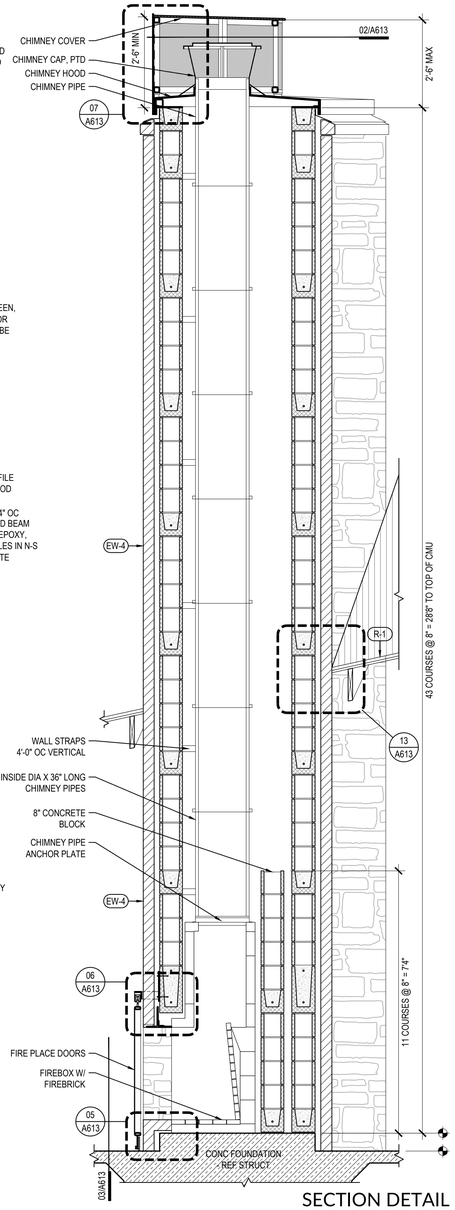

## CHIMNEY CRICKET 10

SCALE: NTS |



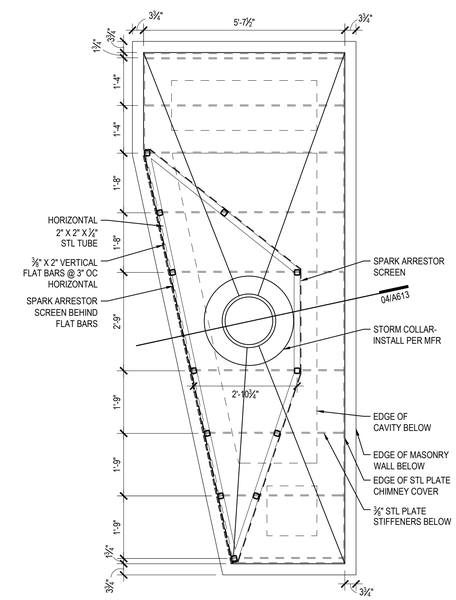

## ELEVATION FIREPLACE DOORS 03

SCALE: 3/4" = 1'-0" | A613



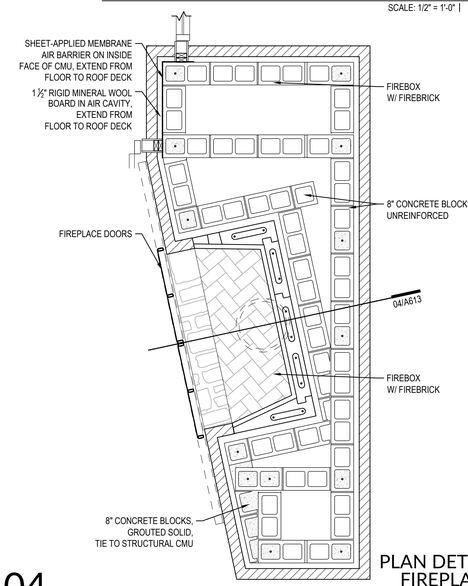

## SECTION DETAIL FIREPLACE 04

SCALE: 1/2" = 1'-0" | A613




## PLAN DETAIL CHIMNEY CAP 02

SCALE: 1/2" = 1'-0" | A613




## PLAN DETAIL FIREPLACE 01

SCALE: 1/2" = 1'-0" | A231

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# RIVER RANCH COUNTY PARK INTERPRETIVE CENTER

WILLIAMSON COUNTY, TX

REGISTERED ARCHITECT CHARLES A. YORK 17821 STATE OF TEXAS
02/22/19

ISSUE DATE: Feb 22, 2019

REVISIONS

| # | DATE | DESCRIPTION |
|---|---|---|

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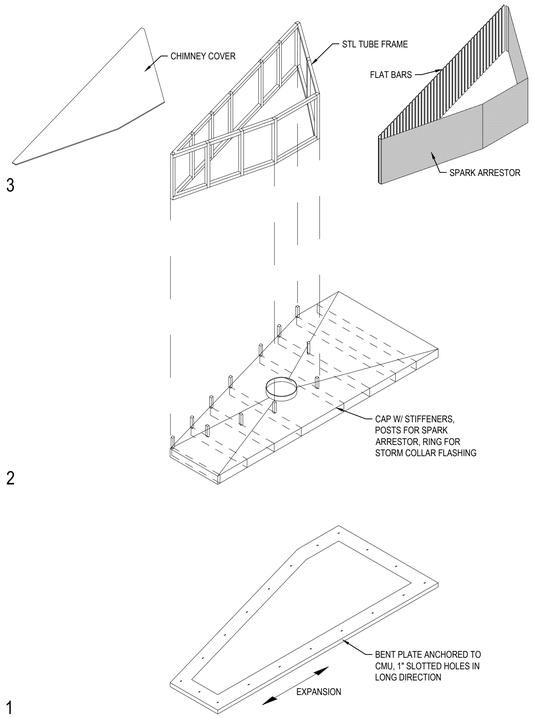
PROJECT NUMBER: 5619

DETAILS

SHEET NUMBER

A-613

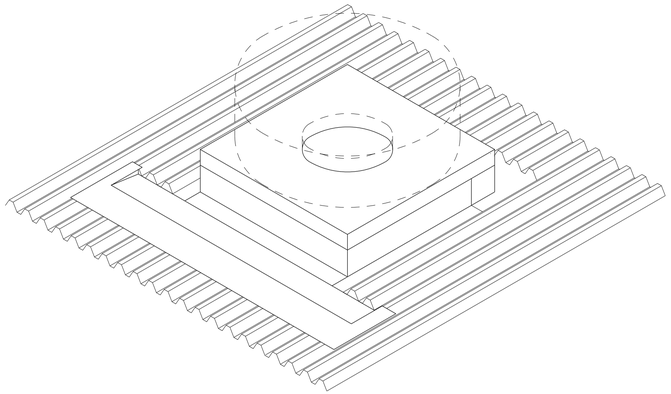
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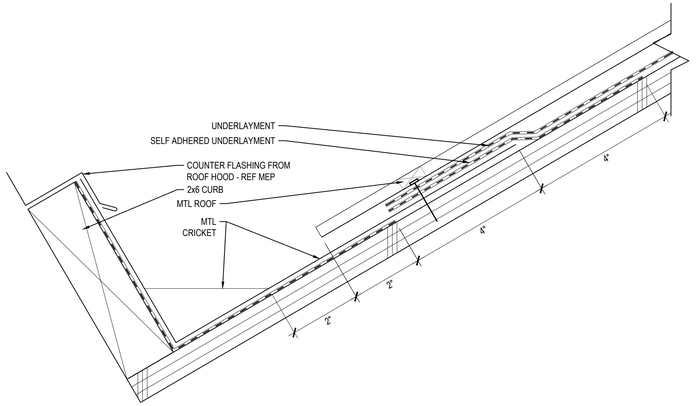



3 PIECES ARE TO BE FABRICATED IN SHOP AND INSTALLED TOGETHER ON SITE

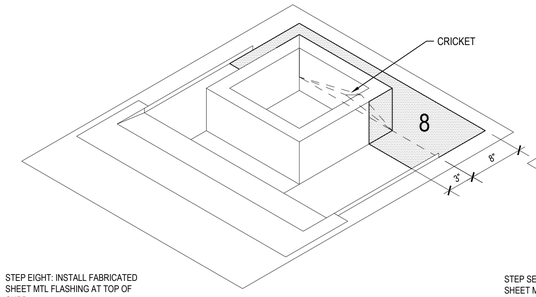
CHIMNEY CAP & SPARK ARRESTOR 02

SCALE: NTS

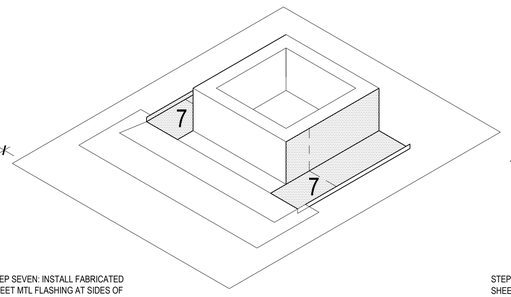




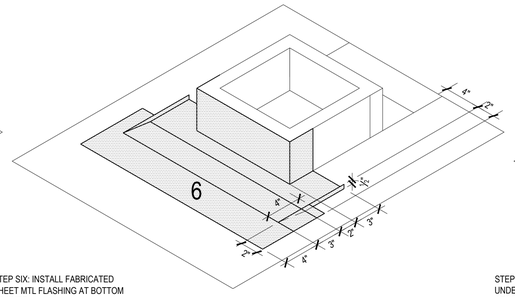

FINAL INSTALLATION




STEP EIGHT: INSTALL FABRICATED SHEET MTL FLASHING AT TOP OF CURB

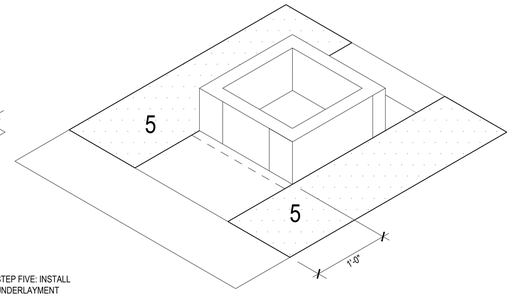



STEP SEVEN: INSTALL FABRICATED SHEET MTL FLASHING AT SIDES OF CURB

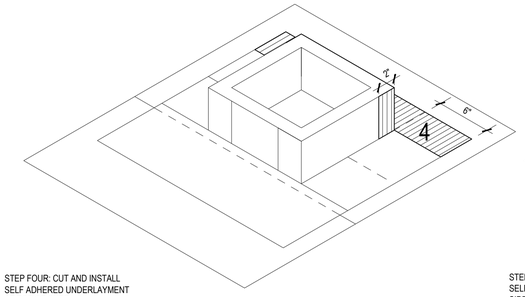



STEP SIX: INSTALL FABRICATED SHEET MTL FLASHING AT BOTTOM OF CURB

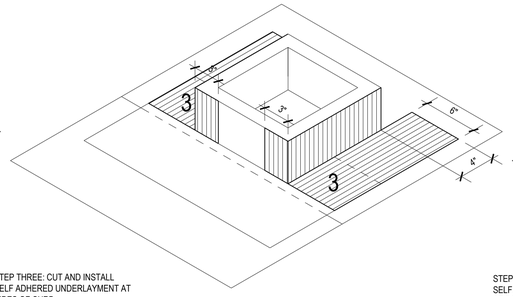
STEP NINE: INSTALL SELF ADHERED UNDERLAYMENT AND UNDERLAYMENT ABOVE CURB, AND INSTALL ROOFING



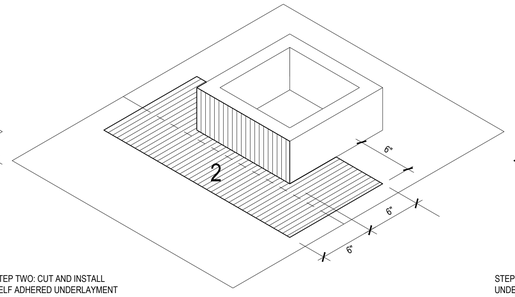

STEP FIVE: INSTALL UNDERLAYMENT AROUND CURB



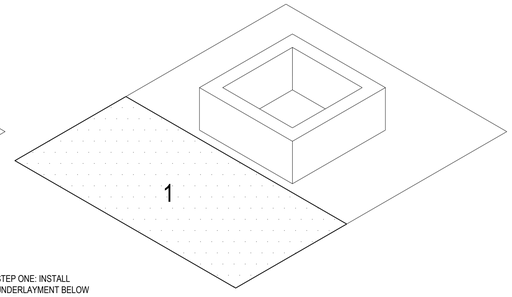

STEP FOUR: CUT AND INSTALL SELF ADHERED UNDERLAYMENT AT TOP OF CURB




STEP THREE: CUT AND INSTALL SELF ADHERED UNDERLAYMENT AT SIDES OF CURB




STEP TWO: CUT AND INSTALL SELF ADHERED UNDERLAYMENT AT BOTTOM OF CURB




STEP ONE: INSTALL UNDERLAYMENT BELOW CURB

ROOF VENT DETAIL 01

SCALE: NTS

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CONTACT: WILL WOOD

# RIVER RANCH COUNTY PARK INTERPRETIVE CENTER

## WILLIAMSON COUNTY, TX

REGISTERED ARCHITECT CHARLES A. YORK 17821 STATE OF TEXAS
02/22/19

ISSUE DATE: Feb 22, 2019

REVISIONS

| # | DATE | DESCRIPTION |
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PROJECT NUMBER: 5619

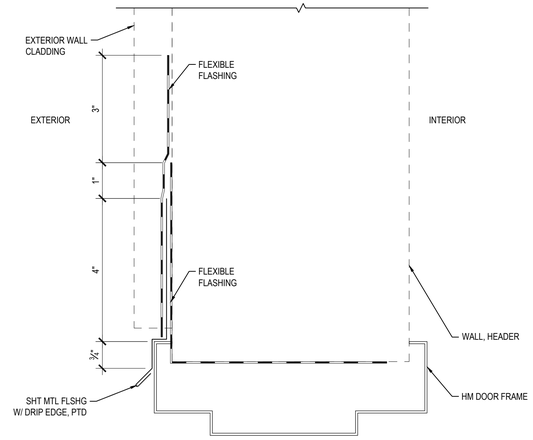
DETAILS

SHEET NUMBER

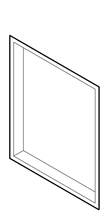
A-614

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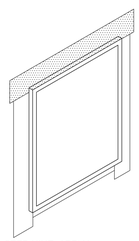
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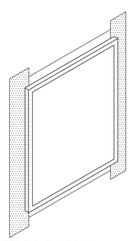

TYP FLASHING @ HM DOOR HEAD 02
SCALE: 6" = 1'-0"



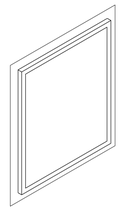
STEP TEN: INSTALL AIR SEAL ON INTERIOR SIDE OF WALL, BETWEEN WINDOW FRAME AND ROUGH OPENING.



STEP NINE: APPLY ADHESIVE-BACKED FLASHING TAPE AT HEAD; LAP ONTO PROJECTING FACE OF WINDOW CLADDING AND OVERLAP THE JAMB FLASHINGS.

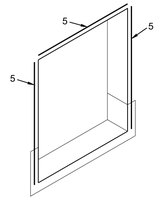


STEP EIGHT: APPLY ADHESIVE-BACKED FLASHING TAPE AT JAMBS; MAKE SMALL CUTS AT SILL AND HEAD TO ALLOW FLASHING TO LAP ONTO PROJECTING FACE OF WINDOW FRAME. DO NOT APPLY ADHESIVE-BACKED FLASHING TAPE AT SILL.

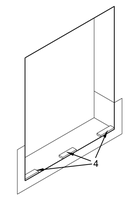


STEP SIX: INSTALL WINDOW WITH NAILING FLANGES AND NAILING FIN CORNER GASKETS.

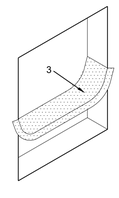
STEP SEVEN: IF REQUIRED PER DETAILS, INSTALL DRIP CAP WITH BEAD OF SEALANT ON BACK OF VERTICAL AND HORIZONTAL FACE OF CAP, EXTEND 1/8" BEYOND EDGE OF WINDOW



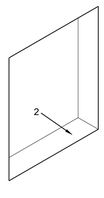

STEP FIVE: APPLY 3/8" BEAD OF SEALANT AT OUTSIDE FACE OF HEAD AND JAMBS, 3/4" FROM EDGE OF ROUGH OPENING STOPPING 3/4" FROM ENDS.



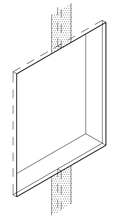

STEP FOUR: INSTALL PLASTIC OR COMPOSITE SHIMS AT ENDS AND MIDDLE OF ROUGH OPENING SILL.




STEP THREE: APPLY MINIMUM 6" WIDE ADHESIVE-BACKED STRETCHABLE FLASHING TAPE TO SILL. OVERHANG ONTO SHEATHING BY AT LEAST 2" AND EXTEND A MINIMUM OF 6" UP EACH JAMB. INSTALL ACCORDING TO MANUFACTURER'S INSTALLATION INSTRUCTIONS.




STEP TWO: INSTALL CONTINUOUS CEDAR OR REDWOOD SILL WEDGE, 1/2" THICK AT INTERIOR SIDE AND SLOPED TO EXTERIOR



STEP ONE: COMPLETE INSTALLATION OF WOOD SHEATHING WITH INTEGRAL WATER-RESISTANT BARRIER/ AIR BARRIER, INCLUDING TREATMENT OF PANEL JOINTS.

FLANGED WINDOW INSTALLATION 01
SCALE: NTS

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# RIVER RANCH COUNTY PARK INTERPRETIVE CENTER

## WILLIAMSON COUNTY, TX

REGISTERED ARCHITECT CHARLES A. YORK 17821 STATE OF TEXAS
02/22/19

ISSUE DATE: Feb 22, 2019

REVISIONS

| # | DATE | DESCRIPTION |
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PROJECT NUMBER: 5619

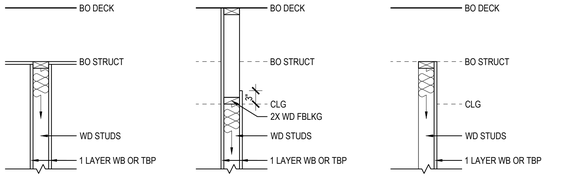
STANDARD DETAILS

SHEET NUMBER

A-630

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SECTION @ NON-RATED HOR ASSEMBLY

STC W/ BATTS: 36
STC W/O BATTS: 34
NON-RATED
W/ OR W/O TILE

**OPTION: CLG @ BO STRUCT**

33X

SECTION @ NON-RATED HOR ASSEMBLY

STC W/ BATTS: 36
STC W/O BATTS: 34

**NON-RATED, W/ OR W/O TILE**

32X

SECTION @ NON-RATED HOR ASSEMBLY

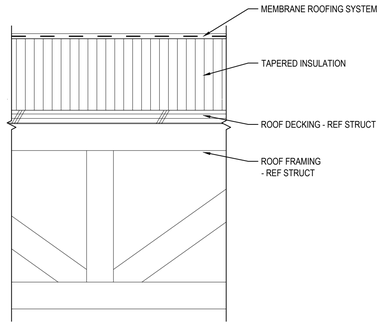
STC W/ BATTS: --
STC W/O BATTS: 28
NON-RATED
W/ OR W/O TILE

**OPTION: CLG BELOW BO STRUCT**

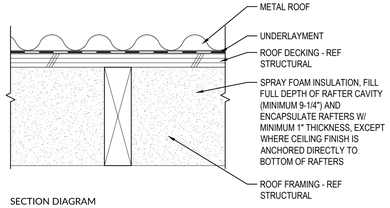
30X

## PARTITION TYPES - WOOD 03

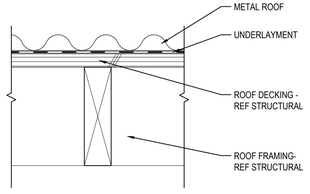
SCALE: NTS




SECTION DIAGRAM
R-3 - INSULATED ASSEMBLY



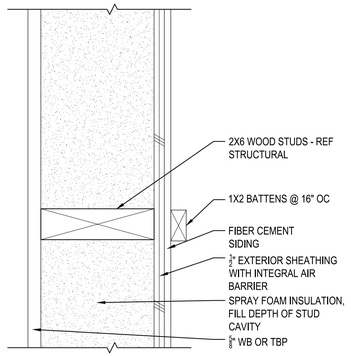

SECTION DIAGRAM
R-2 - INSULATED ASSEMBLY



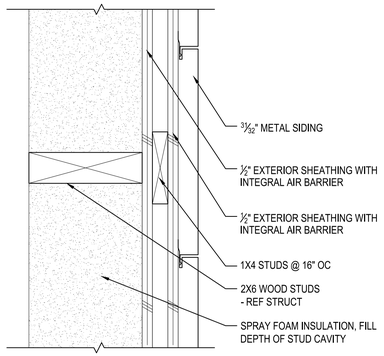

SECTION DIAGRAM
R-1 - NON INSULATED ASSEMBLY

## ASSEMBLY TYPES - ROOFS 02

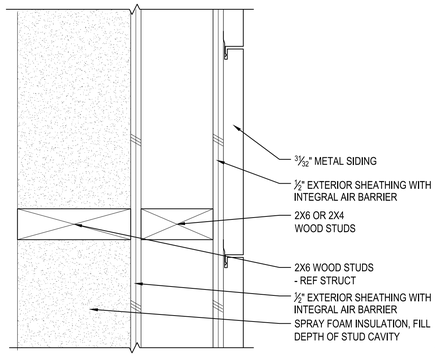
SCALE: NTS



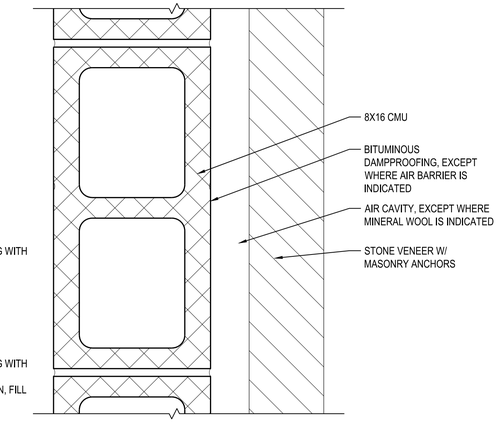

PLAN DIAGRAM
EW-7 6" WOOD STUDS



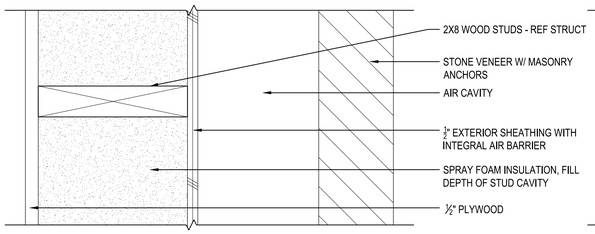

PLAN DIAGRAM
EW-6 6" WOOD STUDS



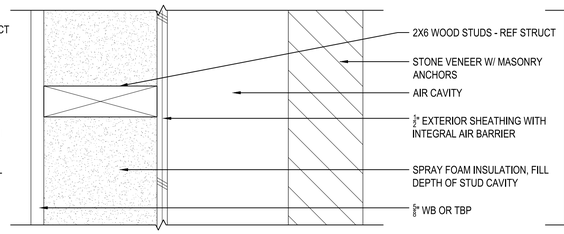

PLAN DIAGRAM
EW-5 6" WOOD STUDS



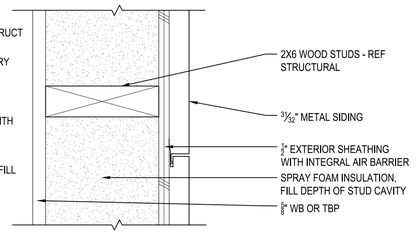

PLAN DIAGRAM
EW-4 CMU




PLAN DIAGRAM
EW-3 8" WOOD STUDS




PLAN DIAGRAM
EW-2 6" WOOD STUDS




PLAN DIAGRAM
EW-1 6" WOOD STUDS

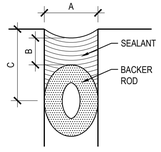
## ASSEMBLY TYPES - EXTERIOR WALLS 01

SCALE: NTS

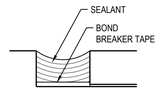
# ASSEMBLY TYPE NOTES

1. NOT USED

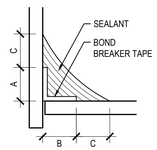
# SEALANT JOINT GUIDELINES



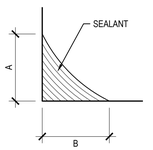

**TYPICAL SEALANT JOINT GUIDELINES:**
- RATIO OF A:B SHALL BE 2:1
- DIMENSIONS A & C SHALL BE ¼" MINIMUM
- JOINT SURFACE TOOLED CONCAVE




**MOVEMENT JOINT GUIDELINES:**
- BOND BREAKER TAPE SHALL BE PRESENT TO PREVENT 3-SIDED ADHESION
- JOINT SURFACE TOOLED CONCAVE




**MOVING COVE JOINT GUIDELINES:**
- DIMENSIONS A, B, & C SHALL BE ¼" MIN
- MINIMUM SEALANT THICKNESS OF ¼"
- BOND BREAKER TAPE SHALL BE PRESENT TO PREVENT 3-SIDED ADHESION
- JOINT SURFACE TOOLED CONCAVE

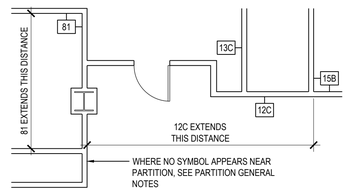



**NON-MOVING COVE JOINT GUIDELINES:**
- DIMENSIONS A & B SHALL BE ¼" MIN
- MINIMUM SEALANT THICKNESS OF ¼"
- JOINT SURFACE TOOLED CONCAVE

# PARTITION TYPE NOTES

1. PARTITION TYPES ARE INDICATED IN FLOOR PLANS BY PARTITION TAGS. UNTAGGED PARTITIONS ARE TYPE **32A**.
2. FIRE RESISTANCE RATINGS ARE INDICATED IN FLOOR PLANS BY GRAPHIC DESIGNATION.
3. FIRE RESISTANCE RATED ASSEMBLY REQUIREMENTS ARE INDICATED IN THE PARTITION TYPES BY REFERENCE TO INDEPENDENT TESTING AGENCY DESIGNATIONS AND CODE EVALUATION REPORT DESIGNATIONS. THE FOLLOWING ABBREVIATIONS ARE USED:
   - UL - UNDERWRITERS LABORATORIES
   - ICC-ES - ICC EVALUATION SERVICES
   - GA-600 - GYPSUM ASSOCIATION FIRE RESISTANCE DESIGN MANUAL
4. STUD SPACING SHALL BE 16" OC, UNLESS INDICATED OTHERWISE.
5. PARTITION TYPES SHALL EXTEND FROM THE LOCATION OF THE TAG, TO THE TERMINATION OF THE PARTITION. PARTITIONS SHALL EXTEND FROM THE FLOOR AND TERMINATE VERTICALLY AS INDICATED IN PARTITION TYPES, AND HORIZONTALLY AT INTERSECTING PARTITIONS ON THE SIDE WHERE THE TAG IS SHOWN. PARTITIONS DO NOT TERMINATE AT DOORS, WINDOWS, OPENINGS, MINOR PROJECTIONS, MINOR RECESSES, OR ALCOVES. REFER TO PARTITION TAG DIAGRAM FOR ADDITIONAL INFORMATION.
6. WHERE FRAMED PARTITION TYPES SHOW MULTIPLE ASSEMBLY OPTIONS, THE CONTRACTOR SHALL SELECT THE APPROPRIATE ONE BASED ON THE FIRE RESISTANCE RATING, PRESENCE OF TILE, AND ABOVE CEILING CONDITIONS.
7. WHERE FRAMED PARTITIONS WILL RECEIVE TILE, INSTALL 5/8" TILE BACKER PANELS, UNLESS INDICATED OTHERWISE. WHERE TILE BACKER PANELS ARE PART OF THE FIRE RATED ASSEMBLY, THEY SHALL EXTEND THE FULL HEIGHT OF THE PARTITION. PROVIDE A LEVEL 5 GYPSUM BOARD FINISH WITH INDICATED TEXTURE WHERE TILE BACKER PANELS ARE EXPOSED WITHOUT TILE.
8. WHERE WALL BOARD IS INDICATED, PROVIDE 5/8" TYPE 'X' GYPSUM BOARD, EXCEPT AT TOILET ROOMS AND JANITOR CLOSETS, PROVIDE TYPE 'X' MOISTURE AND MOLD RESISTANT GYPSUM BOARD.
9. ACOUSTICAL INSULATION:
   - 9.1. INSTALL BATTS (SOUND ATTENUATION BLANKETS) IN PARTITIONS WHERE INDICATED AS "REQUIRED" IN PARTITION TYPES.
   - 9.2. WHERE ROOM TAGS ARE PRECEDED BY AN ASTERISK (*), INSTALL BATTS IN ALL FRAMED PARTITIONS SEPARATING THAT SPACE FROM OTHER SPACES.
   - 9.3. WHERE PARTITION TAGS ARE PRECEDED BY AN ASTERISK (*), INSTALL BATTS IN THAT PARTITION.
   - 9.4. WHERE BATTS ARE INSTALLED, PROVIDE THE MAXIMUM THICKNESS THAT WILL FIT WITHIN THE PARTITION CAVITY WITHOUT COMPRESSION.
   - 9.5. INDICATED STC RATINGS ARE APPROXIMATIONS. THEY REFER TO THE RATING OF THE PARTITION BELOW THE CEILING. ABOVE CEILING CONDITIONS ARE NOT CONSIDERED. INDICATED STC RATINGS FOR FRAMED PARTITIONS ARE FOR 3-5/8" METAL STUDS OR 3-1/2" WOOD STUDS @ 16" OC AND 5/8" TYPE 'X' GYPSUM WALL BOARD UNLESS INDICATED OTHERWISE.
10. ALIGN DIFFERING PARTITION TYPES SO FINISHED SURFACES ARE FLUSH, UNLESS INDICATED OTHERWISE.
11. REFER TO ROOM FINISH SCHEDULE AND INTERIOR ELEVATIONS FOR APPLIED FINISHES.
12. PROVIDE DECORATIVE CMU WHERE INDICATED IN ROOM FINISH SCHEDULE.
13. AT FIRE RESISTANCE RATED CMU PARTITIONS, USE CMU WITH A MINIMUM EQUIVALENT THICKNESS AS INDICATED ON AN ASTM C140 TEST REPORT FOR THE REQUIRED FIRE RESISTANCE RATING AND AGGREGATE TYPE. THIS CAN ALSO BE ACHIEVED THROUGH GROUTING OF CELLS OR FILLING WITH LOOSE GRANULAR FILL INSULATION. THE EQUIVALENT THICKNESS OF FULLY GROUTED PARTITIONS OR PARTIALLY GROUTED PARTITIONS WHERE REMAINING CELLS ARE FILLED WITH LOOSE GRANULAR FILL INSULATION IS THE FULL THICKNESS OF THE CMU. THE EQUIVALENT THICKNESS FOR PARTIALLY GROUTED AND/OR PARTIALLY FILLED PARTITIONS IS EQUAL TO THE EQUIVALENT THICKNESS OF THE CMU ONLY.

# PARTITION TAG DIAGRAM




# PARTITION SIZE SCHEDULE (X)

| SERIES | 10-29 | 30-49 | 50-59 | 60-69 | 60-69 | 70-79 |
|---|---|---|---|---|---|---|
| MATERIAL | STEEL STUD | WOOD STUD | CMU | FURRING | PLASTER | SHAFT WALL |
| A | 1-5/8" | 3-1/2" | 3-5/8" | 1/2" | 1/2" | 2-1/2" |
| B | 2-1/2" | 5-1/2" | 5-5/8" | 3/4" | 3/4" | 4" |
| C | 3-5/8" | 7-1/4" | 7-5/8" | 7/8" | - | 6" |
| D | 4" | 9-1/4" | 9-5/8" | 1" | - | - |
| E | 6" | 11-1/4" | 11-5/8" | 1-1/2" | - | - |
| F | 8" | - | - | 2" | - | - |
| G | - | - | - | 2-1/2" | - | - |
| H | - | - | - | 3" | - | - |

# CMU MIN THICKNESS

| AGGREGATE TYPE IN CMU | EQUIVALENT THICKNESS TO ACHIEVE FIRE RESISTANCE RATING | | | |
|---|---|---|---|---|
| | 1 HOUR | 2 HOUR | 3 HOUR | 4 HOUR |
| PUMICE OR EXPANDED SLAG | 2.1" | 3.2" | 4.0" | 4.7" |
| EXPANDED SHALE, CLAY OR SLATE | 2.6" | 3.6" | 4.4" | 5.1" |
| LIMESTONE, CINDERS OR UNEXPANDED SLAG | 2.7" | 4.0" | 5.0" | 5.9" |
| CALCAREOUS OR SILICEOUS GRAVEL | 2.8" | 4.2" | 5.3" | 6.2" |

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**RIVER RANCH COUNTY PARK INTERPRETIVE CENTER**

**WILLIAMSON COUNTY, TX**

REGISTERED ARCHITECT CHARLES A. YORK 17821 STATE OF TEXAS
02/22/19

ISSUE DATE: Feb 22, 2019

REVISIONS

| # | DATE | DESCRIPTION |
|---|---|---|
| | | |

DRAWN: REVIEWED:

**100% CONSTRUCTION DOCUMENTS**

PROJECT NUMBER: 5619

CONSTRUCTION ASSEMBLIES & PARTITION TYPES

SHEET NUMBER

A-700

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# DOOR SCHEDULE

| | | DOOR SIZE | | | | DOOR | | | FRAME | | | | | DETAILS | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DOOR NUMBER | ROOM NUMBER | NUMBER OF PANELS | PANEL WIDTH(S) | HEIGHT | THICKNESS | TYPE | MATERIAL | FINISH | TYPE | PROFILE | MATERIAL | FINISH | THICKNESS | HEAD | SILL | JAMB | HARDWARE | STOP | REMARK |
| 101 | 101 | 2 | 3'-0" | 8'-0" | 1-3/4" | B | ALUM/GL | DARK BRONZE ANOD | | | ALUM/GL | DARK BRONZE ANOD | 1-3/4" | | 16/A612 | | - | - | SAFETY GLAZING REQUIRED |
| 102 | 102 | 1 | 3'-0" | 7'-0" | 1-3/4" | C | WD | PTD | | | WD | PTD | 1-1/2" | 05/A612 SIM | | 11/A611 | - | - | - |
| 103 | 103 | 1 | 3'-0" | 7'-0" | 1-3/4" | C | WD | PTD | | | WD | PTD | 1-1/2" | | | | - | - | - |
| 104 | 104 | 2 | 4'-6" | 7'-0" | 1-3/4" | D | WD | PTD | | | WD | PTD | 1-1/2" | | | | - | - | - |
| 105 | 105 | 1 | 3'-0" | 7'-0" | 1-3/4" | C | WD | PTD | | | WD | PTD | 1-1/2" | 05/A612 | | 12/A611 | - | - | - |
| 106 | 106 | 1 | 3'-0" | 7'-0" | 1-3/4" | C | WD | PTD | | | WD | PTD | 1-1/2" | 05/A612 | | 12/A611 | - | - | - |
| 108 | 108 | 1 | 3'-0" | 7'-0" | 1-3/4" | E | HM | PTD | A | A | HM | PTD | 2" | 14/A612 | 13/A612 | 10/A611 | - | - | - |
| 109 | 109 | 1 | 2'-8" | 7'-0" | 1-3/4" | E | HM | PTD | A | A | HM | PTD | 2" | | | | - | - | - |
| 110 | 110 | 1 | 3'-0" | 7'-0" | 1-3/4" | E | HM | PTD | A | A | HM | PTD | 2" | 14/A612 | 13/A612 | 10/A611 | - | - | - |
| 111 | 111 | 1 | 3'-0" | 7'-0" | 1-3/4" | E | HM | PTD | A | A | HM | PTD | 2" | 14/A612 | 13/A612 | 10/A611 | - | - | - |
| 112 | 101 | 1 | 3'-0" | 8'-0" | 1-3/4" | A | ALUM/GL | DARK BRONZE ANOD | | | ALUM/GL | DARK BRONZE ANOD | 1-3/4" | | 15/A612 | | - | - | SAFETY GLAZING REQUIRED |
| 113 | 101 | 1 | 3'-0" | 8'-0" | 1-3/4" | A | ALUM/GL | DARK BRONZE ANOD | | | ALUM/GL | DARK BRONZE ANOD | 1-3/4" | | 15/A612 | | - | - | SAFETY GLAZING REQUIRED |

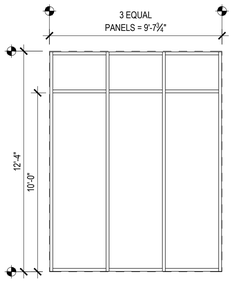
NOTES:

# DOOR SCHEDULE NOTES

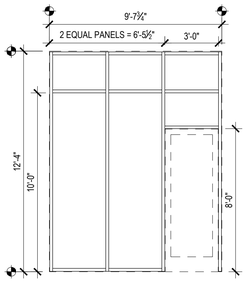
1. UNLESS INDICATED OTHERWISE, WHERE STEEL DOOR OR FRAME SIZES COMPLY WITH SIZE AND PROFILE LIMITATIONS FOR STANDARD DOORS OR FRAMES AS DEFINED BY SDI, PROVIDE STANDARD DOORS IN COMPLIANCE WITH THE SIDE STANDARDS SPECIFIED. ALL OTHER DOORS OR FRAMES SHALL BE CUSTOM. FOR CUSTOM DOORS AND FRAMES, PROVIDE DOORS AND FRAMES IN COMPLIANCE WITH NAAMM STANDARDS SPECIFIED.

# FENESTRATION NOTES

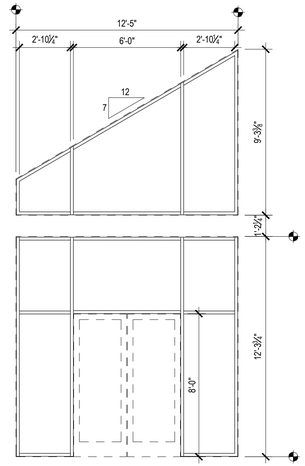
1. NONE




ST-3



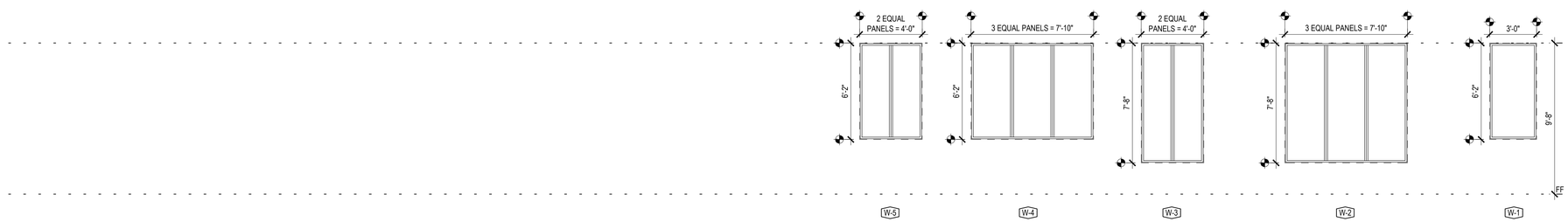

ST-2




ST-1

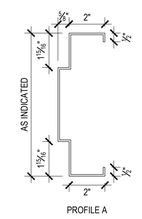
## STOREFRONT TYPES 05

SCALE: 1/4" = 1'-0"




## WINDOW TYPES 04

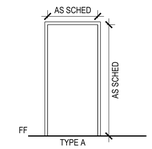
SCALE: 1/4" = 1'-0"




PROFILE A

## FRAME PROFILES 03

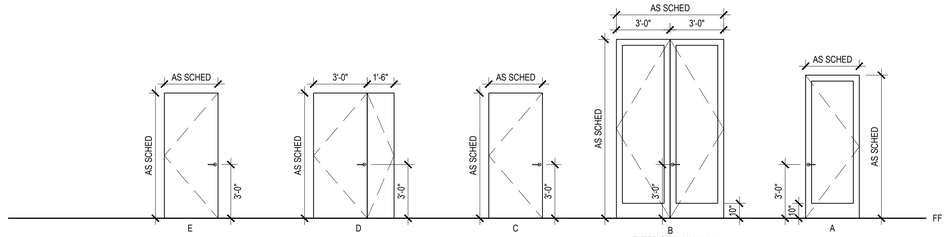
SCALE: 3" = 1'-0"




TYPE A

## FRAME TYPES 02

SCALE: NTS




## DOOR TYPES 01

SCALE: 1/4" = 1'-0"

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CONTACT: WILL WOOD

# RIVER RANCH COUNTY PARK INTERPRETIVE CENTER

## WILLIAMSON COUNTY, TX

REGISTERED ARCHITECT
CHARLES A. YORK
17821
STATE OF TEXAS
02/22/19

ISSUE DATE: Feb 22, 2019

REVISIONS

| # | DATE | DESCRIPTION |
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DRAWN: REVIEWED:

100% CONSTRUCTION DOCUMENTS

PROJECT NUMBER: 5619

FENESTRATION TYPES

SHEET NUMBER

A-800

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# BATH ACCESSORY SCHEDULE

| MARK | ITEM | MANUFACTURE | MODEL | FINISH | REMARK |
|---|---|---|---|---|---|
| A | TOILET PAPER DISPENSER | BOBRICK | B-4288 | | |
| B | SANITARY NAPKIN DISPOSAL | BOBRICK | B-270 | | |
| C-XX* | GRAB BAR | BOBRICK | B-5806 | | LENGTH AS SPECIFIED |
| D | MIRROR | BOBRICK | B-165 | | |
| E | TAS COMPLIANT UNDER LAVATORY GUARD | IPS CORP | LAV GUARD2 102E-Z& #402W" | | |
| F | SOAP DISPENSER | BOBRICK | B-2111 | | |
| G | TOUCHLESS HAND DRYER | PINNACLE DRYER CORP. | P3-12S | | |
| H | BABY CHANGING STATION | AMERICAN SPECIALTIES, INC | 9013 | | BOTTOM OF TABLE IN OPEN POSITION @ 27" AFF |
| J | UTILITY SHELF WITH MOP/BROOM HOLDERS AND RAG HOOKS | BOBRICK | B-239 | | |
| K | SHELF | BOBRICK | B-298-24 | | |

NOTES:
1) ALL TOILET ROOM ACCESSORIES CONTRACTOR PROVIDED, CONTRACTOR INSTALLED (CPCI), UIO

# AV EQUIPMENT BASIS OF DESIGN

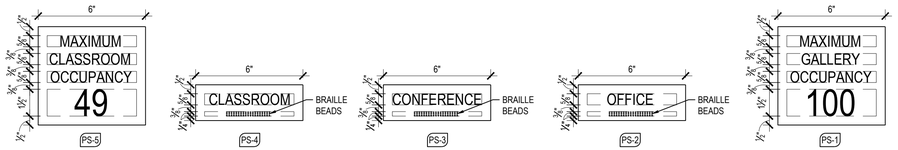
| MARK | ITEM | PURCHASER | INSTALLER | MANUFACTURER | MODEL | FINISH | CONTACT | REMARK |
|---|---|---|---|---|---|---|---|---|
| CLASSROOM (102) | | | | | | | | |
| 101 | TV | OWNER | OWNER | SAMSUNG | 82" MU8000 | | | |
| - | MICROSOFT WIRELESS DISPLAY ADAPTER | OWNER | OWNER | MICROSOFT | P3Q-00001 | | | |
| 102 | TV MOUNT | OWNER | OWNER | MANTEL MOUNT | M 700 | | | |
| 103 | SPEAKER | OWNER | OWNER | PRO ACOUSTICS | PURE RESONANCE AUDIO SD4 | | | |
| 104 | STEREO INTEGRATED AMPLIFIER | OWNER | OWNER | YAMAHA | A-S301 | | | |
| - | LECTERN | OWNER | OWNER | | | | | |
| CLASSROOM (102) | | | | | | | | |
| 105 | 55" TV | OWNER | OWNER | SAMSUNG | 55" MU8000 | | | |
| - | MICROSOFT WIRELESS DISPLAY ADAPTER | OWNER | OWNER | MICROSOFT | P3Q-00001 | | | |
| 106 | TV MOUNT | OWNER | OWNER | ECHOGEAR | TVS-EGLF1 | | | |
| | | | | | | | | |

NOTES:
1) A/V EQUIPMENT AND CABLING BY OWNER. CONTRACTOR SHALL PROVIDE PATHWAYS, BACKBOXES, AND BLOCKING AS REQUIRED FOR A/V COMPONENTS. EQUIPMENT LISTED ABOVE WAS USED FOR BASIS-OF-DESIGN ONLY. CONFIRM ACTUAL SIZES OF EQUIPMENT WITH OWNER AND COORDINATE LOCATIONS WITH ARCHITECT.

# SIGNAGE SCHEDULE

| MARK | TYPE | DESCRIPTION | COLOR OR FINISH | REMARK |
|---|---|---|---|---|
| PS-1 | PANEL SIGN | OCCUPANT LOAD | BLACK W/ WHITE TEXT | ¼" THICK ACRYLIC SHEET WITH RAISED LETTERS, BOTTOM OF SIGN 48" AFF |
| PS-2 | PANEL SIGN | ROOM IDENTIFICATION SIGNAGE | BLACK W/ WHITE TEXT | ¼" THICK ACRYLIC SHEET WITH RAISED LETTERS |
| PS-3 | PANEL SIGN | ROOM IDENTIFICATION SIGNAGE | BLACK W/ WHITE TEXT | ¼" THICK ACRYLIC SHEET WITH RAISED LETTERS |
| PS-4 | PANEL SIGN | ROOM IDENTIFICATION SIGNAGE | BLACK W/ WHITE TEXT | ¼" THICK ACRYLIC SHEET WITH RAISED LETTERS |
| PS-5 | PANEL SIGN | OCCUPANT LOAD | BLACK W/ WHITE TEXT | ¼" THICK ACRYLIC SHEET WITH RAISED LETTERS, BOTTOM OF SIGN 48" AFF |
| PS-6 | | | | SIGNAGE SHALL MATCH TYPICAL PARK RESTROOM SIGNS - REF LANDSCAPE. BACKGROUND COLOR TO BE SELECTED BY ARCHITECT |
| PS-7 | | | | SIGNAGE SHALL MATCH TYPICAL PARK RESTROOM SIGNS - REF LANDSCAPE. BACKGROUND COLOR TO BE SELECTED BY ARCHITECT |
| PS-8 | | | | SIGNAGE SHALL MATCH TYPICAL PARK RESTROOM SIGNS - REF LANDSCAPE. BACKGROUND COLOR TO BE SELECTED BY ARCHITECT |

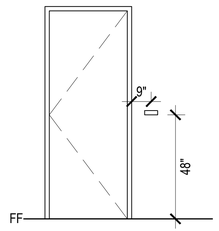
NOTES: LOCATION OF ALL SIGNS TO COMPLY WITH TAS CHAPTER 7




SIGNAGE TYPES 02
SCALE: NTS

## SIGNAGE NOTES

1. CHARACTER TYPEFACE SHALL BE ARIEL NARROW, UIO.
2. PROVIDE GRADE 2 BRAILLE RASTER BEADS
3. PROVIDE SMOOTH STONE SURFACE ON STONE WALLS FOR SIGNS




ROOM IDENTIFICATION SIGN LOCATION 01
SCALE: NTS

# ROOM FINISH SCHEDULE

| ROOM | | SURFACES | | | | | | | ELEMENTS | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NUMBER | NAME (BLDNG #-ROOM ID) | FLOOR | BASE | NORTH WALL | EAST WALL | SOUTH WALL | WEST WALL | CEILING | CABINETS/ SHELVING | COUNTER TOPS | REMARK |
| 101 | EXHIBIT GALLERY | CONC | - | ST-1/ PT4 | ST-1 | PT-4 | ST-1, PT-1 | BP-1/ PT-4/ PT-1/PT-2 | - | - | |
| 102 | CLASSROOM | CONC | RB-1 | PT-1 | PT-1 | PT-1 | PT-1 | ACP-1 | PT-5 | AS INDICATED | |
| 103 | MECH | CONC | RB-1 | PT-1 | PT-1 | PT-1 | PT-1 | - | - | - | |
| 104 | CLOSET | CONC | RB-1 | PT-1 | PT-1 | PT-1 | PT-1 | ACP-1 | - | - | |
| 105 | CONFERENCE ROOM/ LIBRARY | CONC | RB-1 | PT-1 | PT-1 | PT-1 | PT-1 | ACP-1 | PT-5 | - | |
| 106 | OFFICE | CONC | RB-1 | PT-1 | PT-1 | PT-1 | PT-1 | ACP-1 | - | - | |
| 107 | COVERED ENTRY PORCH | CONC | - | - | PT-2 | - | ST-1 | PT-3 | - | - | |
| 108 | UNISEX 108 | CONC | - | T-1 | T-1 | T-1 | T-1 | PT-1 | - | - | |
| 109 | MECH | CONC | - | PT-1 | PT-1 | PT-1 | PT-1 | - | - | - | |
| 110 | UNISEX 110 | CONC | - | T-1 | T-1 | T-1 | T-1 | PT-1 | - | - | |
| 111 | UNISEX 111 | CONC | - | T-1 | T-1 | T-1 | T-1 | PT-1 | - | - | |
| 112 | OUTDOOR FIREPLACE | CONC | - | - | - | - | - | PT-3 | - | - | |

NOTES:

# FINISH INDEX

| | SPECIFICATION REFERENCE | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| MARK | SECTION NAME | DESCRIPTION | MANUFACTURER | SERIES | COLOR / FINISH | SIZE | CONTACT | REMARK |
| ACP-1 | ACOUSTICAL PANEL CEILINGS | ACOUSTIC CEILING PANELS | ARMSTRONG | DUNE | WHITE | 24X24 | - | |
| CONC | CONCRETE SEALING | CONCRETE FLOOR SEAL | - | - | CLEAR | - | - | |
| CT-1 | SPECIALTY COUNTERTOPS AND SURFACING | QUARTZ STONE | | - | COLOR SELECTED BY ARCHITECT | - | - | |
| HPC-1 | HIGH PERFORMANCE COATINGS | | SHERWIN-WILLIAMS | - | TBD, MATCH METAL ROOF | - | - | |
| HPC-2 | HIGH PERFORMANCE COATINGS | | SHERWIN-WILLIAMS | - | SW 7020 - BLACK FOX | - | - | |
| PT-1 | PAINTING & COATINGS | PAINT | SHERWIN-WILLIAMS | - | SW 7014 - EIDER WHITE | - | - | |
| PT-2 | PAINTING & COATINGS | PAINT | SHERWIN-WILLIAMS | - | SW 7020 - BLACK FOX | - | - | |
| PT-3 | PAINTING & COATINGS | PAINT | SHERWIN-WILLIAMS | - | SW 6718 - OVERT GREEN | - | - | |
| PT-4 | PAINTING & COATINGS | PAINT | SHERWIN-WILLIAMS | - | TBD | - | - | |
| PT-5 | PAINTING & COATINGS | PAINT | SHERWIN-WILLIAMS | - | TBD | - | - | |
| PT-6 | PAINTING & COATINGS | PAINT | SHERWIN-WILLIAMS | - | MATCH METAL ROOF | | | |
| RB-1 | RESILIENT BASE | RESILIENT BASE | ROPPE OR PINNACLE PLUS | - | COLOR SELECTED BY ARCHITECT | - | - | |
| ST-1 | - | STONE VENEER | | - | COLOR SELECTED BY ARCHITECT | - | - | MATCH LANDSCAPE STONE FEATURES |
| ST-2 | - | QUARTZ STONE | CERASTONE | - | 4004 - RAW CONCRETE | - | - | MATCH LANDSCAPE STONE FEATURES |
| BP-1 | FINISH CARPENTRY | BOARD PANELING | | | | | | 1X6 V-GROVE WOOD PANELING |
| T-1 | TILING | TILE | DALTILE | - | 100 - WHITE | 4X4 | - | |
| WB-1 | WHITE BOARD | | CLARUS | FLOAT | | | | |

NOTES:
1) ALL COLORS/FINISHES ARE SELECTED BY ARCHITECT FROM MFR STANDARD COLORS/FINISHES, UIO.

# ELEMENT FINISH SCHEDULE

| ITEM | LOCATION | DESCRIPTION | FACTORY FINISH | FIELD FINISH | REMARK |
|---|---|---|---|---|---|
| STEEL GUTTERS, DIVERTERS, BRACKETS, & RIDGE CAPS | ALL | | | HPC-1 | |
| STRUCTURAL STEEL | EXTERIOR | | | HPC-2 | |
| | INTERIOR | | | PTD TO MATCH ADJACENT SURFACE | |
| WOOD BEAMS & TRUSSES | ALL | | | PT-2 | |
| EXPOSED RAFTERS & EXPOSED ROOF DECK | EXTERIOR | | | PT-3 | |
| | INTERIOR | | | PT-3 | |
| FIBER CEMENT SIDING, BATTENS, TRIM | EXTERIOR | | | PT-1 | |
| | INTERIOR | | | PT-1 | |
| CABINETS | ALL | | | PT-5 | |
| HM DOORS AND FRAMES | EXTERIOR SIDE | | | PT-2 | |
| | INTERIOR SIDE | | | PT-1 | |
| WD DOORS AND FRAMES | ALL | | | PTD TO MATCH ADJACENT SURFACE | |
| ELECTRICAL EQUIPMENT & PANELBOARDS | ALL | | | PTD TO MATCH ADJACENT SURFACE | |
| ACCESS DOORS | ALL | | | PTD TO MATCH ADJACENT SURFACE | |
| FIELD PAINTABLE FLASHING | ALL | | | PTD TO MATCH ADJACENT SURFACE | |
| VENT PIPES | EXTERIOR | | | PTD TO MATCH ADJACENT SURFACE | |
| STEP LIGHTS | EXTERIOR | | | PTD TO MATCH ADJACENT SURFACE | |
| FIREPLACE DOOR ACCESSORIES | EXTERIOR | | | PT-6 | |
| CHIMNEY CAP | EXTERIOR | | | PT-6 | |
| CHIMNEY COVER ACCESSORIES | EXTERIOR | | | PT-6 | |

## ELEMENT FINISH SCHEDULE NOTES

1. ITEMS IN THE ELEMENT FINISH SCHEDULE REFER TO EXPOSED AND SEMI-EXPOSED SURFACES, UNLESS INDICATED OTHERWISE.
2. FACTORY FINISHES ARE NOT SHOWN IN FINISH SCHEDULE, UNLESS INDICATED OTHERWISE.
3. FIELD FINISH FACTORY PRIMED ITEMS OR ITEMS THAT ARE NOT FACTORY FINISHED, UNLESS INDICATED OTHERWISE.
4. FIELD FINISH ITEMS IN ELEMENT FINISH SCHEDULE AND ROOM FINISH SCHEDULE, UNLESS INDICATED OTHERWISE.

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RIVER RANCH COUNTY PARK INTERPRETIVE CENTER

WILLIAMSON COUNTY, TX

REGISTERED ARCHITECT CHARLES A. YORK 17821 STATE OF TEXAS
02/22/19

ISSUE DATE: Feb 22, 2019

REVISIONS

| # | DATE | DESCRIPTION |
|---|---|---|

DRAWN: REVIEWED:

100% CONSTRUCTION DOCUMENTS

PROJECT NUMBER: 5619

FINISHES, SCHEDULES AND SIGNAGE TYPES

SHEET NUMBER

A-900

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Bid 1906.327

Williamson County, Texas

# FRAMING NOTES

## SPECIAL INSPECTIONS

### GENERAL

1. In addition to the regular inspections required by Section 110 of the 2015 International Building Code (IBC), Special Inspections are required in accordance with Sections 1704 and 1705 of the 2015 IBC.

2. Structural Observations as noted in Sections 1704.6.1 (Seismic Resistance) and 1704.6.2 (Wind Resistance) and Special Inspections as noted in 1705.11 (Wind Resistance) and 1705.12 (Seismic Resistance) are not required.

3. See Specification Section 014529, "Special Inspections and Quality Control", for a more detailed description of special inspection and quality control requirements.

4. Contractor shall communicate and coordinate work schedule with the Special Inspector. Contractor shall generally notify the Special Inspector of upcoming inspection items 7 days prior to the work being executed.

### EXCAVATION, FILLING AND BACKFILLING

1. Qualified representatives of Raba Kistner, the geotechnical engineering firm, shall provide periodic and "continuous" inspections of excavation, fill materials, placement and compaction as required by 2015 IBC Section 1705.6 and Specification Section 014529. Raba Kistner personnel shall confirm that proper materials and procedures have been used as required by the Building Pad construction requirements on Sheet S2.1 and Raba Kistner's geotechnical engineering report recommendations.

### FOUNDATION CONCRETE

1. Inspect all reinforcing steel before placement of concrete and provide concrete inspection and testing in accordance with IBC Section 1705.3 and Spec Section 014529.

2. Provide periodic inspections of concrete formwork as required to confirm compliance with Specification Section 031000, "Concrete Formwork".

### ANCHOR BOLTS, EXPANSION AND EPOXY ANCHORS IN CONCRETE

1. Provide periodic inspections of anchor bolts, embedded assemblies, expansion and epoxy anchors as required by IBC Section 1705.3 and Specification Section 014529.

### STRUCTURAL STEEL

1. All structural steel shall be inspected during and after construction for conformance with the Contract Documents and shop drawings.

2. Welds, bolts and welded studs shall be inspected as required by Specification Section 014529, Paragraph 3.4.

### WOOD FRAMING

1. A general observation of the wood framing should be made at the appropriate stages of construction for compliance with the Contract Documents and pre-engineered truss shop drawings, including truss and web bracing.

2. Periodic observation is required to confirm nailing, bolting, anchoring and other fastenings of the various wood framing components, including the structural roof, wall and ceiling sheathing fastenings noted on the plans and in the "Structural Notes".

3. Pre-engineered wood truss fabricator shall be registered in compliance with IBC Section 1704.2.5.1 to perform such work without special inspection. At completion of fabrication, the approved fabricator shall submit a certificate of compliance to the Special Inspector that the work was performed in accordance with the approved construction documents.

### STRUCTURAL MASONRY

1. At the start of masonry construction, inspect preparation of mortar and grout, mortar beds, grout spaces, embedded items and reinforcing steel as required by Specification Section 014529, Paragraph 3.6.

2. Provide periodic inspections and testing of masonry construction as required by Specification Section 014529, Paragraph 3.6.

### CODE REQUIREMENTS FOR CONSTRUCTION

Building Code: 2015 International Building Code

Concrete: Building Code Requirements for Reinforced Concrete ACI, 318-05.

DESIGN LOADS

1. Live Loads
   - A. Ground Floor 100 psf
   - B. Roof w/ 7:12 Slope 16 psf
   - C. Roof at Other Slopes 20 psf

2. Ground Snow Load, Pg = 5 psf

3. Wind Load - ASCE 7-10 Requirements
   - A. Basic Wind Speed = 115 mph, Exposure B, Occupancy Category II
   - B. Importance Factor = 1.0
   - C. Internal Pressure Coefficient = (+/-) 0.18
   - D. Exterior Components and Cladding Design Load (for items designed by others) = 25 psf (service Load)

4. Earthquake Loads - ASCE 7-10 Requirements
   - A. Risk Category II, Importance Factor = 1.0
   - B. Spectral Response Accelerations: Ss = 0.061, S1 = 0.034
   - C. Site Class B.
   - D. Spectral Response Coeffecients: Sds = 0.041, S d1 = 0.023
   - E. Seismic Design Category A.
   - F. Basic seismic-force-resisting system is light-framed bearing walls sheathed with OSB & gypsum wallboard (A13/14).
   - G. Design Base Shear = 750#
   - H. Seismic Response coefficient, Cs (NA for Category A).
   - I. Response modification factor, R (NA for Category A).
   - J. Analysis: Equivalent Lateral Force Procedure

### STRUCTURAL STEEL

1. All structural steel shall conform to ASTM Specification A-36 u.n.o. Details and connections shall conform to AISC Standards.
   Steel wide flange members shall be ASTM A992, Grade 50 ksi.
   Steel tubes shall be ASTM A500, Grade B, Fy=46 ksi.
   Steel pipe shall be ASTM A500, Grade B, Fy=42 ksi min.
   Anchor bolts shall be ASTM F1554, Grade 36.

2. Splices are not permitted.

3. All welding shall conform to the American Welding Society (AWS) Code.

4. All steel (tubes, plates, bolts, etc.) and shall be cleaned and galvanized.

### PREFABRICATED WOOD TRUSSES

1. Trusses shall be designed and fabricated in accordance with the applicable provisions of the local Building Code and with the Truss Plate Institute design specifications for plate evaluation and National Design Specification for nail values.

2. Plates shall be sized for axial load eccentricity and section of metal.

3. Truss members shall be clamped in a mechanical or hydraulic jig with sufficient pressure to bring members into reasonable contact at all joints during application of connector plates.

4. Connector Plates shall be manufactured from 20 gage (0.0359 inches) minimum thickness sheet metal meeting the requirements of ASTM A446 Grade A (or higher as required by design). Plates shall be hot dip galvanized in accordance with ASTM A525 G60 coating requirements.

5. All trusses and their connections shall be designed for the following loads. Design live load deflection shall not exceed L/360.

Roof Trusses

20 psf live load along horizontal projection of top chord
15 psf net wind uplift along top chord
10 psf dead load along top chord
10 psf hanging dead load along bottom chord

### WOOD FRAMING

1. Unless noted otherwise, all structural framing lumber other than studs shall be clearly marked No. 2 Southern Yellow Pine. All 2 x 6 studs shall be clearly marked No. 2 Douglas Fir. "Stud" grade material is not acceptable.

2. All wood stud walls shall be full height without intermediate plate line unless detailed otherwise. Provide a minimum of 2 studs at wall corners and on each side of framed openings.

3. Solid 2x blocking shall be provided between all wood joists at each end and point of support. Blocking shall also be placed between supports in rows not exceeding 8'-0" apart. All load-bearing walls shall have solid 2x blocking at 4'-0" o.c. maximum vertically. End nail with 2-16d nails or side toe-nail with 2-16d nails.

4. Decking: Plywood decking - 15/32" for sloped roofs, American Plywood Association (APA) Rated Sheathing 32/16 Exposure 1. 19/32" for low slope roofs, APA Rated Sheathing 40/20 Exposure 1.

Install roof decking with 8d galvanized common nails at 6" o.c. at all edge supports and 12" o.c. at intermediate supports. Provide 1/8" spacers between all roof panel edges.

5. All exterior walls shall be sheathed with 1/2" ZIP System Sheathing as manufactured by Huber Engineered Woods, LLC, from the top plate to the bottom plate. 1/2" ZIP Sheathing shall be rated Exposure 1, Structural 1 panels. Provide 2x blocking as required to support panel edges. Nail with 8d common nails (2 1/2" long, 0.131" diameter) at 6" o.c. at supported edges unless noted otherwise on plan and 12" o.c. at all intermediate supports. Provide 1/8" spacers at all wall panel ends and edges.

The bottom plate of exterior walls shall be anchored to the foundation with not less than 1/2" diameter (MINIMUM) x 7" min. embedment hooked anchor bolts with standard tightened nuts and washers (1.25" diameter) spaced at 48" o.c. max. Anchor bolts shall be installed not more than 12" from each end with a minimum of 2 anchor bolts per exterior (shear) wall segment.

6. Gypsum board sheathing (5/8" as noted on Arch'l.) on exterior walls, interior load-bearing walls and shear walls shall be attached with No. 6 - 1 1/4" long (min.) Type S or W screws spaced at 4" o.c. max. at edges an 12" o.c. max. at intermediate supports. Screws shall not be closer than 3/8" to edge of sheathing, studs or plates.

7. All members framing into the side of a header shall be attached using Simpson metal joist hangers sized and installed in accordance with the manufacturer's recommendations for the size of joist supported.

8. Nailing and attachment of all framing members shall be as specified in the International Building Code (or other code having jurisdiction) wood framing fastener schedule unless a more substantial connection is noted on the drawings. Common wire nails or galvanized (required at exterior exposure) box nails shall be used for all framing unless noted otherwise.

9. Place a single pressure-treated (w/ Borate) #2 Southern Yellow Pine (SYP) wood plate at the bottom and a double SYP plate at the top of all stud walls. Splices in top plates shall be staggered and occur over studs. Exterior wall sill plates shall be bolted to the foundation at a maximum spacing of 48" o.c. with 1/2" diameter x 11" long (8" minimum embedment) anchor bolts.

All nails and screws in pressure-treated wood shall be of hot-dipped galvanized steel in accordance with ASTM A153.

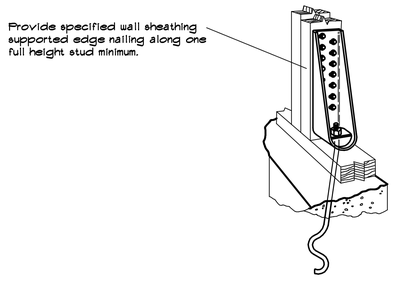
10. Glu-laminated beams shall be grade 24FV3 or better. Glued laminated timber shall conform to the requirements of the American Institute of Timber Construction (AITC) and shall be manufactured in accordance with the latest edition of American National Standard ANSI/AITC A190.1 (Structural Glued Laminated Timber).

11. Contractor shall coordinate spacing of wood framing where appropriate to avoid cutting and notching to accommodate piping, conduit, etc. Where cutting, notching or boring of wood framing members is required, do not exceed code allowables or the following without notifying the Architect for further direction:

   a. No notches shall be cut in joists, beams, load-bearing wall studs or exterior wall studs.

   b. Holes bored in joists, beams or studs shall be entirely located within the middle 1/3 of their depth and shall not exceed 1/4 of their depth.

12. All bolts and lag screws shall comply with ANSI/ASME Standard B18.2.1-2006 and shall be installed with standard hex nuts and ANSI Type B regular washers (below the bolt head and nut).




1 **SHEAR WALL HOLDOWN DETAIL @ CONCRETE FOUNDATION**
NO SCALE

Simpson Strong-Tie HDU5-SDS2.5 Holdown w/ Simpson provided screws into double stud jamb & Simpson 5/8" DIA. SSTB24 Anchor w/ 21" minimum embedment into concrete.

Anchor bolts shall be tied to forms with a holder or other device to keep it securely in position during concrete pour.

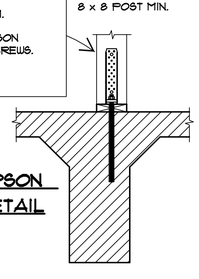
PROVIDE SIMPSON HDU14-SDS2.5 HOLDOWN WITH 1" DIA. F1554 X 1'-5" THREADED ROD ANCHOR W/ 12" MIN. EMBEDMENT USING SIMPSON SET ANCHORING ADHESIVE.

INSTALLATION:
1. DRILL 1 1/8" DIA. X 14" DEEP HOLE.
2. BLOW ALL DUST OUT OF HOLE W/ OIL-FREE COMPRESSED AIR.
3. THOROUGHLY CLEAN HOLE (4 CYCLES MIN) W/ A BRUSH THAT IS A TIGHT FIT IN THE HOLE AND THEN REPEAT STEP 2. REPLACE BRUSH WHEN WORN.

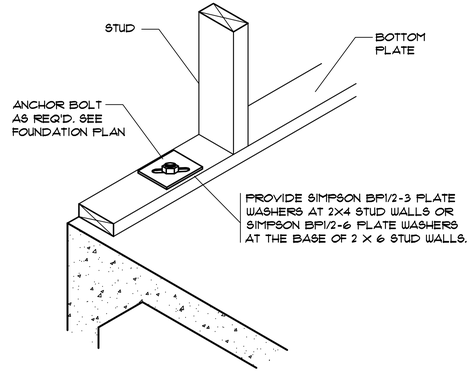
PROVIDE 8 X 8 POST AT EACH HD ANCHOR @ 1.

FILL ALL HOLES IN HOLDOWN ANCHOR W/ SIMPSON SDS (1/4" DIA. X 2 1/2" LONG) SELF-DRILLING SCREWS.

SEE WOOD FRAMING NOTES AND DETAILS FOR INTERIOR SHEATHING REQUIREMENTS.




2 **POST-INSTALLED SIMPSON HOLDOWN ANCHOR DETAIL**
NO SCALE




3 **TYPICAL EXTERIOR STUD WALL BOTTOM PLATE CONNECTION DETAIL**
NO SCALE

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**WILLIAMSON COUNTY, TX**

STATE OF TEXAS
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51116
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02/22/19

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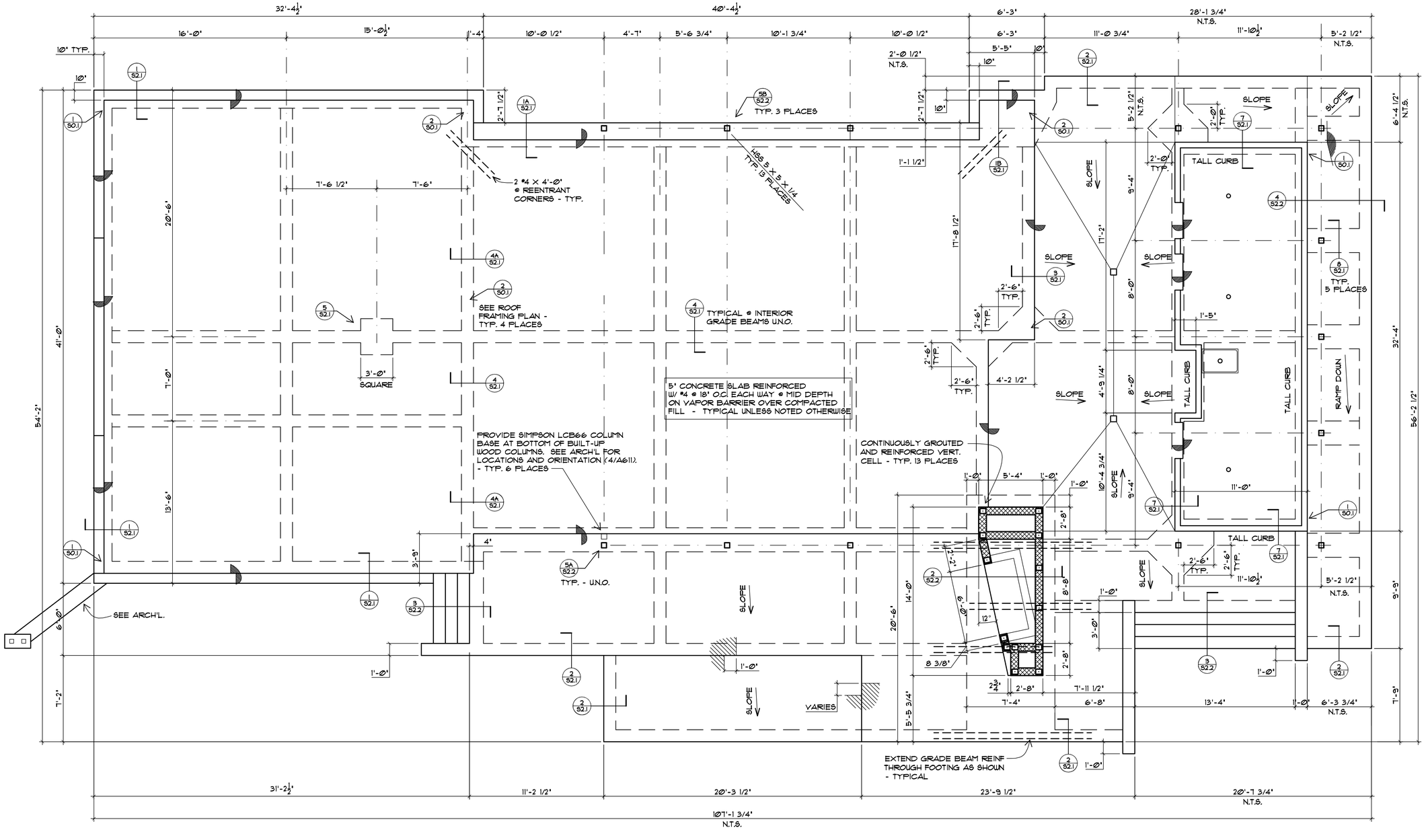
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# INTERPRETIVE CENTER FOUNDATION PLAN

SCALE: 1/4" = 1'-Ø"

PLAN NOTES:
1. FINISH FLOOR ELEVATION TO BE SET BY OTHERS. GRADE SITE TO SLOPE AWAY FROM FOUNDATION. TOP OF SLAB ELEVATIONS VARY. SEE ARCHITECTURAL SHEET A-234 FOR THAT INFO.
2. SEE ARCHITECTRURAL FOR CONTROL JOINT LOCATIONS.
3. SEE ARCHITECTURAL FOR LOCATIONS OF VERTICAL BOARD FORMED CONCRETE SURFACES AS WELL AS ADDITIONAL FORMWORK SPECIFICATION REQUIREMENTS.

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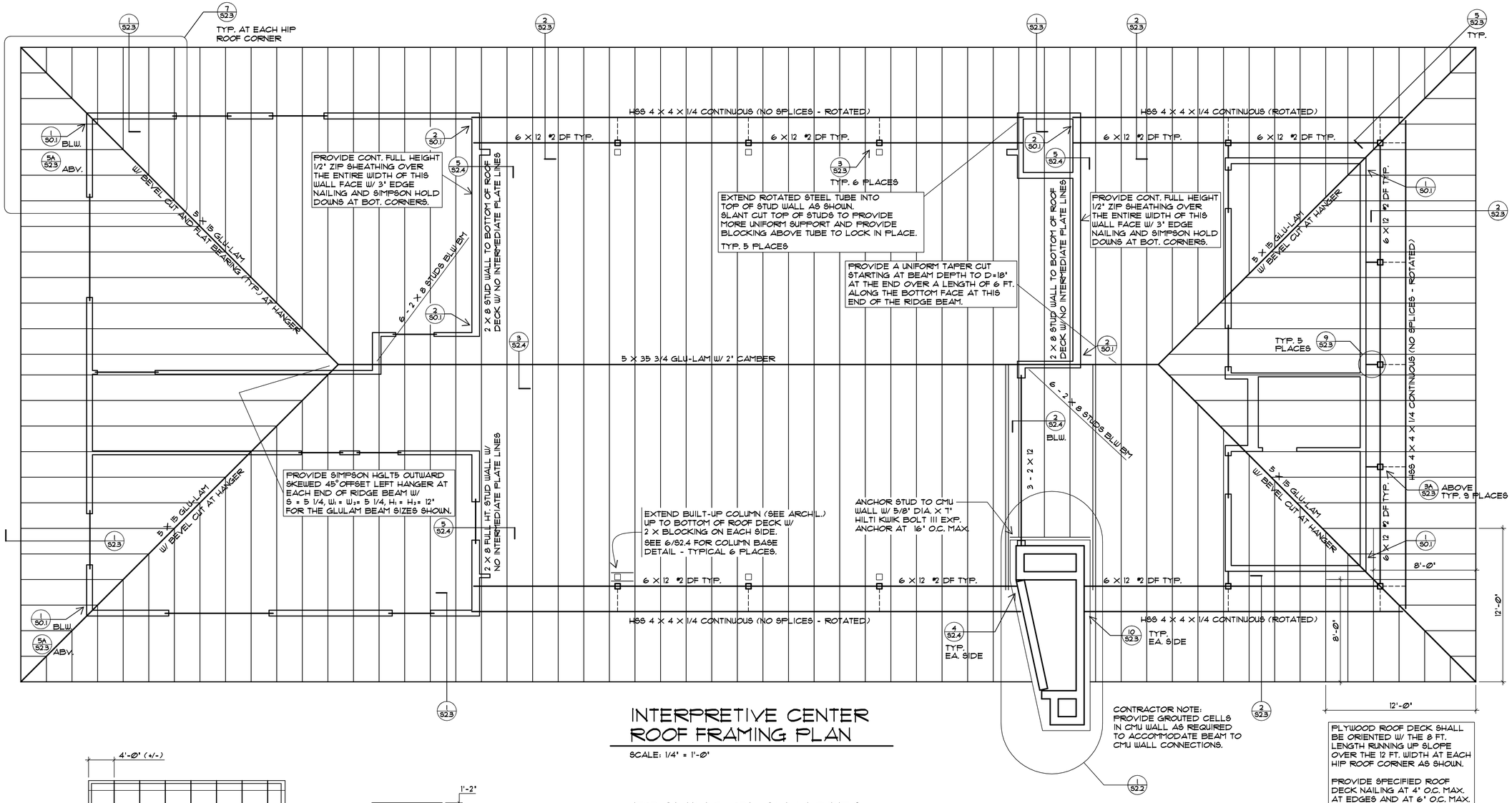
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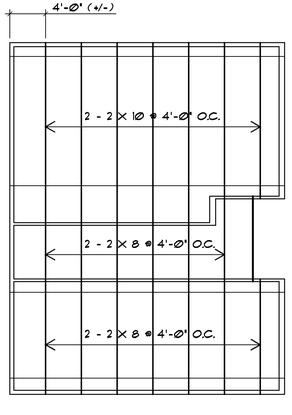
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## INTERPRETIVE CENTER ROOF FRAMING PLAN

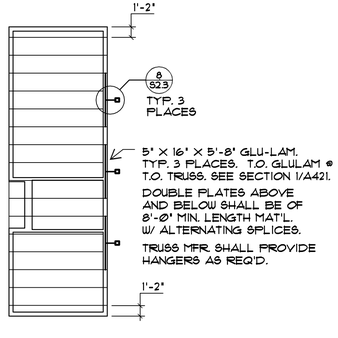
SCALE: 1/4" = 1'-0"




## CLASSROOM, OFFICE, ETC. CEILING FRAMING PLAN

SCALE: 1/8" = 1'-0"

PROVIDE DOUBLED-UP CONTINUOUS CEILING 'JOISTS' W/ 16d NAILS AT 24" O.C. TOP & BOT. @ 4'-0" O.C. BETWEEN RAFTERS W/ CONT. 2 X 4 FLAT PLATE ACROSS TOP AND CLOSE TO ENDS AS SHOWN. NAIL 2 X 4 FLAT PLATE TO FULL HT. STUD AT EAST WALL FOR JOIST STABILITY. TOE-NAIL 'JOISTS' TO STUD WALLS AS REQ'D. BY CODE.




## RESTROOM FACILITY ROOF FRAMING PLAN

SCALE: 1/8" = 1'-0"

PROVIDE 5/8" PLYWOOD ROOF DECK OVER 16" DEEP PREENGINEERED FLAT CHORD TRUSSES SPACED AT 24" O.C.

## FRAMING PLAN NOTES

1. SEE HEADER SCHEDULE FOR BEAM SIZES NOT SHOWN ON PLAN AND TYPICAL WALL FRAMING AT OPENINGS DETAIL FOR FRAMING REQ'MTS..
2. ALL LOAD-BEARING STUD WALLS SHALL BE FRAMED AS FOLLOWS:
   EXTERIOR (12'-0" PLATE) - 2X6 AT 24" O.C. UNLESS NOTED OTHERWISE (U.N.O.)
   INTERIOR (NORTH-SOUTH) H =12'-0" TO 20'-0" MAX. - 2X8 AT 16" O.C.
   H GREATER THAN 20'-0" - 2X8 AT 8" O.C.
   INTERIOR (EAST-WEST) 12'-0" PLATE OR LESS - 2X4 AT 24" O.C.
   STUDS W/ H = 12'-0" OR LESS SHALL BE CLEARLY MARKED #2 DOUGLAS FIR (#2 DF). ALL 2 X 8 STUDS SHALL BE CLEARLY MARKED #2 SOUTHERN YELLOW PINE (#2 SYP).
3. WALLS SHALL BE BRACED AS REQUIRED UNTIL CONSTRUCTION OF WOOD FRAMING IS COMPLETE.
   GYPSUM BOARD WALL SHEATHING SHALL BE INSTALLED ON AT LEAST ONE FACE OF INTERIOR SHEAR WALLS (SEE PLAN) ALONG WITH INSTALLATION OF EXTERIOR SHEATHING. PROVIDE BLOCKING IN SHEAR WALLS AT GYPSUM BOARD EDGES.
4. SEE S2.2, S2.3 AND S2.4 FOR TYPICAL FRAMING DETAILS AND NOTES.
5. RAFTERS SHALL BE #2 SYP 2 X 10 SPACED AT 24" O.C. MAX. PROVIDE SIMPSON HU210 SLOPED AND SKEWED HANGER AT EACH RAFTER TO HIP BEAM CONN. PROVIDE SIMPSON HU210 SLOPED HANGER AT EACH RAFTER TO RIDGE BEAM CONNECTION.
6. ALL HOLES IN SIMPSON BEAM TO BEAM AND JOIST TO BEAM CONNECTIONS SHALL BE FILLED W/ 16d (Ø.162" DIA. X 3 1/2" LONG) COMMON NAILS UNLESS NOTED OTHERWISE OR APPROVED BY ENGINEER. ALL JOIST TO HANGER HOLES SHALL BE FILLED WITH 10d (Ø.148" DIA. X 1 1/2") NAILS.
7. PROVIDE STEEL PLATE WASHERS AT BOTTOM PLATE PER DETAIL 3/S0.1 ON ALL STUD WALLS SHOWN ON THESE PLANS.

**ALLOWABLE SPAN OF HEADERS IN FEET FOR BEARING WALLS (1)**

| SIZE OF WOOD HEADER (2,3) | | | ALLOWABLE SPAN OF HEADERS IN WALLS NOT SUPPORTING FLOORS OR ROOF |
|---|---|---|---|
| 2 - 2x8 | 6' | | 8' to 10' |
| 2 - 2x10 | 7' | | 10' to 12' |
| 2 - 2x12 | 9' | | 12' to 14' |

1. BASED ON TEN (10) PSF. TRIBUTARY FLOOR AND ROOF LOADS. HEADERS LOCATED IN EXTERIOR WALLS LIMITED TO TWENTY (20) FT. SPAN JOISTS. HEADERS LOCATED IN INTERIOR LOAD-BEARING WALLS LIMITED TO JOISTS SPANNING TEN (10) FT. EACH SIDE.
2. ALL LUMBER TO BE #2 SYP.
3. NOMINAL FOUR (4) INCH WIDE SINGLE HEADERS MAY BE SUBSTITUTED FOR DOUBLE MEMBERS.
4. PROVIDE BOX BEAM HEADER CONSTRUCTION IN 2 X 6 OR WIDER STUD WALLS.

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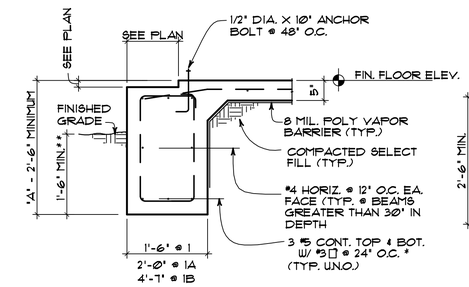
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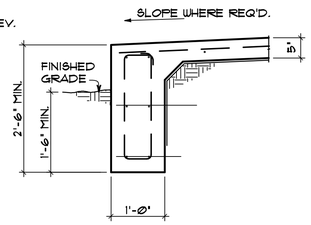
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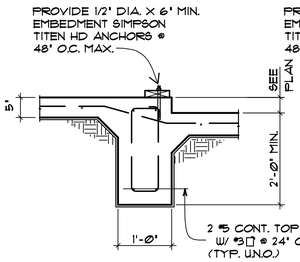
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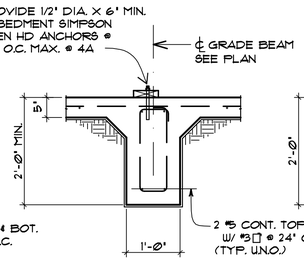

1 1A 1B 3/4" = 1'-0"



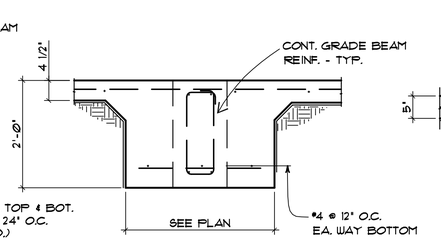

2 3/4" = 1'-0"



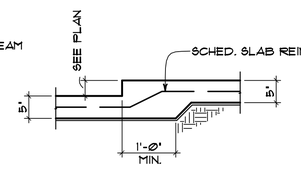

3 3/4" = 1'-0"



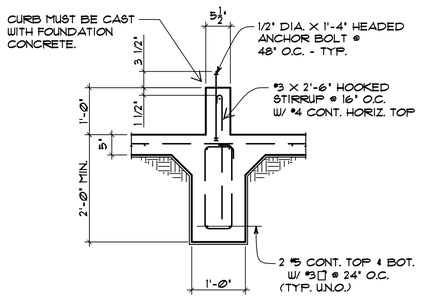

4 4A 3/4" = 1'-0"



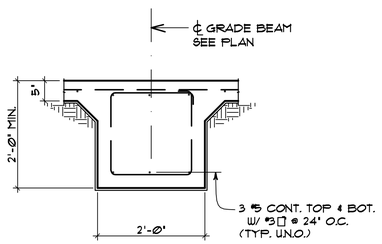

5 3/4" = 1'-0"



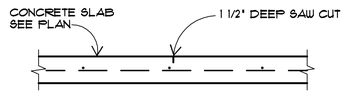

6 3/4" = 1'-0"




7 3/4" = 1'-0"




8 3/4" = 1'-0"




NOTE: SAW CUT SHALL BE MADE WITHIN 24 HOURS OF PLACEMENT OF CONCRETE

9 TYPICAL SAW CUT JOINT IN SLAB-ON-GRADE

# FOUNDATION NOTES

## CODE REQUIREMENTS FOR CONSTRUCTION

Building Code: 2015 International Building Code

Concrete: Building Code Requirements for Reinforced Concrete ACI, 318-05.
ACI 305 - Hot Weather Concreting

## BUILDING PAD

1. Remove all surface vegetation, loose topsoil, debris and any organic material from the construction area. Roots of trees shall also be removed to their full depth, including any dry soil around the roots. After clearing, excavate and remove the existing surface soils down to a depth of 6' below grade for a distance of 5'-0" beyond the building line.

   Should limestone be exposed before reaching full excavation depth, excavate as required to provide a minimum of 12" of select fill below the slab.

2. The building pad excavation shall then be proof-rolled with a fully loaded dump truck or equivalent equipment for a minimum of 5 passes to locate any weak zones in the subgrade. Soft spots shall be removed and replaced with compacted select fill.

3. The exposed subgrade shall then be scarified to a minimum depth of 6 inches, then moisture conditioned to between optimum and + 3% of optimum moisture content. The subgrade shall then be recompacted to at least 95% of its maximum dry density in accordance with TxDOT test method TEX 113E. The subgrade shall not be allowed to dry out or become saturated prior to installation of select fill.

4. Bring the building pad to grade with a crushed limestone base material meeting the requirements of the Texas Department of Transportation (TxDOT) 2014 Standard Specification Item 247, Type A, Grades 1 through 2 meeting the following criteria:

   I. Maximum liquid limit 40

   II. Plasticity Index: 7 minimum 20 maximum

   III. Maximum size of rock fragments: 4 inches in any direction

5. Compact select fill to 95% minimum of its maximum dry density in accordance with TxDOT test method TEX 113E at a moisture content within 2% of optimum. Maintain compacted lift thicknesses to 6 inches or less.

6. It is strongly recommended that selection of materials, moisture conditioning and compaction operations be reviewed and approved by a qualified representative of Raba Kistner, the project geotechnical engineer.

7. During construction, a positive drainage scheme shall be implemented to prevent ponding of water on the subgrade. The subgrade and building pad shall not be allowed to dry out. Foundation backfill shall proceed as soon as possible (24 hours max.) after approval of the subgrade preparation. If the bearing soils are softened by water intrusion or by desiccation, the unsuitable material must be removed from the foundation excavation and replaced as required.

8. Grade beams shall be neatly excavated. Some limestone subgrade areas may require rock trenching equipment. Any debris in the bottom of excavations shall be removed prior to placing concrete. Grade beam excavations shall be level with a slope only as required to create internal sumps for runoff collection and removal.

9. Remove any surface water runoff or groundwater seepage accumulation in excess of 1-inch depth from foundation excavations.

10. Place a polyethylene sheet with a minimum thickness of 8 mils over the compacted fill to act as a vapor barrier. Joints shall be lapped a minimum of 12 inches and sealed in accordance with manufacturer's recommendations.

11. Half size (minimum) concrete bricks may be used to chair up the slab and beam reinforcing. Rocks or large stones are not acceptable for use as chairs.

12. Site grading, gutter downspouts, paving and sidewalks shall be constructed such that water drains away from the building foundation.

## CONCRETE

1. All concrete shall be normal weight concrete made with natural aggregates and reach a minimum strength of 3000 psi at 28 days. Concrete shall contain not less than 5 sacks of cement per cubic yard of concrete and not more than 6 gallons of water per sack of cement (maximum water cement ratio = 0.53). Mixing water shall be clean. Maximum aggregate size shall be 1".

   Contractor shall keep concrete delivery tickets for record purposes to confirm concrete mix compliance with these requirements.

2. Concrete floor slabs shall be placed monolithically with beams. Where an opening interrupts slab reinforcing, provide an equal amount of reinforcing on each side of the opening extending a minimum of 36 bar diameters past the edges at each end. Provide 2#4 x 48 in. long at each reentrant corner.

3. Horizontal construction joints in concrete pours shall be permitted only where indicated on the drawings. The location of construction joints shall be as approved by the Architect and the Structural Engineer. Additional reinforcing at construction joints shall be as specified by the Engineer without additional cost to the Owner.

4. No conduit or piping larger than 1/2" outside diameter shall be run within the concrete slab thickness specified. Provide additional excavation (and slab thickness) as required to accommodate larger conduit.

5. Reinforcing steel shall be deformed new billet steel bars in accordance with A.S.T.M. Specification A615 Grade 60. Welded wire fabric shall conform to ASTM 185 requirements.

6. Detailing of reinforcing steel shall conform to the American Concrete Institute Detailing Manual.

7. Provide 2-#4 x 4'-0" "L" shaped bars top and bottom at all corners and "T" intersections of beams. Provide #3 x 4'-0" "L" shaped bars at all corners of grade beams deeper than 36" to match each horiz. bar on each face.

8. All hooks and bends in reinforcing bars shall conform to ACI Standards unless shown otherwise.

9. Lap continuous unscheduled reinforcing bars 48 bar diameters, unless noted otherwise.

10. Tack welding on reinforcing steel will not be permitted.

11. Heat shall not be used in the fabrication or installation of reinforcement.

12. Reinforcing steel coverage shall be as follows:

    Grade beams - 1 1/2" top, 3" bottom, 2" side formed, 3" side against earth

    Slabs-on-grade - 1 3/4" top, 1 1/2" bottom

13. The concrete subcontractor and concrete supplier must be familiar with the recommendations of ACI 305R "Hot Weather" and ACI 306R "Cold Weather" Concreting. The delivery, placement and curing of concrete shall follow ACI 305R and ACI 306R recommendations as appropriate.

14. Structural engineer shall be given adequate and reasonable notice as required for review of reinforcement installation before pouring concrete. Grade beam excavations shall be clean and free of water.

    Reinforcement installation shall be 100% complete before scheduling engineer's site visit.

15. The concrete shall be cured in accordance with ACI 308 recommendations. Protect all freshly placed concrete from damage by weather, etc. as required. Cure concrete by keeping concrete surfaces continuously wet for a minimum of 7 days after placing or by application of an approved non-bituminous liquid curing compound.

    Submit any proposed curing compounds to Architect for review. Curing compound must be compatible with sealer specified by Arch't. Submittals must include documentation from the curing compound manufacturer that their product is compatible with the concrete sealing system.

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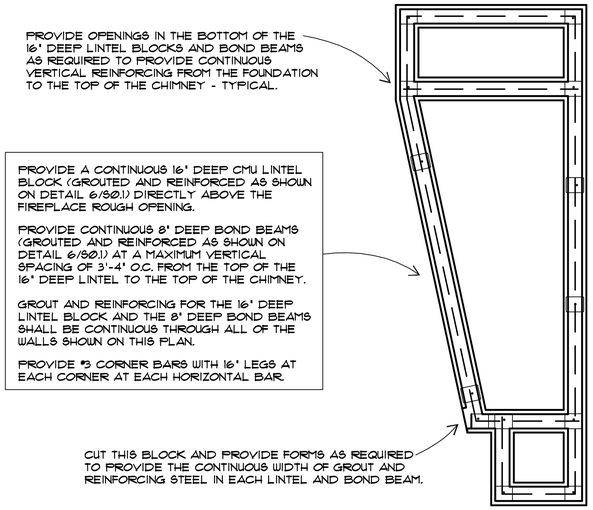
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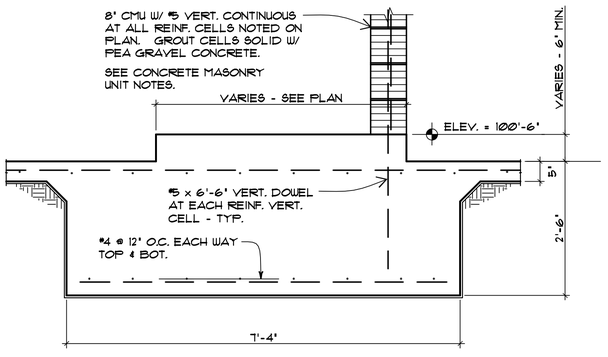
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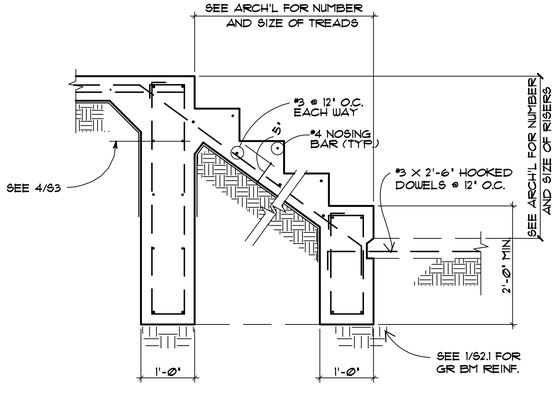
Williamson County, Texas




1 1/2" = 1'-0"




2 3/4" = 1'-0"




3 TYPICAL CONCRETE STAIR DETAIL
3/4" = 1'-0"

## CONCRETE MASONRY UNITS

1. Concrete masonry units shall be hollow load bearing Type N-1 units which conform to ASTM C90, with a minimum compressive strength of 1900 psi.

2. All concrete masonry shall be installed in accordance with the requirements of the 2012 International Building Code and the American Concrete Institute's Building Code Requirements and Specifications for Masonry Structures.

3. Concrete masonry units shall be dry when laid. Each unit shall be adjusted to final position in the wall while mortar is still soft and plastic. Any unit disturbed after mortar has stiffened shall be removed and re-laid with fresh mortar.

4. Concrete masonry units shall be laid with full mortar coverage. Mortar shall conform to ASTM 270, Type S. Mortar shall be mixed by proportion with one part cement to 1/2 part hydrated lime to about 4 parts mason's sand.

5. Reinforce CMU wall horizontal joints with ladder type hot dip galvanized cold-drawn steel conforming to ANSI/ASTM A82 with #9 longitudinal rods and #9 cross ties. Horizontal joint reinforcement shall be provided in 10'-0" standard lengths and spaced at 16" o.c. vertically with 8" minimum length lap splices.

Horizontal joint reinforcement at wall corners and at "T" wall intersections shall be specially fabricated for that purpose.

Install continuous horizontal joint reinforcement in first and second bed joints and over and under openings.

6. Reinforce and grout each cell of concrete masonry units each side of framed openings and at wall corners. Minimum vertical reinforcement shall be 1-#4 (u.n.o) and it shall be centered in the cell. Grout cell full height of wall.

7. Vertical cells to be filled with grout shall be aligned to form a continuous unobstructed opening. Grout for reinforced vertical cells and bond beams shall conform to ASTM C476 requirements with a maximum aggregate size of 1/2". Grout shall be mixed by proportion with one part portland cement (See CONCRETE notes) to about three parts mason's sand and two parts coarse aggregate (pea gravel).

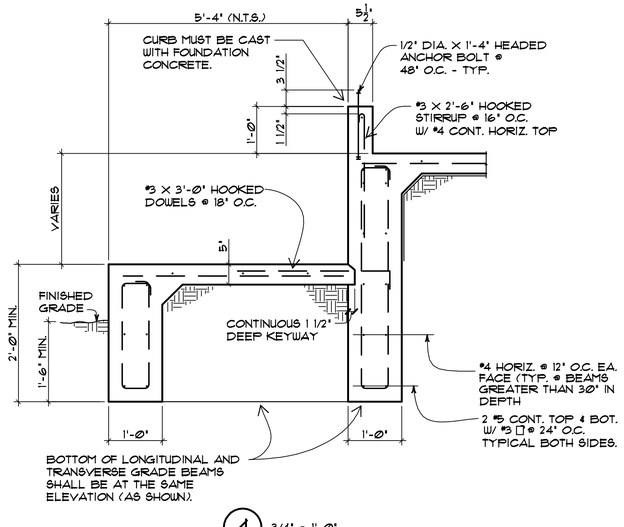
Grout using low lift grouting techniques. Grout shall be poured or pumped in lifts not to exceed 60 inches in height. When grouting is stopped for more than one hour, terminate grout 1.5" below top of upper masonry unit to form a positive key for subsequent grout placement. Place first lift of grout to a height of 16 inches and rod for grout consolidation. Place subsequent lifts in 8 inch increments and rod for grout consolidation. Maximum height of ungrouted concrete masonry prior to grout placement shall be 5 feet.

8. See 'CONCRETE' notes and typical details for reinforcing (rebar) steel material and construction requirements. Unless shown otherwise, all bond beam, lintel and vertical cell rebar is continuous with the following minimum lap splice lengths:

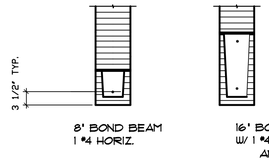
- #4 - 3'-6"
- #5 - 4'-0"
- #6 - 5'-0"

9. Contractor shall carefully review and accommodate the work of other sections (Arch'l, etc.) as required to install anchors, wall plugs, accessories and other items to be built in as the masonry work progresses. Hollow cores shall be grouted as required for anchorage of embedded items. All cutting and fitting of masonry, including that required to accommodate the work of other sections shall be done by masonry mechanics with masonry saws.

10. Masonry construction shall be inspected. See Specification Section 014529 Paragraph 3.6.




4 3/4" = 1'-0"




6 TYPICAL CMU LINTEL DETAIL

NOTE: 1. HORIZ. REINFORCEMENT SHALL BE CONTINUOUS
2. PROVIDE LINTELS OVER ALL CMU WALL OPENINGS
3. PROVIDE 8" MINIMUM BEARING AT EACH END

## LOOSE LINTEL SCHEDULE - STONE

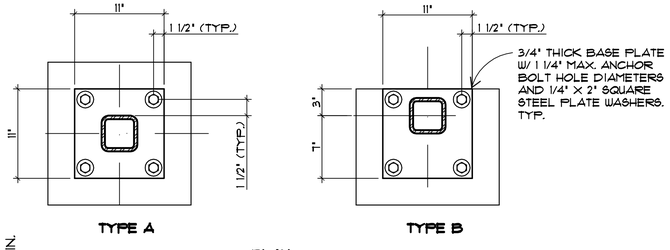
NOTE: PROVIDE 8" MINIMUM BEARING EACH END FOR STEEL LOOSE LINTELS.

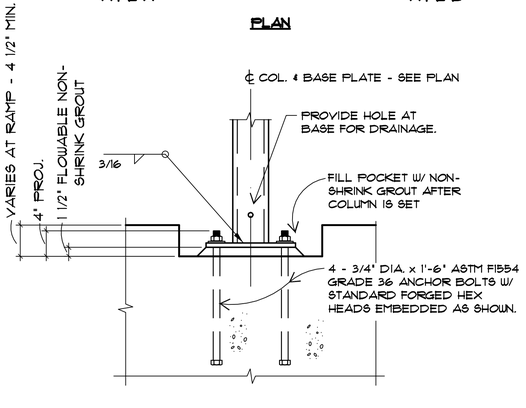
STEEL LINTELS SHALL INSTALLED W/ LONG LEG UP.

STEEL LINTELS SHALL BE GALVANIZED EXCEPT AT THOSE LOCATIONS NOTED OTHERWISE.

PROVIDE SHORING BELOW STEEL LINTELS SPANNING MORE THAN 8'-0" DURING AND FOR A MINIMUM OF 3 DAYS AFTER INSTALLATION.

| ALLOWABLE SPAN | | SIZE | DETAIL |
|---|---|---|---|
| DOORS & WINDOWS | CHIMNEY | | |
| 5'-0" | | L 3 1/2 X 3 1/2 X 1/4 | L |
| 6'-0" | | L 4 X 3 1/2 X 1/4 | L |
| 9'-0" | | L 6 X 3 1/2 X 1/4 | L |
| 12'-0" | 6'-0" | L 7 X 4 X 3/8 | L |




5 TYPICAL TUBE COLUMN BASE PLATE DETAIL
NO SCALE

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WILLIAMSON COUNTY, TX

STATE OF TEXAS
C. VICTOR WINTER III
51116
REGISTERED
PROFESSIONAL ENGINEER
02/22/19

ISSUE DATE: February 22, 2019

REVISIONS

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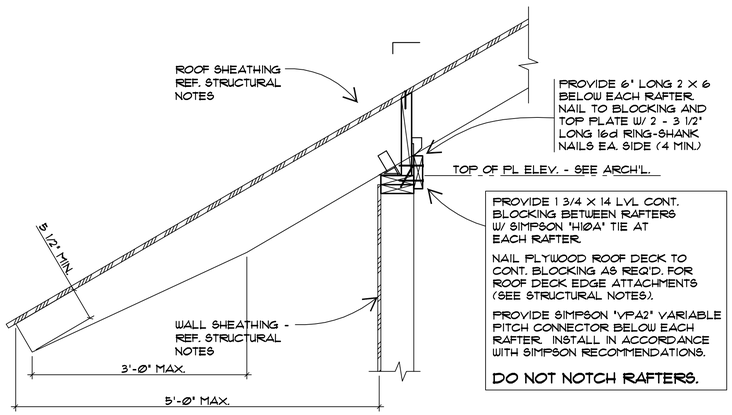
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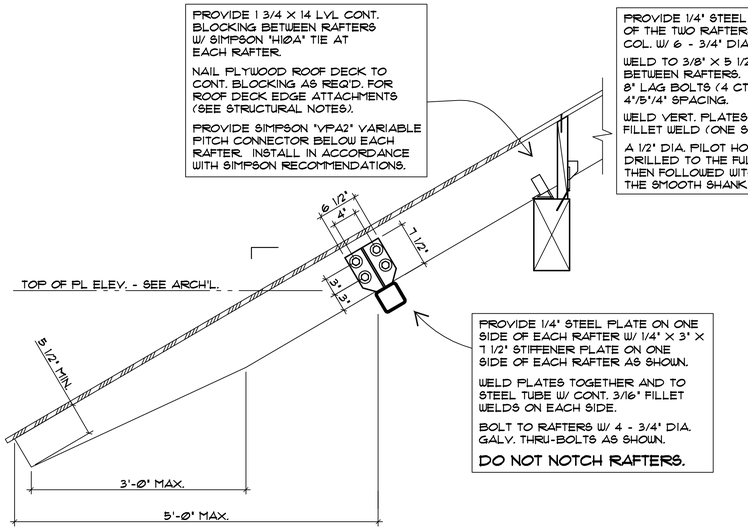


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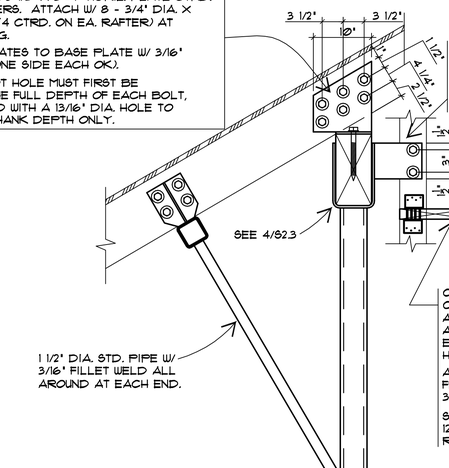

1 TYPICAL PERIMETER ROOF RAFTER DETAIL

NO SCALE



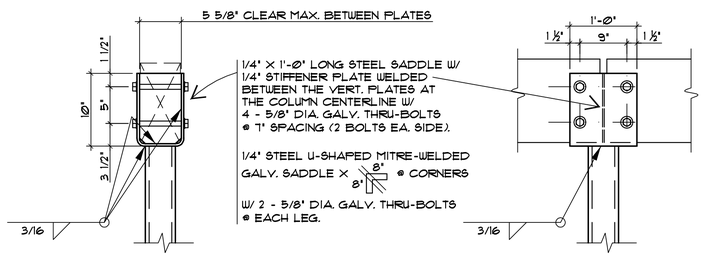

2 TYPICAL PERIMETER ROOF RAFTER DETAIL

NO SCALE



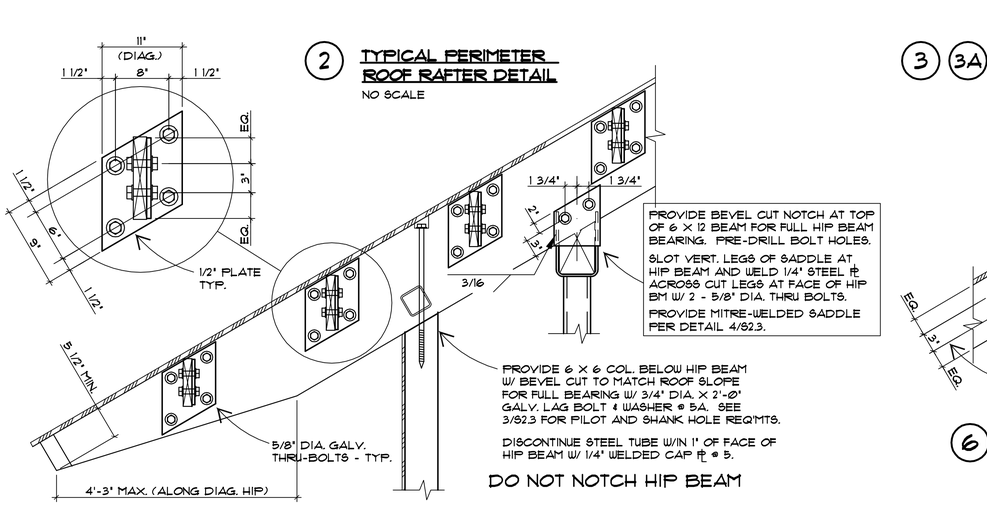

3 3A TYPICAL BRACE SUPPORT DETAIL

NO SCALE



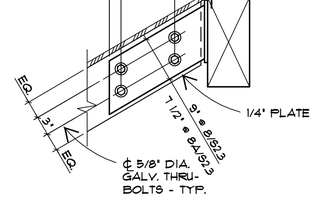

4 TYPICAL STEEL COLUMN CAP DETAIL

NO SCALE



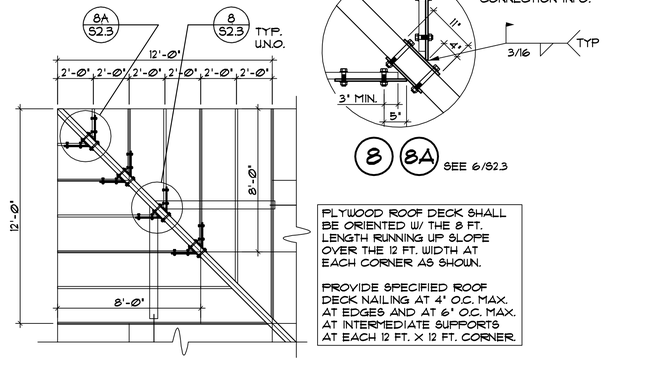

5 5A TYPICAL HIP BEAM SUPPORT DETAIL

NO SCALE



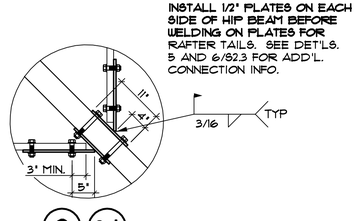

6 TYPICAL HIP RAFTER CONNECTION DETAIL

NO SCALE

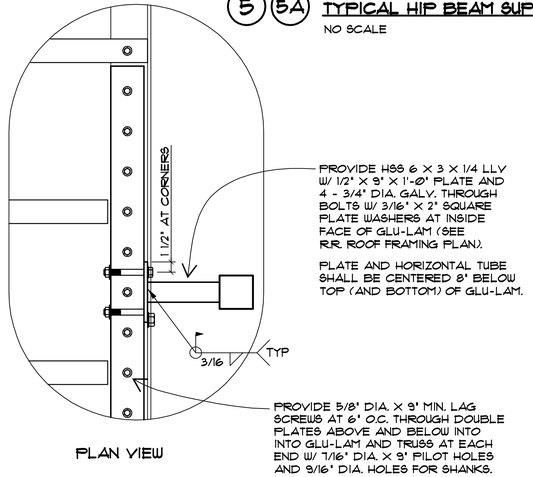



7 TYPICAL HIP ROOF CORNER FRAMING DETAIL

NO SCALE

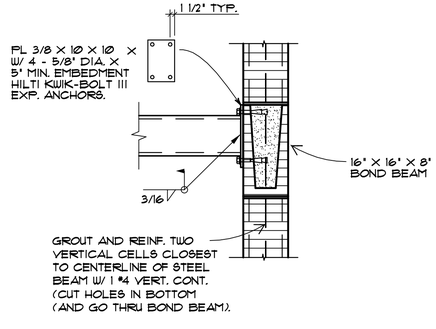



8 8A SEE 6/S2.3




PLAN VIEW

9 NO SCALE




10 TYPICAL STEEL TUBE TO CMU WALL CONN. DETAIL

NO SCALE

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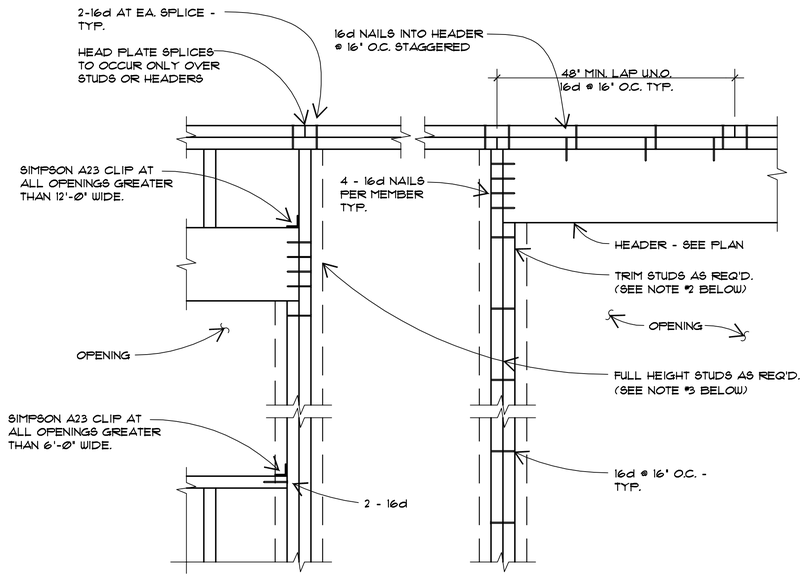
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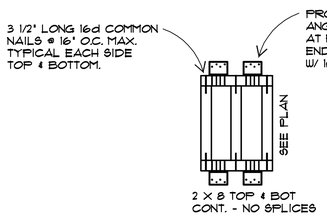
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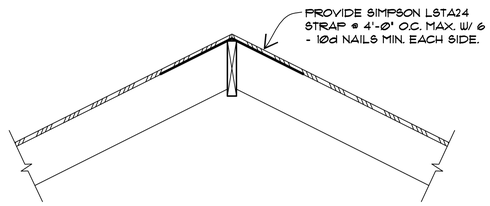

## 1 TYPICAL WALL FRAMING AT OPENING DETAIL

NO SCALE

NOTES:
1. UNLESS NOTED OTHERWISE ON PLAN, SEE HEADER SCHEDULE FOR HEADERS ABOVE DOORS AND WINDOWS.
2. HEADERS SHALL BE SUPPORTED AT ENDS AND AT INTERMEDIATE SUPPORTS BETWEEN WINDOWS BY 2 TRIM STUDS MINIMUM. HEADERS OVER OPENINGS LESS THAN 4 FT. WIDE MAY BE SUPPORTED AT ENDS W/ 1 TRIM STUD.
3. A MINIMUM OF TWO FULL HEIGHT STUDS SHALL BE INSTALLED ON EACH SIDE OF OPENINGS UP TO 4 FT. WIDE. PROVIDE 3 FULL HEIGHT STUDS ON EACH SIDE OF 4 FT. TO 8 FT. WIDE OPENINGS IN EXTERIOR WALLS. 4 FULL HEIGHT STUDS ON EACH SIDE OF OPENINGS GREATER THAN 8 FT. WIDE.




## 2

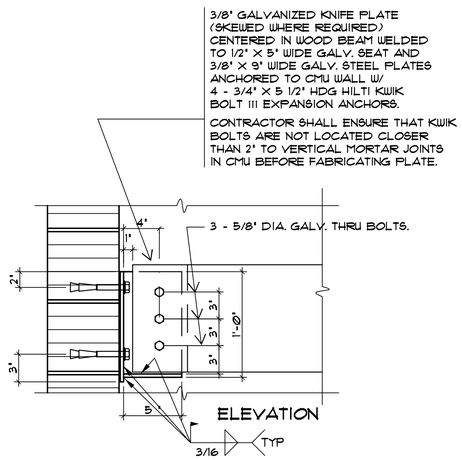



## 3 TYPICAL RAFTER TIE DETAIL AT ROOF RIDGE

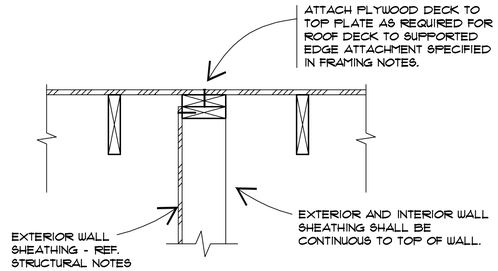
NO SCALE

| NAILING SCHEDULE | |
|---|---|
| CONNECTION | NAILING |
| 1. FLOOR JOIST TO BAND JOIST, FACE NAIL | 3-16d |
| 2. FLOOR JOIST TO SILL PLATE OR GIRDER, TOE NAIL | 3-8d |
| 3. BLOCKING TO STUDS, TOE NAIL OR END NAIL EACH END | 2-8d |
| 4. SILL PLATE TO BAND JOIST OR BLOCKING, FACE NAIL | 16d AT 16" O.C. |
| 5. TOP PLATE TO STUD, END NAIL | 2-16d |
| 6. STUD TO SILL PLATE | 4-8d TOE NAIL OR 2-16d END NAIL |
| 7. DOUBLE STUDS, FACE NAIL | 16d AT 24" O.C. MAX. |
| 8. DOUBLE TOP PLATES, FACE NAIL | 16d AT 16" O.C. |
| 9. TOP PLATES AND INTERSECTIONS, FACE NAIL | 2-16d OR 3-10d |
| 10. TOP PLATES AND LAPS, FACE NAIL | 8-16d |
| 11. CONTINUOUS HEADER-TWO PIECES | 16d AT 16" O.C. ALONG EACH EDGE |
| 12. CEILING JOISTS TO PLATE, TOE NAIL | 3-8d |
| 13. CEILING JOISTS, LAPS OVER PARTITIONS, FACE NAIL | 3-16d |
| 14. CEILING JOISTS TO PARALLEL RAFTERS, FACE NAIL | 3-16d |
| 15. RAFTER TO PLATE, TOE NAIL<br>RAFTER TO RIDGE, HIP OR VALLEY TOE NAIL<br>END NAIL | 3-8d<br>4-16d<br>3-16d |
| 16. BLOCKING TO JOISTS, RAFTERS OR TRUSSES, TOE NAIL<br>BLOCKING BELOW ROOF DECK, PERPENDICULAR TO ROOF FRAMING, TOE-NAIL TO TOP PLATE OF STUD WALL.<br>BLOCKING BELOW ROOF DECK, PARALLEL TO ROOF FRAMING, TOE-NAIL TO TOP PLATE OF STUD WALL. | 2-8d<br>4-16d<br>16d @ 6" O.C. MAX. |
| 17. 3/4" LET-IN BRACE TO EACH STUD AND PLATES, FACE NAIL | 2-8d |
| 18. BUILT-UP CORNER STUDS | 16d AT 12" O.C. |
| 19. BUILT-UP GIRDER AND BEAMS, THREE MEMBERS | 10d AT 32" O.C. AT TOP AND BOTTOM. 2-10d AT ENDS |

NOTES:
1. PROVIDE NAILING CONNECTIONS INDICATED IN SCHEDULE UNLESS DETAILED OR NOTED OTHERWISE.

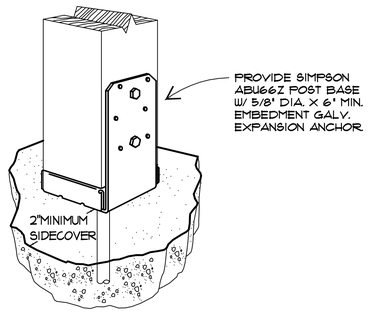



## 4 NO SCALE




## 5 TYPICAL INTERIOR SHEAR WALL FRAMING DETAIL

NO SCALE




## 6 TYPICAL COLUMN BASE DETAIL

NO SCALE

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ESC-15

# ELECTRICAL ABBREVIATION SCHEDULE

| | |
|---|---|
| A | AMPERES |
| A/C | AIR CONDITIONING |
| AFF | ABOVE FINISHED FLOOR |
| AHJ | AUTHORITY HAVING JURISDICTION |
| AL | ALUMINUM |
| AUTO | AUTOMATIC |
| AUX | AUXILIARY |
| BFF | BELOW FINISHED FLOOR |
| BLDG | BUILDING |
| C | CONDUIT |
| CB | CIRCUIT BREAKER |
| CKT | CIRCUIT |
| COL | COLUMN |
| CONC | CONCRETE |
| CONST | CONSTRUCTION |
| CONTR | CONTRACTOR |
| CTV | CABLE TELEVISION |
| DWG | DRAWING |
| EC | ELECTRICAL CONTRACTOR |
| EF | EXHAUST FAN |
| DN | DOWN |
| ELEC | ELECTRIC/ELECTRICAL |
| EMT | ELECTRICAL METALLIC TUBING |
| EQUIP | EQUIPMENT |
| EX | EXISTING |
| FA | FIRE ALARM |
| FF | FINISHED FLOOR |
| FLR | FLOOR/FLOORING |
| G | GROUND |
| GC | GENERAL CONTRACTOR |
| GFI | GROUND FAULT INTERRUPT |
| HD | HEAVY DUTY |
| HP | HORSEPOWER |
| IMC | INTERMEDIATE METAL CONDUIT |
| KVA | KILOVOLT-AMPERES |
| KW | KILOWATTS |
| LGT | LIGHT/LIGHTING |
| MAX | MAXIMUM |
| MC | MECHANICAL CONTRACTOR |
| MCB | MAIN CIRCUIT BREAKER |
| MDP | MAIN DISTRIBUTION PANEL |
| MECH | MECHANICAL |
| MH | MANHOLE |
| MIN | MINIMUM |
| MISC | MISCELLANEOUS |
| MLO | MAIN LUG ONLY |
| MSB | MAIN SWITCHBOARD |
| NEC | NATIONAL ELECTRICAL CODE |
| NEMA | NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION |
| NF | NON-FUSED |
| NIC | NOT IN CONTRACT |
| NTS | NOT TO SCALE |
| OC | ON CENTER(S) |
| OE | OVERHEAD ELECTRIC |
| OT | OVERHEAD TELEPHONE |
| PC | PLUMBING CONTRACTOR |
| PH | PHASE |
| PNL | PANEL |
| PVC | POLYVINYL CHLORIDE |
| RE | REFERENCE/REFER TO |
| RECPT | RECEPTACLE |
| RGS | RIGID GALVANIZED STEEL CONDUIT |
| RM | ROOM |
| SCH | SCHEDULE |
| SPEC | SPECIFICATIONS |
| TEL | TELEPHONE |
| TTB | TELEPHONE TERMINAL BOARD |
| TYP | TYPICAL |
| UE | UNDERGROUND ELECTRIC |
| UL | UNDERWRITER'S LABORATORIES |
| UON | UNLESS OTHERWISE NOTED |
| UT | UNDERGROUND TELEPHONE |
| V | VOLTS/VOLTAGE |
| VA | VOLT-AMPERES |
| W | WATTS |
| W/ | WITH |
| W/O | WITHOUT |
| WP | WEATHER PROOF |
| XFMR | TRANSFORMER |

ESC-19

# BRANCH CIRCUIT WIRE AND CONDUIT SCHEDULE

**NOTE:**
A. PROVIDE INDIVIDUAL NEUTRALS FOR EACH CIRCUIT. NO SHARED NEUTRALS ALLOWED.

C – CONDUIT G – GROUND L – LINE OR PHASE N – NEUTRAL

| MARK | WIRE AND CONDUIT | SYSTEM | MARK | WIRE AND CONDUIT | SYSTEM | MARK | WIRE AND CONDUIT | SYSTEM |
|---|---|---|---|---|---|---|---|---|
| (1) | 2#12, 1/2"C. | LN | (31) | 2#4, 1#8G., 1"C. | LLG | (61) | 3#1/0, 1#6G., 2" C. | LLNG |
| (2) | 2#12, 1#12G., 1/2" C. | LNG | (32) | 3#4, 1" C. | LLL | (62) | 3#1/0, 1#6G., 2" C. | LLLG |
| (3) | 2#12, 1#12G., 1/2" C. | LLG | (33) | 3#4, 1#8G., 1" C. | LLNG | (63) | 4#1/0, 1#6G., 2" C. | LLLNG |
| (4) | 3#12, 1/2" C. | LLL | (34) | 3#4, 1#8G., 1" C. | LLLG | (64) | 2#2/0, 1 1/2" C. | LN |
| (5) | 3#12, 1#12G., 1/2" C. | LLNG | (35) | 4#4, 1#8G., 1 1/4" C. | LLLNG | (65) | 2#2/0, 1#4G., 1 1/2"C. | LNG |
| (6) | 3#12, 1#12G., 1/2" C. | LLLG | (36) | 2#3, 1" C. | LN | (66) | 2#2/0, 1#4G., 1 1/2" C. | LLG |
| (7) | 4#12, 1#12G., 1/2" C. | LLLNG | (37) | 2#3, 1#8G., 1"C. | LNG | (67) | 3#2/0, 1 1/2" C. | LLL |
| (8) | 2#10, 1/2"C. | LN | (38) | 2#3, 1#8G., 1" C. | LLG | (68) | 3#2/0, 1#4G., 2" C. | LLNG |
| (9) | 2#10, 1#10G., 1/2" C. | LNG | (39) | 3#3, 1" C. | LLL | (69) | 3#2/0, 1#4G., 2" C. | LLLG |
| (10) | 2#10, 1#10G., 1/2" C. | LLG | (40) | 3#3, 1#8G., 1 1/4" C. | LLNG | (70) | 4#2/0, 1#4G., 2" C. | LLLNG |
| (11) | 3#10, 1/2" C. | LLL | (41) | 3#3, 1#8G., 1 1/4" C. | LLLG | (71) | 2#3/0, 1 1/2" C. | LN |
| (12) | 3#10, 1#10G., 1/2" C. | LLNG | (42) | 4#3, 1#8G., 1 1/4" C. | LLLNG | (72) | 2#3/0, 1#4G., 2" C. | LNG |
| (13) | 3#10, 1#10G., 1/2" C. | LLLG | (43) | 2#2, 1"C. | LN | (73) | 2#3/0, 1#4G., 2" C. | LLG |
| (14) | 4#10, 1#10G., 1/2" C. | LLLNG | (44) | 2#2, 1#8G., 1" C. | LNG | (74) | 3#3/0, 2" C. | LLL |
| (15) | 2#8, 1/2" C. | LN | (45) | 2#2, 1#8G., 1" C. | LLG | (75) | 3#3/0, 1#4G., 2" C. | LLNG |
| (16) | 2#8, 1#10G., 3/4" C. | LNG | (46) | 3#2, 1 1/4" C. | LLL | (76) | 3#3/0, 1#4G., 2" C. | LLLG |
| (17) | 2#8, 1#10G., 3/4" C. | LLG | (47) | 3#2, 1#8G., 1 1/4" C. | LLNG | (77) | 4#3/0, 1#4G., 2 1/2" C. | LLLNG |
| (18) | 3#8, 3/4" C. | LLL | (48) | 3#2, 1#8G., 1 1/4" C. | LLLG | (78) | 2#4/0, 2" C. | LN |
| (19) | 3#8, 1#10G., 3/4" C. | LLNG | (49) | 4#2, 1#8G., 1 1/4" C. | LLLNG | (79) | 2#4/0, 1#4G., 2" C. | LNG |
| (20) | 3#8, 1#10G., 3/4" C. | LLLG | (50) | 2#1, 1 1/4" C. | LN | (80) | 2#4/0, 1#4G., 2" C. | LLG |
| (21) | 4#8, 1#10G., 1" C. | LLLNG | (51) | 2#1, 1#6G., 1 1/4" C. | LNG | (81) | 3#4/0, 2" C. | LLL |
| (22) | 2#6, 3/4" C. | LN | (52) | 2#1, 1#6G., 1 1/4" C. | LLG | (82) | 3#4/0, 1#4G., 2 1/2" C. | LLNG |
| (23) | 2#6, 1#10G., 3/4" C. | LNG | (53) | 3#1, 1 1/2" C. | LLL | (83) | 3#4/0, 1#4G., 2 1/2" C. | LLLG |
| (24) | 2#6, 1#10G., 3/4" C. | LLG | (54) | 3#1, 1#6G., 1 1/2" C. | LLNG | (84) | 4#4/0, 1#4G., 2 1/2" C. | LLLNG |
| (25) | 3#6, 3/4"C. | LLL | (55) | 3#1, 1#6G., 1 1/2" C. | LLLG | | | |
| (26) | 3#6, 1#10G., 3/4" C. | LLNG | (56) | 4#1, 1#6G., 1 1/2" C. | LLLNG | | | |
| (27) | 3#6, 1#10G., 3/4" C. | LLLG | (57) | 2#1/0, 1 1/4" C. | LN | | | |
| (28) | 4#6, 1#10G., 1" C. | LLLNG | (58) | 2#1/0, 1#6G., 1 1/2" C. | LNG | | | |
| (29) | 2#4, 3/4" C. | LN | (59) | 2#1/0, 1#6G., 1 1/2"C. | LLG | | | |
| (30) | 2#4, 1#8G., 1" C. | LNG | (60) | 3#1/0, 1 1/2" C. | LLL | | | |

ESC-2

# DISTRIBUTION SYMBOL SCHEDULE

**NOTES:**
A. ALL SYMBOLS DO NOT NECESSARILY APPEAR ON THESE DRAWINGS.

| SYMBOL | DESCRIPTION | REMARKS |
|---|---|---|
| | HOMERUN (REFER TO PANEL SCHEDULES FOR CONDUIT/WIRING) | |
| | CIRCUIT ROUTED THRU CONTACTOR OR RELAY | |
| UE | UNDERGROUND ELECTRIC | |
| UT | UNDERGROUND TELEPHONE | |
| OE | OVERHEAD ELECTRIC | |
| OT | OVERHEAD TELEPHONE | |
| | CIRCUIT INDICATORS (HOT, NEUTRAL, GROUND, SWITCHLEG) | |
| | PHOTOCELL | |
| | JUNCTION BOX | |
| | JUNCTION BOX, FLOOR MOUNTED FLUSH | |
| | JUNCTION BOX, WALL MOUNTED – 3/4"C TO ABOVE CEILING | |
| M | MANUAL STARTER WITH THERMAL TRIP | |
| | DISCONNECT SWITCH, REFER TO DISCONNECT SCHEDULE | |
| | STARTER | |
| | COMBINATION STARTER/DISCONNECT SWITCH, REFER TO SCHEDULE | |
| | POWER AND/OR LIGHTING PANELBOARD, REFER TO PANELBOARD SCHEDULE | |
| | SWITCHBOARD, REFER TO SWITCHBOARD SCHEDULE | |
| | TRANSFORMER, REFER TO TRANSFORMER SCHEDULE | |

ESC-01

# DEVICE SYMBOL SCHEDULE

**NOTES:**
A. ALL SYMBOLS DO NOT NECESSARILY APPEAR ON THESE DRAWINGS.
B. ALL DEVICE PART NUMBERS ARE HUBBELL UNLESS OTHERWISE NOTED.

| SYMBOL | DESCRIPTION | REMARKS |
|---|---|---|
| | SINGLE RECEPTACLE 20A/120V 16" AFF UON | HBL 5361-W |
| | DUPLEX RECEPTACLE 20A/120V 16"AFF UON | CR20-W |
| | DUPLEX RECEPTACLE WITH DUAL USB 20A/120V 16" AFF UON | USB20X2W |
| | DUPLEX RECEPTACLE 20A/120V 16" AFF UON WITH GROUND FAULT INTERRUPTER | GF20ILA |
| K | DUPLEX RECEPTACLE 20A/120V 16" AFF UON WITH ISOLATED/INSULATED GROUND | CR5352IG |
| | FOURPLEX RECEPTACLE 20A/120V 16" AFF UON | (2) CR20-W |
| CLOCK | CLOCK RECEPTACLE 120V 96" AFF UON | HBL 5235 |
| | SPECIAL PURPOSE RECEPTACLE 16" AFF SEE PLANS FOR DETAILS | |
| | CEILING MOUNTED DUPLEX RECEPTACLE 20A/120V (FLUSH) | CR20-W |
| | DUPLEX RECEPTACLE 20A/120V MOUNTED HORIZONTALLY 48" AFF UON | CR20-W |
| | FOURPLEX RECEPTACLE FOR PROJECTOR | |
| A | WEATHER/TAMPER-RESISTANT DUPLEX RECEPTACLE WITH "IN-USE" COVER 20A/120V 18"AFF UON | GFTR20W/ WP26M |
| | 8" ABOVE COUNTER – GFI | |
| | DUPLEX RECEPTACLE W/ SURGE SUPPRESSION 20A/120V 16" AFF UON | IG5362-SA |
| | SAFETY TYPE DUPLEX RECEPTACLE 20A/120V 16" AFF UON | CR20WTR |
| | DUPLEX RECEPTACLE, FLOOR MOUNTED FLUSH | CR20-I,PFBRG1 SA3083,SA3825 |
| | FOURPLEX RECEPTACLE, FLOOR MOUNTED FLUSH | (2) HBL-5362-I, PFBRG2 SA3084, (2)SA3825 |
| | EXISTING DUPLEX RECEPTACLE | |
| | EXISTING FOURPLEX RECEPTACLE | |
| | EXISTING 208V RECEPTACLE | |
| $ | SINGLE POLE SWITCH 20A, 48"AFF UON | CS120-W |
| $3 | THREE-WAY SWITCH 20A, 48"AFF UON | CS320-W |
| $4 | FOUR-WAY SWITCH 20A, 48"AFF UON | CS1224-W |
| $K | SINGLE POLE KEY OPERATED SWITCH 20A, 48"AFF UON | HBL 1221-RKL |
| $ | DIMMER SWITCH, 48"AFF UON, SEE PLANS FOR DETAILS | |
| $P | SWITCH WITH PILOT LIGHT, 48"AFF UON | HBL1221-PL |
| $2 | TWO POLE SWITCH 20A, 48"AFF UON | CS1222-W |
| $T | TIMER SWITCH, 48"AFF UON | INTERMATIC FF60MC |
| $F | FAN SWITCH, 48"AFF UON | RF51 |
| $IR | WALL MOTION SENSOR: 48" AFF UON, (IR) INFRARED | WS1277-I |
| $US | WALL MOTION SENSOR: 48" AFF UON, (US) ULTRASONIC | AU1277I1 |
| $DT | WALL MOTION SENSOR: 48" AFF UON, (DT) DUAL TECHNOLOGY | AD1277-I1 |
| M US | MOTION SENSOR: US (ULTRASONIC) | ATU2000C |
| M IR | MOTION SENSOR: IR (INFRARED) | ATP1500C |
| M DT | MOTION SENSOR: DT (DUAL TECHNOLOGY) | ATD2000C |

ESC-5

# TELECOMMUNICATION/DATA SYMBOL SCHEDULE

**NOTES:**
A. ALL SYMBOLS DO NOT NECESSARILY APPEAR ON THESE DRAWINGS.
B. PROVIDE 3/4" CONDUIT TO ABOVE CEILING WITH PULLSTRING AND PLASTIC BUSHING FOR ALL DEVICES, U.O.N.
C. USE 4" x 4" x 2 1/8" JUNCTION BOX WITH SINGLE GANG PLASTER RING FOR ALL DEVICES.
D. ALL CABLING BY OWNER/ OTHERS.

**REMARKS:**
1. 10 FEET SERVICE LOOP WITH DATA BISCUIT BOX ON END ABOVE CEILING, TIE OFF TO NEAREST JOIST. FINAL INSTALL OF AP DEVICE BY DISTRICT.

| SYMBOL | DESCRIPTION | REMARKS |
|---|---|---|
| | TELEPHONE OUTLET | |
| | TELEPHONE OUTLET, FLOOR MOUNTED FLUSH | |
| W | TELEPHONE OUTLET, WALL MOUNTED | |
| | COMBINATION SINGLE VOICE TELEPHONE/DUAL DATA | |
| | COMBINATION SINGLE VOICE TELEPHONE/DUAL DATA, FLOOR MOUNTED FLUSH | |
| | DUAL DATA OUTLET | |
| | DUAL DATA OUTLET, FLOOR MOUNTED FLUSH | |
| | DUAL DATA OUTLET, CEILING MOUNTED FLUSH | |
| | TELEVISION OUTLET | |
| MR | MUDRING WITH 3-PULL STRINGS TO ABOVE CEILING | |
| AP | SINGLE DATA DROP FOR WIRELESS ACCESS POINT, (WALL MOUNT) | |
| AP | SINGLE DATA DROP FOR WIRELESS ACCESS POINT, (CEILING MOUNT) | 1 |
| AV | AUDIO/VISUAL WALL MOUNTED OUTLET | 1"C TO ABOVE CEILING |
| TS | TEACHER STATION | 1 1/2"C TO ABOVE CEILING |

# SPECIAL SYSTEMS SCOPE

**ACCESS CONTROL SYSTEM**
**1. NONE OR BY OWNER.**

**SECURITY SYSTEM**
**1. NONE OR BY OWNER.**

**TECHNOLOGY SYSTEM**
**1. ROUGH-IN PER ELECTRICAL DRAWINGS.**
**2. CABLING AND DEVICE SPECIFICATION BY OWNER.**
**3. COORDINATE RACK AND EQUIPMENT SCOPE WITH OWNER.**

**INTERCOM SYSTEM**
**1. NONE.**

**FIRE ALARM SYSTEM**
**1. NONE.**

**AUDIO-VIDEO SYSTEM**
**1. ROUGH-IN PER ELECTRICAL DRAWINGS.**
**2. CABLING AND DEVICE SPECIFICATION BY OWNER.**
**3. COORDINATE EQUIPMENT SCOPE WITH OWNER.**

# GENERAL NOTES

A. THE CONTRACTOR IS TO VISIT THE SITE PRIOR TO BID TO FAMILIARIZE HIMSELF WITH ALL CONDITIONS AS THEY EXIST. SUBMISSION OF BID INDICATES THE CONTRACTOR'S UNDERSTANDING OF EXISTING CONDITIONS AND HIS WILLINGNESS TO WORK WITH THESE CONDITIONS. NO ADDITIONAL TIME OR MONEY WILL BE ALLOTTED DUE TO LACK OF COORDINATION WITH EXISTING CONDITIONS OR OTHER TRADES.

B. CONTRACTOR IS TO REVIEW AND COMPARE ALL DRAWINGS SO ALL WORK IN THEIR RESPECTIVE TRADE IS INCLUDED IN BID. EACH CONTRACTOR SHALL INCLUDE ALL MATERIALS AND INSTALLATION REQUIRED FOR HIS PARTICULAR TRADE AFTER COMPLETE REVIEW OF ALL CONTRACT DRAWINGS AND SPECIFICATIONS.

C. ALL WORK SHALL COMPLY WITH THE CURRENT APPLICABLE LOCAL, STATE AND FEDERAL CODES AND ORDINANCES. FOLLOW RECOMMENDED PRACTICES AS SET DOWN BY NFPA, BUILDING CODE, MECHANICAL CODE, PLUMBING CODE, NATIONAL ELECTRICAL CODE, ADA AND OSHA, AS THEY APPLY TO THIS PROJECT, EXCEPT IN CASES WHERE LOCAL STATUTES GOVERN. THE CONTRACTOR SHALL VERIFY WITH AUTHORITY HAVING JURISDICTION THE LATEST ADOPTED LOCAL CODES, ORDINANCES AND AMENDMENTS THAT APPLY TO THIS PROJECT.

D. THE ELECTRICAL CONTRACTOR SHALL VERIFY SIZES OF BREAKERS, FUSES, WIRES, ETC., FOR ALL EQUIPMENT PROVIDED AND REPORT DISCREPANCIES TO THE ENGINEER/ARCHITECT PRIOR TO INSTALLATION OF CONDUIT. COORDINATE WITH MECHANICAL/ELECTRICAL COORDINATION SHEET PROVIDED BY MECHANICAL CONTRACTOR FOR ACTUAL EQUIPMENT BEING USED.

E. HOMERUNS SHALL BE COORDINATED WITH PANELBOARDS. ALL WIRING AND CONDUIT SHALL BE CONCEALED, EXCEPT IN ELECTRICAL ROOMS AND EXPOSED STRUCTURE AREAS.

F. ALL WIRING SHALL BE FREE OF SHORTS AND GROUNDS. NO WIRING SHALL BE LOADED BEYOND THE PERMITTED AMPACITIES ALLOWED BY N.E.C.

G. MINIMUM WIRE/CONDUIT SIZES, EXCEPT FOR CLASS 2 LOW VOLTAGE CIRCUITS, ARE #12 AWG COPPER IN 1/2" CONDUIT. WHERE THE DISTANCE BETWEEN THE SUPPLYING PANEL AND THE FIRST BRANCH CIRCUIT RECEPTACLE OR LIGHT FIXTURE IS MORE THAN 100 FEET, UP SIZE CONDUCTOR TO ALLOW FOR MAXIMUM OF 3% VOLTAGE DROP FOR ACTUAL ROUTING OF CONDUITS TO DEVICE.

H. THE ELECTRICAL CONTRACTOR SHALL PROVIDE ALL EQUIPMENT, LABOR AND MATERIALS NECESSARY TO MAKE A COMPLETE AND WORKABLE SYSTEM.

I. CONFIRM THE EXACT LOCATION AND MOUNTING HEIGHTS OF LIGHTING FIXTURES WITH ARCHITECT BEFORE ROUGH-IN. COORDINATE REQUIRED CLEARANCES ABOVE FIXTURES WITH OTHER TRADES.

J. PROVIDE A TYPED PANEL DIRECTORY FOR ALL PANELBOARDS INDICATING FINAL INSTALLED CONDITION. CIRCUIT LABELING SHALL AGREE WITH EQUIPMENT DESIGNATIONS AND OWNERS FINAL ROOM NUMBERS.

K. LABEL ALL RECEPTACLES AND LIGHT SWITCHES WITH CIRCUIT NUMBER USING AN ELECTRONIC LABELER (BLACK ON CLEAR).

L. THE CONTRACTOR IS TO LAY OUT SERVICE ENTRANCE AND ELECTRIC ROOMS TO SCALE WITH ACTUAL GEAR TO BE INSTALLED TO ENSURE PROPER FIT AND CLEARANCES BEFORE INSTALLATION. COORDINATE ALL SERVICE CLEARANCE REQUIREMENTS WITH LOCAL UTILITY COMPANY. PROVIDE A 1/4" SCALE (MINIMUM) SHOP DRAWING. NOTIFY ARCHITECT/ENGINEERS OF ANY DIMENSIONAL PROBLEMS.

M. COORDINATE AND WIRE ALL DOOR HOLD OPEN DEVICES, AS REQUIRED. REFER TO ARCHITECTURAL DRAWINGS FOR LOCATIONS. ROUTE 120 VOLT POWER FROM NEAREST AVAILABLE CIRCUIT AS REQUIRED. PROVIDE ALL WIRING NECESSARY FOR A COMPLETE AND OPERATIONAL SYSTEM.

N. CONDUITS ROUTED TO ROOF SHALL BE INSTALLED IN SAME ROOF JACK AS MECHANICAL ELEMENTS. THE ELECTRICAL CONTRACTOR SHALL COORDINATE WITH THE MECHANICAL CONTRACTOR. ELECTRICAL CONTRACTOR SHALL PROVIDE ROOF JACK WHERE NO MECHANICAL ELEMENTS EXIST.

O. PROVIDE SLEEVES FOR SPECIAL SYSTEMS ABOVE EACH DOOR INTO A RATED EGRESS CORRIDOR, (1 - 2" AND 3 - 3/4"). FIRE SEAL ENDS AND UNUSED SLEEVES SHALL HAVE A SCREW CAP INSTALLED ON BOTH SIDES. USE THREADED CONDUIT.

P. ALL RECEPTACLES SERVING ELECTRIC WATER COOLERS SHALL BE LOCATED AT A HEIGHT SO AS NOT TO BE VISIBLE AFTER INSTALLATION OF EWC. COORDINATE MOUNTING HEIGHT WITH EQUIPMENT BEING PROVIDED. PROTECT WITH GFCI BREAKER.

Q. ALL CONDUITS ROUTED BELOW FINISHED FLOOR SHALL BE RUN BELOW THE GRADE BEAMS. CONDUITS AND MULTIPLE CONDUITS SHALL NOT PENETRATE GRADE BEAMS UNLESS COORDINATED WITH STRUCTURAL ENGINEER. OBTAIN WRITTEN APPROVAL FROM STRUCTURAL ENGINEER PRIOR TO BEGINNING WORK.

R. ALL EXPOSED CONDUIT SHALL BE RUN PARALLEL AND PERPENDICULAR TO STRUCTURE AND BUILDING LINES. COORDINATE FINAL CONDUIT ROUTING PATH WITH ARCHITECT AND ENGINEER PRIOR TO INSTALLATION.

S. THE ELECTRICAL CONTRACTOR SHALL PROVIDE ALL 120 VOLT WIRING AND CONNECTIONS REQUIRED TO FIRE/SMOKE DAMPERS. COORDINATE EXACT LOCATIONS OF DAMPERS WITH MECHANICAL CONTRACTOR AND RELAY REQUIREMENTS WITH FIRE ALARM CONTRACTOR. CONNECT TO NEAREST AVAILABLE UNSWITCHED CIRCUIT UNLESS OTHERWISE INDICATED ON DRAWINGS.

T. ELECTRICAL CONTRACTOR SHALL CONNECT MOTORIZED BACK DRAFT DAMPERS FOR EXHAUST FANS FROM CIRCUIT FEEDING FAN. PROVIDE ALL MATERIAL AND LABOR TO MAKE CONNECTIONS.

U. ELECTRICAL CONTRACTOR SHALL WIRE ALL EXHAUST FANS TO BE CONTROLLED PER "EXHAUST FAN SCHEDULE" ON MECHANICAL SHEET. ELECTRICAL CONTRACTOR TO PROVIDE ALL RELAYS, CONTACTORS, SPRING WOUND TIMERS, ETC., AS REQUIRED PER SCHEDULE TO OPERATE AND CONTROL EXHAUST FAN. IF NO CONTROL IS SPECIFIED, EXHAUST FAN SHALL ENERGIZE WHEN LIGHTS IN ANY ROOM IT SERVES ARE POWERED ON. REFERENCE DETAIL ON ELECTRICAL SHEET FOR ADDITIONAL INFORMATION.

V. ELECTRICAL CONTRACTOR TO SEAL ALL PENETRATIONS OF ELECTRICAL WORK IN FIRE AND SMOKE RATED PARTITIONS, CEILINGS, ETC.

W. ELECTRICAL CONTRACTOR TO PROVIDE DISCONNECTING MEANS FOR ALL EQUIPMENT PER N.E.C. UNLESS OTHERWISE NOTED.

X. COORDINATE ALL DEVICES IN MILLWORK WITH ARCHITECTURAL MILLWORK SHOP DRAWINGS PRIOR TO ROUGH-IN.

Y. SENSOR OPERATED PLUMBING DEVICES: PLUMBING CONTRACTOR TO PROVIDE LOW VOLTAGE TRANSFORMERS FROM MANUFACTURER. ELECTRICAL CONTRACTOR IS TO PROVIDE ALL OTHER MATERIALS AND LABOR FOR COMPLETE INSTALLATION.

Z. SPRAY PAINT JUNCTION BOXES RED FOR FIRE ALARM SYSTEM. ALL OTHER SPECIAL SYSTEM JUNCTION BOXES TO BE PAINTED WHITE.

AA. DO NOT HANG ANY FIXTURES, EQUIPMENT OR CONDUIT FROM ROOF DECK.

BB. LABEL ALL JUNCTION BOXES WITH CIRCUIT NUMBERS.

CC. IDENTIFY RECEPTACLE CIRCUITS IN PANELBOARDS TO INDICATE FINAL ROOM NUMBERS. VERIFY FINAL ROOM NUMBERS PRIOR TO TYPING PANELBOARD SCHEDULES.

DD. MECHANICALLY FASTEN ALL LABELS TO EQUIPMENT.

EE. ELECTRICAL CONTRACTOR TO OBTAIN "MECH/ELEC COORDINATION SHEET" FILLED OUT FROM MECHANICAL CONTRACTOR. THIS SHEET IS TO BE INCLUDED WITH ELECTRICAL GEAR/PANELBOARD SUBMITTAL. SUBMITTAL WILL NOT BE CHECKED WITHOUT THIS FORM INCLUDED.

FF. ELECTRICAL CONTRACTOR IS TO PROVIDE ROUGH-IN FOR ALL MECHANICAL CONTROL DEVICES IN WALLS AND PENETRATIONS FOR CONTROL WIRES TO EXTERIOR UNITS. COORDINATE ALL LOCATIONS WITH MECHANICAL CONTRACTOR AND MECHANICAL SHEETS.

**GG. DISCONNECTS MOUNTED ABOVE CEILING MUST BE MOUNTED TO BE READILY ACCESSIBLE NEAR UNIT. HANDLE TO BE NO MORE THAN 36" ABOVE CEILING GRID.**

**HH. ALL EXTERIOR DISCONNECTS ARE TO BE MOUNTED BELOW LINE OF SIGHT OF A SCREEN WALL OR IF SINGLE DISCONNECT, LEVEL WITH TOP OF CONDENSER. VERIFY LOCATION WITH ARCHITECT/ENGINEER PRIOR TO ROUGH-IN.**

# MISCELLANEOUS EQUIPMENT SCHEDULES

**GENERAL NOTES:**
A. ELECTRICIAN TO PROVIDE 120V POWER TO ALL EQUIPMENT FROM NEAREST PANEL HAVING CAPACITY, UNLESS OTHERWISE NOTED.

B. ELECTRICAL CONTRACTOR IS TO PROVIDE ALL PARTS AND LABOR TO MAKE FINAL CONNECTIONS TO ALL EQUIPMENT SHOWN IN CONTRACT DOCUMENTS. POWER MAY BE SHOWN IN GENERAL LOCATION. IT IS EXPECTED THAT THE ELETRICAL CONTRACTOR COORDINATE FINAL LOCATION FOR ROUGH-IN AND CONNECTION REQUIREMENTS WITH EXACT EQUIPMENT BEING INSTALLED. THESE ITEMS INCLUDE, BUT NOT LIMITED TO, BOOK SECURITY, EXHAUST FANS, KILNS, HAND DRYERS, SENSOR OPERATED PLUMBING DEVICES, ELECTRIC OVERHEAD DOORS, FIRE SMOKE DAMPERS, AIR PURIFICATION UNITS, ETC.

**DAIKEN MINI-SPLIT AC SYSTEMS**
POWER IS CONNECTED TO OUTDOOR UNIT, INDOOR UNIT IS FED FROM OUTDOOR UNIT AND POWER AND COMMUNICATION WIRES MUST BE RUN IN THEIR OWN DEDICATED CONDUIT. REFERENCE PLANS AND MANUFACTURER'S INSTALLATION MANUAL.

REFERENCE GENERAL NOTES ON SHEETS M000, P000 AND E000 FOR ADDITIONAL INFORMATION


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# RIVER RANCH COUNTY PARK INTERPRETIVE CENTER

WILLIAMSON COUNTY, TX

STATE OF TEXAS
B.J. HENDRIX
94813
LICENSED
PROFESSIONAL ENGINEER

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ISSUE DATE: FEBRUARY 22, 2019

REVISIONS

| # | DATE | DESCRIPTION |
|---|---|---|

DRAWN: REVIEWED:

# ISSUE FOR BIDS

PROJECT NUMBER: 5619

## SCHEDULES, NOTES, AND LEGENDS - ELECTRICAL

SHEET NUMBER

# E000

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# SPLIT SYSTEM ELECTRICAL CONNECTION SCHEDULE — 240/1

## RIVER RANCH COUNTY PARK PHASE 1 IMPROVEMENTS — JOB NO. 17-061

## VARIABLE SPEED HEAT PUMP SPLIT SYSTEM WITH AUXILLARY ELECTRIC HEAT

| | | UNIT TYPE | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 2H2 | 2H3 | 2H4 | 2H5 | | | |
| INDOOR | | | | | | | | |
| INDOOR: VOLTAGE/ PHASE | | 240/1 | 240/1 | 240/1 | 240/1 | | | |
| KVA | | 8.4 | 12.0 | 17.3 | 20.2 | | | |
| MCA | | 35 | 50 | 72 | 84 | | | |
| FUSED DISCONNECT SIZE (NEMA 1) | | 60 | 60 | 100 | 100 | | | |
| MOCP | | 35 | 50 | 80 | 90 | | | |
| MINIMUM WIRE/ CONDUIT SIZES | | 9 | 9 | 9 | 9 | | | |
| LENGTH UP TO (FT) | 125 | 17 | 24 | 31 | 31 | | | |
| LENGTH UP TO (FT) | 250 | 31 | 38 | 45 | 52 | | | |
| LENGTH UP TO (FT) | 375 | 38 | 52 | 59 | 66 | | | |
| OUTDOOR | | | | | | | | |
| OUTDOOR: VOLTAGE/ PHASE | | 240/1 | 240/1 | 240/1 | 240/1 | | | |
| KVA | | 4.0 | 5.1 | 6.3 | 9.1 | | | |
| MCA | | 16.6 | 21.1 | 28.5 | 38 | | | |
| FUSED DISCONNECT SIZE (NEMA 3R) | | 30 | 60 | 60 | 60 | | | |
| MOCP | | 25 | 35 | 45 | 60 | | | |
| MINIMUM WIRE / CONDUIT SIZES | | 9 | 9 | 9 | 9 | | | |
| LENGTH UP TO (FT) | 125 | 10 | 10 | 17 | 24 | | | |
| LENGTH UP TO (FT) | 250 | 17 | 24 | 24 | 31 | | | |
| LENGTH UP TO (FT) | 375 | 24 | 31 | 31 | 38 | | | |
| | | | | | INDOOR UNIT KVA TOTAL = | | 0 | |
| | | | | | OUTDOOR UNIT KVA TOTAL = | | 0 | |
| | | | | | GRAND TOTAL KVA = | | 0 | |

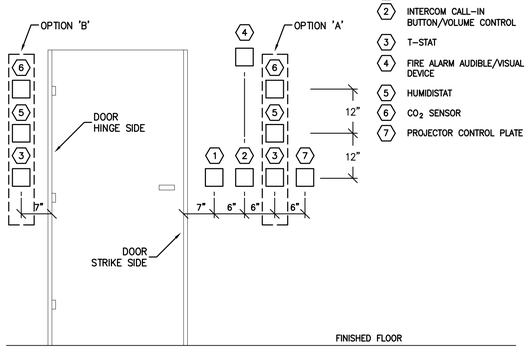
| UNIT MARK | UNIT TYPE | REMARKS | UNIT MARK | UNIT TYPE | REMARKS |
|---|---|---|---|---|---|
| AHU/HP-1 | 2H5 | | | | |
| AHU/HP-2 | 2H5 | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

ESC-68-240V

# PANELBOARD CONNECTION SCHEDULE (1 PH)

A. USE TABLE FOR WIRE AND CONDUIT SIZES FOR ALL PANELBOARDS UNLESS NOTED OTHERWISE.
B. WIRE SIZES BASED ON 86° AMBIENT, 75° COLUMN OF CHART, NEC 310,15(B)(16)
C. TABLE FOR 120/240/1PH/3W PANELBOARDS.
D. PROVIDE 200% NEUTRAL BUS BAR AND 200% NEUTRAL WIRE WHEN SPECIFIED.

| PANEL SIZE OR MCB SIZE | WIRE SIZE | GROUND | CONDUIT |
|---|---|---|---|
| 50 | 3 #8 | #10 | 1" |
| 60 | 3 #6 | #10 | 1" |
| 70 | 3 #4 | #8 | 1 1/4" |
| 100 | 3 #3 | #8 | 1 1/4" |
| 125 | 3 #1 | #6 | 1 1/2" |
| 150 | 3 #1/0 | #6 | 2" |
| 200 | 3 #3/0 | #6 | 2" |
| 225 | 3 #4/0 | #4 | 2 1/2" |
| 300 | 3 #350 | #4 | 3" |
| 400 | 2 SETS 3 #3/0 OR | #3 | 2" PER SET |
| | 1 SET 3 #600 | #3 | 4" |
| 600 | 2 SETS 3 #350 | #1 | 3" PER SET |
| 800 | 2 SETS 3 #600 | #1/0 | 4" PER SET |




**NOTES:**
1. THE PURPOSE OF THIS DETAIL IS TO SET A STANDARD FOR DEVICE ROUGH-IN. ADJUSTMENT FOR FIELD CONDITIONS WILL BE ALLOWED.
2. PROVIDE HORIZONTAL MULTI-DEVICE BRACKET AS REQUIRED.
3. MARKER BOARD IN CLASSROOMS SHOULD BE 30" FROM DOOR TO ALLOW ALL DEVICES TO BE ROUGHED-IN PER DETAIL.
4. MECHANICAL CONTROL DEVICES MAY BE ON EITHER SIDE OF DOOR, DEPENDING ON JOB CONDITIONS. REFERENCE OPTION 'A' AND OPTION 'B'. T-STAT MAY NOT BE BEHIND DOOR WHEN OPEN.

## TYPICAL DEVICE OUTLET LOCATIONS ADJACENT TO DOORS

NO SCALE — EDE-91

# NLIGHT - DEVICE SYMBOL SCHEDULE

**NOTES:**
A. ALL SYMBOLS DO NOT NECESSARILY APPEAR ON THESE DRAWINGS.
B. ALL DEVICE PART NUMBERS ARE NLIGHT UNLESS OTHERWISE NOTED.
C. THESE DEVICES SHOULD BE USED IN ALL AREAS TO BE CONTROLLED BY NLIGHT.
D. MOTION SENSOR: WHERE MOTION SENSORS ARE SHOWN ON THE PLANS. THAT INDICATES AREA SHOULD BE COVERED IN FULL BY MOTION SENSORS. IT IS UP TO MOTION SENSOR PROVIDER TO PROVIDE APPROPRIATE QUANTITY AND LAYOUT OF MOTION SENSORS FOR COMPLETE COVERAGE. PROVIDE SHOP DRAWING AT SUBMITTAL PHASE.
E. PHOTOCELL: WHERE PHOTOCELLS ARE SHOWN ON PLANS OR IN TYPICAL DETAILS. IE:CLASSROOMS. PHOTOCELL LOCATION AND QUANTITY SHOULD BE DETERMINED BY PHOTOCELL PROVIDER. PHOTOCELLS ARE INTENDED TO DIM LIGHTS IN DAYLIGHT ZONES AS INDICATED BY IECC 2015.
F. IF MULTIPLE ZONE CONTROL IS INDICATED FOR A SPACE AND THOSE ZONES ARE NOT CLEAR TO CONTRACTOR, THE CONTRACTOR IS TO MAKE BEST ASSUMPTION IN SHOP DRAWING PHASE AND NOTE AREAS IN QUESTION. ENGINEER WILL REVIEW AND MAKE ANY ADJUSTMENTS TO ZONES AT THAT TIME.
G. MANUFACTURER TO PROVIDE A COMPLETE SET OF SHOP DRAWINGS INDICATING ALL ASPECTS OF LIGHTING CONTROL AT A MINIMUM OF 1/8" = 1' SCALE WITH CLEAR DESCRIPTIONS AND LEGENDS FOR SYMBOLS.
H. BASIC COMPONENTS ARE CALLED FOR HERE, IT IS EXPECTED THAT MANUFACTURER PROVIDES ALL COMPONENTS FOR A COMPLETE WORKABLE SYSTEM.
I. FACTORY START-UP IS REQUIRED FOR ALL NLIGHT SPACES.
J. CONTRACTOR SHOULD SEND COMPLETE SET OF ELECTRICAL PLANS TO NLIGHT FACTORY REP TO ENSURE A COMPLETE BID.
K. PROVIDE ALL GATEWAYS AND BRIDGES TO NETWORK ALL INDIVIDUAL NLIGHT SYSTEMS TOGETHER.
L. PROVIDE ALL REQUIRED CABLING BETWEEN DEVICES.

| SYMBOL | DESCRIPTION | REMARKS |
|---|---|---|
| | DIMMER | nPODM-DX |
| | DUAL TECHNOLOGY WALL MOUNT MOTION AND DIMMING | nWSX-PDT-SA |
| | ONE ZONE CONTROLLER, ON/OFF AND DIMMING | nPODM-DX |
| | TWO ZONE CONTROLLER, ON/OFF AND DIMMING | nPODM-2P-DX |
| | THREE ZONE CONTROLLER, 3 PRESET TOGGLE BUTTONS | -- |
| | FOUR ZONE CONTROLLER, 4 PRESET TOGGLE BUTTONS | -- |
| | MOTION SENSOR, DT (DUAL TECHNOLOGY) | nWV-PDT-16 |
| | PHOTOCELL | nCM-ADCX |
| | | |
| | | |
| | | |

# NLIGHT INTERIOR LIGHTING SCHEDULE

**GENERAL NOTES:**

**MOTION SENSORS**
PROVIDE MOTION SENSORS AS SHOWN ON PLANS. PROVIDE DUAL TECHNOLOGY MOTION SENSORS IN EVERY ROOM AS REQUIRED BY IEEC 2015.

**CONTROL STATION**
ALL ROOMS SHALL HAVE A CONTROL STATION FOR CONTROL OF LIGHTS IN ROOM. IF NO CONTROL STATION IS SHOWN, ASSUME A TWO ZONE CONTROLLER FOR ROOMS LARGER THAN 9' X 9' AND A WALL MOUNT DUAL TECHNOLOGY CONTROLLER FOR ROOMS SMALLER THAN 9' X 9'.

**SPACE TYPE DESCRIPTION:**

GALLERY
A. PROVIDE CONTROL STATIONS AND ZONING AS SHOWN ON PLANS.
B. PROVIDE COMPLETE MOTION SENSOR COVERAGE FOR MINOR MOVEMENTS. MANUAL ON / AUTO OFF. SHOP DRAWING REQUIRED.
D. PROVIDE PHOTOCELL AND CONTROL LIGHTS IN DAYLIGHT ZONE PER IECC 2015 AS SHOWN ON PLANS.

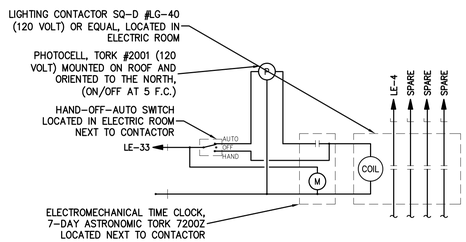
CLASSROOM
A. PROVIDE CONTROL STATIONS AS SHOWN ON PLANS.
B. TWO ZONE CONTROL. ZONE 'a' , ZONE 'b' AS SHOWN IN PLANS AND AS DESCRIBED BELOW;
1. ROOMS WITH UPLIGHTS AND DOWNLIGHTS, ZONE 'a' - DOWNLIGHTS, ZONE 'b' - UPLIGHTS.
2. ROOMS WITH DOWNLIGHTS ONLY, ZONE 'a' - ROW OF LIGHTS AT TEACHING WALL, ZONE 'b' - ALL OTHER LIGHTS IN ROOM, U.N.O.
C. PROVIDE COMPLETE MOTION SENSOR COVERAGE FOR MINOR MOVEMENTS. MANUAL ON / AUTO OFF. SHOP DRAWING REQUIRED.
D. PROVIDE PHOTOCELL AND CONTROL LIGHTS IN DAYLIGHT ZONE PER IECC 2015 AS SHOWN ON PLANS.

SINGLE ZONE ROOMS
A. PROVIDE CONTROL STATIONS AS SHOWN ON PLANS.
B. ONE OVERALL ZONE TO CONTROL ALL LIGHTS IN ROOM.
C. PROVIDE COMPLETE MOTION SENSOR COVERAGE, SHOP DRAWING REQUIRED.

# CEILING FANS

**CEILING FAN (CF-1):** (SELECTED BY ARCHITECT, ARCHITECT MUST APPROVE SUBMITTAL) PROVIDE PROPER LENGTH MOUNTING STEM FOR HEIGHT SPECIFIED ON ARCHITECTURAL PLANS. KEEP MANUFACTURER MINIMUM CLEARANCE BETWEEN FAN BLADES AND CEILING. FAN SPEED IS VARIABLE.

| MARK NO. | STOCK/ MODEL NUMBER | ROD LENGTH | HP | VOLT/PH/AMPS | BLADE DIAMETER | WEIGHT |
|---|---|---|---|---|---|---|
| CF-1 | MODERN FAN COMPANY – FLUTE FLU-TN-52-NK-NL-001 | 12" | FRACTION | 120/1/0.5 | 52" | . |




## LIGHTING CONTACTOR DETAIL

SCALE: NONE — EDE-11

# LIGHT FIXTURE SCHEDULE

GENERAL NOTES:

A. CONFIRM CEILING TYPE AND CONSTRUCTION PRIOR TO ORDERING LIGHT FIXTURE. PROVIDE FLANGE KIT FOR PROPER INSTALLATION OF LAY-IN FIXTURE IN GYPSUM CEILING. PROVIDE FIXTURE TYPE 'H2' IN LIEU OF FIXTURE TYP 'A2' IN ROOMS WITH NO CEILING. CHAIN HANG AT 10' A.F.F.
B. COORDINATE EXACT LOCATION AND MOUNTING HEIGHT OF WALL MOUNTED LIGHT FIXTURES WITH ARCHITECT PRIOR TO ROUGH-IN.
C. REFER TO ARCHITECTURAL REFLECTIVE CEILING PLAN FOR EXACT LOCATION OF LIGHT FIXTURE.
D. CONFIRM FINISH WITH ARCHITECT PRIOR TO ORDERING LIGHT FIXTURES.
E. 'E' DESIGNATION ADJACENT TO LIGHTING FIXTURE TYPE INDICATES FIXTURE SHALL BE PROVIDED WITH EMERGENCY BATTERY PACK UNIT (LITHONIA PS1400 OR EQUAL). LIGHT FIXTURE SHALL BE SWITCHED, BATTERY PACK SHALL BE UNSWITCHED.
F. CONNECT ALL EXIT LIGHTING TO THE NEAREST UNSWITCHED CIRCUIT OR THE NEAREST EMERGENCY CIRCUIT.

| MARK | MANUFACTURERS CATALOG NUMBER | LAMPS NO. / TYPE / WATTS | FIXTURE VOLTS / WATTS | DESCRIPTION AND COMMENTS |
|---|---|---|---|---|
| B2 | LITHONIA 2FSL2-40L-MVOLT-EZ1-LP835-N100 | 1/4209L/39 | MVOLT/39 | FSL SERIES 2 x 2 LAY IN LED, 1% DIMMING, NLIGHT, WHITE FINISH. |
| G2 | LITHONIA WL4-41L-MVOLT-LP835 | 1/LED 4100 LUMENS/43 | MVOLT/43 | 4' SURFACE MOUNT WRAP AROUND LED. COORDINATE MOUNTING HEIGHT WITH MECHANICAL EQUIPMENT. MOUNT 6" BELOW DUCTWORK. |
| H2 | LITHONIA WL4-41L-MVOLT-LP835-EZ1 NLIGHT | 1/LED 4100 LUMENS/43 | MVOLT/43 | LED STRIP FIXTURE. AIRCRAFT CABLE OR SURFACE MOUNT DEPENDING ON APPLICATION. TYPICAL MOUNTING HEIGHT APPROX 8-12. 1%DIMMING, NLIGHT |
| L1 | LITHONIA LDN4-35-1000-L04-AR-LD-MVOLT-EZ1-NLIGHT | 1/LED 1000 LUMENS/13 | MVOLT/13 | 4" LED DOWNLIGHT. TRIM TO MATCH CANOPY OR SILVER. PROVIDE 'EL' BATTERY WHEN SPECIFIED. 1%DIM, NLIGHT. PROVIDE SLOPED CEILING ADAPATER WHERE LOCATED IN SLOPED CEILING. |
| L2 | LITHONIA LDN4-35-2000-L04-AR-LD-MVOLT-EZ1-NLIGHT | 1/LED 2000 LUMENS/23 | MVOLT/23 | 4" LED DOWNLIGHT. TRIM TO MATCH CANOPY OR SILVER. PROVIDE 'EL' BATTERY WHEN SPECIFIED. 1%DIM, NLIGHT. PROVIDE SLOPED CEILING ADAPATER WHERE LOCATED IN SLOPED CEILING. |
| L4 | LDN6-35-20-L06-AR-LD-TRBL-SCA-6-30D | 1/LED 200 LUMENS/35 | MVOLT/35 | 6" LED DOWNLIGHT. BLACK TRIM. PROVDE 'EL' BATTERY WHEN SPECIFIED. 1%DIM. PROVIDE SLOPED CEILING ADAPTER WHERE LOCATED IN SLOPED CEILING. |
| L5 | LF ILLUMINATION TRA19B-M-14C-8035-W-D1-1-BB | 1/LED 1400 LUMENS/14 | 120/14 | 6" LED MONOPOINT CYLINDER WITH 0-90 DEGREE TILTING ANGLE AND 360 DEGREE ROTATION. BLACK FINISH 1%DIM. |
| M3 | LITHONIA 2FSL4-48L-MVOLT-EZ1-LP835-N100 | 1/4800L/LED | MVOLT/46 | FSL SERIES 2 x 4 LAY IN LED, 1% DIMMING, NLIGHT, WHITE FINISH. |
| N1 | WINONA STEP11-RECT-WL-M-LST1A-700-WHT40K-MVOLT | 1/60L/4 | MVOLT/4 | WET LOCATION LED STEP LIGHT. COORDINATE FINISH WITH ARCHITECT. |
| N2 | BEGA 88673-K4 | 1/67L/3 | MVOLT/3 | EXTERIOR, IN-GRADE LED FIXTURE WITH BLACK POWDER COATED STAINLESS STEEL HOUSING. |
| N3 | GOTHAM ICO-CYL-35/35-4AR-LSS 65D-MVOLT-EZ1-FCM-NLIGHT-CRS06 | 1/LED 3500 LUMENS/23 | MVOLT/36 | 4" ARCHITECTURAL SURFACE MOUNT CYLINDER WITH 3/8" X 6"L STEM AND CANOPY WITH 45° SWIVEL. COORDINATE FINISH WITH ARCHITECT. |
| N5 | BEGA 33361-K4 | 1/LED 1974 LUMENS/22 | MVOLT/22 | WALL MOUNT UPLIGHT. COORDINATE FINISH SELECTION WITH ARCHITECT PRIOR TO ORDER. |
| T1 | LITHONIA WST LED-P2-40K-VF-MVOLT | 1/LED ENGINES/25 | MVOLT/25 | ARCHITECTURAL WALL MOUNTED LED FIXTURE WITH DIE CAST ALUMINUM HOUSING, FULL CUTT-OFF, DARK BRONZE FINISH. MOUNT CENTER OF FIXTURE AT APPROX. 12'-14' A.F.F. MATCH ARCHITECTURAL ELEVATIONS. |
| T5 | LITHONIA WST LED-P1-40K-VF-MVOLT-E7WH | 1/LED 1500L/12 | MVOLT/12 | ARCHITECTURAL WALL MOUNTED LED FIXTURE WITH DIE CAST ALUMINUM HOUSING, FULL CUTT-OFF, DARK BRONZE FINISH. OVER DOOR OR TO SIDE OF DOOR AS SHOWN ON PLANS. COORDINATE FINAL HEIGHT 8-10' WITH ARCHITECTURAL. PROVIDE WITH EMERGENCY BALLAST. |
| V1 | JUNO T262L-G2-35K-80CRI-PDIM-FL-XX | 1/LED 1238 LUMENS/16 | 120/16 | 16W CONIX II LED TRACK HEAD LIGHT. PROVIDE 15' TRACK. COORDINATE FIXTURE AND TRACK COLOR WITH ARCHITECT. |
| V2 | BRUCK 350417-XTM19-13LM-35K-98-SSA20-120-ELV-XX-GEOXX-CL-380-TEK-XX-1-XX-380SP-US48-XX | 1/LED 1145 LUMENS/15 | 120/15 | 15W LED TRACK HEAD LIGHT. PROVIDE GEO TRACK WITH SUSPENSION WIRE. TRACK LENGTH PER ARCHITECTURAL PLANS. COORDINATE FIXTURE AND TRACK COLOR AND MOUNTING HEIGHT WITH ARCHITECT. |
| X1 | LITHONIA LES-1R-277-ELN | INCLUDED | 120/5 | LED SINGLE FACE EXIT SIGN WITH DIE CAST ALUMINUM HOUSING, EMERGENCY BATTERY PACK. |
| X4 | LITHONIA LRP-1-RC-120/277-ELN | INCLUDED | 120/5 | LED SINGLE FACE. EDGE-LIT EXIT SIGN WITH CLEAR PANEL, RED LETTERS AND BRUSHED ALUMINUM HOUSING, EMERGENCY BATTERY PACK. DIRECTIONAL ARROWS AS SHOWN ON PLAN. VERIFY MOUNTING STYLE. |
| Y1 | LITHONIA ELM2-LED | INCLUDED | 120/20 | EMERGENCY EGRESS FIXTURE WITH POLYCARBONATE HOUSING, EMERGENCY BATTERY PACK AND AMMETER. WHITE FINISH. WALL MT APPROX 9' AFF. CONNECT TO NEAREST UNSWITCHED LIGHT CIRCUIT. |
| Y4 | LITHONIA VEL1270-H3512-N | INCLUDED | 120/70 | CONCEALED EMERGENCY EGRESS FIXTURE WITH EMERGENCY BATTERY PACK, FINISH TO MATCH WALL. COORDINATE LOCATION WITH ARCHITECT. COORDINATE APPROPRIATE WALL THICKNESS WITH ARCHITECT. CONNECT TO NEAREST UNSWITCHED LIGHTING CIRCUIT. FIXTURE STYLE PER ARCHITECT. |

REFERENCE GENERAL NOTES ON SHEETS M000, P000 AND E000 FOR ADDITIONAL INFORMATION

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# RIVER RANCH COUNTY PARK INTERPRETIVE CENTER

WILLIAMSON COUNTY, TX

STATE OF TEXAS — B.J. HENDRIX — 94813 — LICENSED PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY B.J. HENDRIX, P.E. NO. 94813 ON: 02/22/2019

ISSUE DATE: FEBRUARY 22, 2019

REVISIONS

| # | DATE | DESCRIPTION |
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DRAWN: — REVIEWED:

# ISSUE FOR BIDS

PROJECT NUMBER: 5619

## SCHEDULES - ELECTRICAL

SHEET NUMBER

# E001

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ESC-17

# DISCONNECT SWITCH SCHEDULE

**REMARKS:**

A. THIS SCHEDULE IS NOT A COMPREHENSIVE DISCONNECT SCHEDULE. REFERENCE OTHER ELECTRICAL CONNECTION SCHEDULES FOR ADDITIONAL DISCONNECT REQUIREMENTS.
B. COORDINATE FINAL FUSE SIZES WITH EQUIPMENT BEING PROVIDED PRIOR TO ROUGH-IN.
C. WHEN THE LENGTH OF THE SECONDARY CONDUCTORS OF ANY TRANSFORMER EXCEEDS TEN FEET, PROVIDE AN ENCLOSED CIRCUIT BREAKER OR FUSED DISCONNECT WITHIN TEN FEET OF THE TRANSFORMER SECONDARY TERMINALS IN ACCORDANCE WITH NEC ARTICLE 240-21(C)(2). THIS OVERCURRENT DEVICE SHALL HAVE AN AMP RATING EQUAL TO THE AMP RATING OF THE PANEL BEING SERVED. THE PANEL BEING FED MAY BE CHANGED TO MAIN LUG ONLY.
D. PROVIDE LUG KITS AND/OR WIRING GUTTERS FOR PANELS WITH OVERSIZED CONDUCTORS DUE TO VOLTAGE DROP AND/OR DISTANCE. MAKE CONNECTIONS IN ACCORDANCE WITH THE N.E.C.
E. PROVIDE SHOP DRAWINGS OF ALL ELECTRIC ROOMS INDICATING ALL PANEL, TRANSFORMER AND DISCONNECT LOCATIONS. ELECTRICAL EQUIPMENT MAY SHIFT IN LOCATION TO INSURE PROPER CLEARANCES.
F. PROVIDE DISCONNECTING MEANS FOR ALL EQUIPMENT PER N.E.C.
**G. DISCONNECTS MOUNTED ABOVE CEILING MUST BE MOUNTED TO BE READILY ACCESSIBLE NEAR UNIT. HANDLE TO BE NO MORE THAN 36" ABOVE CEILING GRID.**
**H. ALL EXTERIOR DISCONNECTS ARE TO BE MOUNTED BELOW LINE OF SIGHT OF A SCREEN WALL OR IF SINGLE DISCONNECT, LEVEL WITH TOP OF CONDENSER. VERIFY LOCATION WITH ARCHITECT/ENGINEER PRIOR TO ROUGH-IN.**
**** FOR ALL PANELS SUBFED FROM TRANSFORMERS THAT REQUIRE DISCONNECT, REFERENCE PANEL SCHEDULE FOR ALL ENCLUSURE TYPE AND DISCONNECT/FUSE SIZING INFORMATION.**

| MARK | VOLTAGE: 120 | 240 | 277 | 480 | 3 PHASE | 1 PHASE | AMPERES RATING: 30 | 60 | 100 | 200 | 400 | 600 | 800 | 1200 | 1600 | 2000 | 2500 | 3000 | POLES: 1 | 2 | 3 | DISCLOSURE: NEMA 1 | NEMA 3R | NEMA 4/4X | FUSES: NON-FUSED | FUSE SIZE | ENCLOSED CIRCUIT BREAKER | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ◇ | | ● | | ● | | | | | | | ● | | | | | | | | | ● | | | ● | | | 400 | | BLDG. DISCONNECT |
| ◇ | | ● | | ● | | | ● | | | | | | | | | | | | | ● | | | ● | | | 15 | | AHU-3 (INDOOR) |
| ◇ | | ● | | ● | | | ● | | | | | | | | | | | | | ● | | | ● | | | 15 | | HP-3 (OUTDOOR) |

# CIRCUIT BREAKER PANELBOARD ' LE '

## WILCO RIVER RANCH PARK - INTERPRETIVE CENTER

**STANDARD NOTES:**
1. PROVIDE BALANCED LOAD ON EACH PHASE. CIRCUIT NUMBERS SHOWN ON DRAWINGS ARE FOR REFERENCE ONLY.
2. REFERENCE BRANCH CIRCUIT WIRE AND CONDUIT SCHEDULE.

**NOTES: (THESE ITEMS APPLY ONLY WHERE SPECIFIED BELOW)**
(a) REFERENCE SPLIT SYSTEM / ROOFTOP ELECTRICAL CONNECTION SCHEDULE.
(b) REFERENCE TRANSFORMER SCHEDULE.
(c) REFERENCE FAN POWERED BOX / VAV CONNECTION SCHEDULE.
(d) PROVIDE WITH SHUNT TRIP BREAKER.
(e) PROVIDE WITH 200% NEUTRAL BUS AND WIRE.
(f) PROVIDE PANEL EXTENSION WITH PHASE MONITORING PROTECTION.
(g) REFERENCE ASSOCIATED PANEL SCHEDULE.

120/240 VOLT, 1 PHASE, 3 WIRE, 400 A. MCB, KA. RMS SYM.
FLUSH MOUNTED, NEMA 1 ENCLOSURE, S/N
FEEDER: REFERENCE PANELBOARD CONNECTION SCHEDULE

| CKT | | LOAD DESCRIPTION | WIRE/CONDUIT | KVA | C/B | C/B | KVA | WIRE/CONDUIT | LOAD DESCRIPTION | | CKT |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | L | LIGHTING | 2 | 1.0 | 20/1 | 1.1 | 2 | LIGHTING | | L | 2 |
| 3 | L | LIGHTING | 2 | 0.3 | 20/1 | 0.3 | 2 | EXTERIOR LIGHTING | | L | 4 |
| 5 | E | CEILING FANS | 2 | 0.2 | 20/1 | 60/2 | 9.1 | HP-1 | | E | 6 |
| 7 | E | AHU-1 | (a) | 20.2 | 90/2 | -- | -- | " " | | | 8 |
| 9 | | " " | -- | -- | -- | 60/2 | 9.1 | (a) | HP-2 | E | 10 |
| 11 | E | AHU-2 | (a) | 20.2 | 90/2 | -- | -- | -- | " " | | 12 |
| 13 | | " " | -- | -- | -- | 15/2 | 2.1 | 5 | HP-3 | E | 14 |
| 15 | E | EF-1 -2 -3 -4 | 2 | 0.3 | 20/1 | -- | -- | -- | " " | | 16 |
| 17 | L | LIGHTED DISPLAYS | 2 | 1.0 | 20/1 | 20/1 | 1.0 | 2 | FLOOR RECEPTACLES | R | 18 |
| 19 | R | RECEPTACLES | 2 | 0.4 | 20/1 | 20/1 | 1.0 | 2 | FLOOR RECEPTACLES | R | 20 |
| 21 | R | RECEPTACLES | 2 | 0.4 | 20/1 | 20/1 | 1.0 | 2 | AV SYSTEM | E | 22 |
| 23 | R | RECEPTACLES | 2 | 0.9 | 20/1 | 20/1 | 0.7 | 2 | RECEPTACLES | R | 24 |
| 25 | R | RECEPTACLES | 2 | 1.1 | 20/1 | 20/1 | 0.7 | 2 | RECEPTACLES | R | 26 |
| 27 | R | RECEPTACLES | 2 | 1.1 | 20/1 | 20/1 | 0.7 | 2 | RECEPTACLES | R | 28 |
| 29 | E | EWC | 2.(f) | 1.0 | 20/1 | 20/1 | 0.5 | 2 | RECEPTACLES | R | 30 |
| 31 | R | RECEPTACLES | 2 | 0.5 | 20/1 | 20/1 | 0.5 | 2 | RECEPTACLES | R | 32 |
| 33 | E | LIGHTING CONTACTOR | 2 | 0.5 | 20/1 | 20/1 | -- | -- | SPARE | S | 34 |
| 35 | E | CEILING FANS | 2 | 0.2 | 20/1 | 20/1 | -- | -- | SPARE | S | 36 |
| 37 | S | SPARE | -- | -- | 20/1 | 20/1 | -- | -- | SPARE | S | 38 |
| 39 | S | SPARE | -- | -- | 20/1 | 20/1 | -- | -- | SPARE | S | 40 |
| 41 | S | SPARE | -- | -- | 20/1 | 20/1 | -- | -- | SPARE | S | 42 |
| 43 | S | SPARE | -- | -- | 20/1 | 20/1 | -- | -- | SPARE | S | 44 |
| 45 | S | SPARE | -- | -- | 20/1 | 20/1 | -- | -- | SPARE | S | 46 |
| 47 | S | SPARE | -- | -- | 20/1 | 20/1 | -- | -- | SPARE | S | 48 |
| 49 | S | SPACE | -- | -- | -- | -- | -- | -- | SPACE | S | 50 |
| 51 | S | SPACE | -- | -- | -- | -- | -- | -- | SPACE | S | 52 |
| 53 | S | SPACE | -- | -- | -- | 60/2 | -- | -- | SPARE | S | 54 |
| 55 | S | SPACE | -- | -- | -- | -- | -- | -- | " " | | 56 |
| 57 | S | SPACE | -- | -- | -- | 60/2 | -- | -- | SPD | E | 58 |
| 59 | S | SPACE | -- | -- | -- | -- | -- | -- | " " | | 60 |

ELECTRICAL LOAD CALCULATIONS:

| CONNECTED LOAD | | | DEMAND FACTOR | DEMAND LOAD | | | REMARKS: |
|---|---|---|---|---|---|---|---|
| LIGHTING | = | 3.7 KVA | X 1.25 | LIGHTING | = | 4.6 KVA | |
| RECEPTACLE | = | 9.5 KVA | NEC 220 - 14 | RECEPTACLE | = | 9.5 KVA | |
| EQUIPMENT | = | 63.9 KVA | X 1.0 | EQUIPMENT | = | 63.9 KVA | |
| KITCHEN | = | 0.0 KVA | NEC 220 - 56 | KITCHEN | = | 0.0 KVA | |
| SPARES | = | 0.0 KVA | X 0.5 | SPARES | = | 0.0 KVA | |
| TOTAL | = | 77.1 KVA | | TOTAL | = | 78.0 KVA | 325 AMPS |

## IMPORTANT ELECTRICAL UTILITY INFORMATION

**OWNER** IS RESPONSIBLE FOR CALLING AND COMPLETING THE FOLLOWING ITEMS:

- OBTAINING EASEMENTS
- PAYING ALL FEES REQUIRED BY UTILITY COMPANY
- COMPLETING CITY ADDRESS VERIFICATION FORMS
- COMPLETING "OWNER INFORMATION" PORTION OF UTILITY COMPANY LOAD FORM.

**ELECTRICAL CONTRACTOR** IS RESPONSIBLE FOR COMPLETING THE FOLLOWING ITEMS:

- CONTACTING ELECTRIC UTILITY COMPANY WITHIN ONE (1) WEEK OF JOB AWARD AND COORDINATING WITH CONSTRUCTION SCHEDULE. KEEP RECORDS OF COMMUNICATION.
- COORDINATE WITH OWNER ON THEIR REQUIRED INFORMATION ABOVE. KEEP OWNER INFORMED OF ANY ADDITIONAL OWNER REQUIREMENTS TO AVOID DELAYS.
- PROVIDING UTILITY WITH AUTOCAD CIVIL UTILITY PLAN AND BASE FILES SHOWING TRANSFORMER AND METER LOCATIONS. (OBTAIN FROM CIVIL ENGINEER)
- COMPLETION OF ELECTRICAL PORTION OF UTILITY COMPANY LOAD FORMS BASED ON LOAD ANALYSIS PROVIDED ON THE PLANS.
- PROVIDING ELECTRICAL RISER DIAGRAM TO UTILITY FROM PLANS.

# GENERAL DISCONNECT NOTES

A. WHEN THE LENGTH OF THE SECONDARY CONDUCTORS OF ANY TRANSFORMER EXCEEDS TEN FEET, PROVIDE AN ENCLOSED CIRCUIT BREAKER OR FUSED DISCONNECT WITHIN TEN FEET OF THE TRANSFORMER SECONDARY TERMINALS IN ACCORDANCE WITH NEC ARTICLE 240-21(C)(2). THIS OVERCURRENT DEVICE SHALL HAVE AN AMP RATING EQUAL TO THE AMP RATING OF THE PANEL BEING SERVED. THE PANEL BEING FED MAY BE CHANGED TO MAIN LUG ONLY.

B. PROVIDE LUG KITS AND/OR WIRING GUTTERS FOR PANELS WITH OVERSIZED CONDUCTORS DUE TO VOLTAGE DROP AND/OR DISTANCE. MAKE CONNECTIONS IN ACCORDANCE WITH THE NEC,

C. PROVIDE SHOP DRAWINGS OF ALL ELECTRIC ROOMS INDICATING ALL PANEL, TRANSFORMER AND DISCONNECT LOCATIONS. ELECTRICAL EQUIPMENT MAY SHIFT IN LOCATION TO INSURE PROPER CLEARANCES.

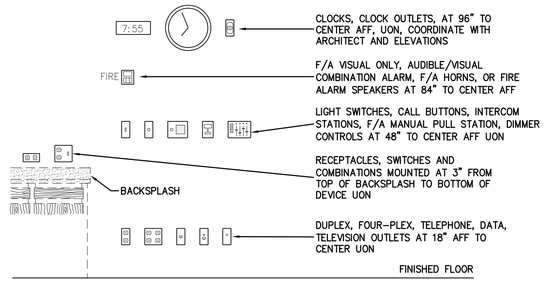
D. REFERENCE "DISCONNECT SCHEDULE" FOR ADDITIONAL DISCONNECT INFORMATION.

ESC-71

# SURGE PROTECTION DEVICE SCHEDULE

**STANDARDS:**
A. PROVIDE TVSS SURGE SUPPRESSION PER LATEST UL. BASIS OF DESIGN, CURRENT TECHNOLOGY. TVSS MUST BE ABLE TO BE SERVICEABLE WITHOUT SHUTTING PANEL OFF.
B. 3RD PARTY SINGLE IMPULSE SURGE CURRENT TEST MUST BE PROVIDED WITH SUBMITTAL VERIFYING PERFORMANCE MEETS SPECIFICATIONS.
C. WHERE FLUSH MOUNT PANELS ARE SPECIFIED, COORDINATE 'PX3' PANEL MANUFACTURER OPTION WITH ELECTRICAL CONTRACTOR.
D. REFERENCE SPECIFICATIONS FOR ADDITIONAL INFORMATION.
E. VOLTAGE AND CONFIGURATION TO MATCH PANEL BEING SERVICED. REFERENCE RISER DIAGRAM AND PANEL SCHEDULES.
E. PROVIDE FILTER OPTION.
F. 15 YEAR WARRANTY STANDARD.
G. CABLE ENTRY TO BE COORDINATED WITH ELECTRICAL CONTRACTOR.
H. QUANTITIES PER RISER DIAGRAM.
I. PROVIDE NEMA 3R WHEN MOUNTED OUTSIDE. REFERENCE PLANS AND RISER DIAGRAM.

| MARK | TYPE: SCB | SCD | SXX | CUP | SURGE CURRENT RATING (IN KA PER MODE PER PHASE): 50/100 | 100/200 | 125/250 | 150/300 | 200/400 | 250/500 | 300/600 | DISCLOSURE: NEMA 1 | NEMA 3R | MONITORING: NM | NM2 | NMX | MOUNTING: SURFACE | FLUSH | APPLICATION (WHERE SPECIFIED ON RISER) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ● | | | ● | | | | | | | ● | | | ● | | | ● | SERVICE ENTRANCES, ONLY WHERE SHOWN |




## MOUNTING HEIGHT DETAIL

NO SCALE EDE-10

# RISER KEYED NOTES

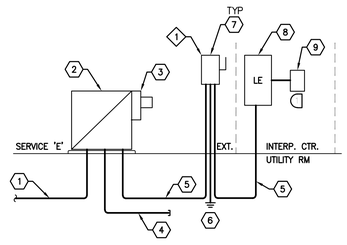
1. ONE (1) - 3" PRIMARY CONDUIT PER UTILITY COMPANY REQUIREMENTS.
2. NEW UTILITY TRANSFORMER PROVIDED AND INSTALLED BY UTILITY COMPANY. TRANSFORMER PAD BY ELECTRICAL CONTRACTOR PER UTILITY COMPANY REQUIREMENTS.
3. METER AT TRANSFORMER PROVIDED BY UTILITY COMPANY AND INSTALLED BY ELECTRICAL CONTRACTOR PER UTILITY COMPANY REQUIREMENTS.
4. STUB THE MAXIMUM NUMBER OF SPARE SECONDARY CONDUITS ALLOWED BY UTILITY COMPANY TO A POINT 5' OUTSIDE TRANSFORMER PAD. INDICATE EXACT LOCATION OF CONDUITS ON RECORD DRAWINGS.
5. REFERENCE PANELBOARD CONNECTION SCHEDULE FOR CONDUIT/WIRING SIZES AND QUANTITIES.
6. REFERENCE SERVICE GROUNDING DETAIL ON DETAIL SHEET(S) FOR GROUNDING REQUIREMENTS.
7. REFERENCE DISCONNECT SCHEDULE FOR ADDITIONAL INFORMATION.
8. REFERENCE PANELBOARD SCHEDULE.
9. REFERENCE SURGE PROTECTION DEVICE SCHEDULE FOR ADDITIONAL INFORMATION.

**UTILITY COMPANY CONTACT:**
**PEDERNALES ELECTRIC COOP**

BRIAN SLATON - 512-525-4120
BRIAN.SLATON@PECI.COM

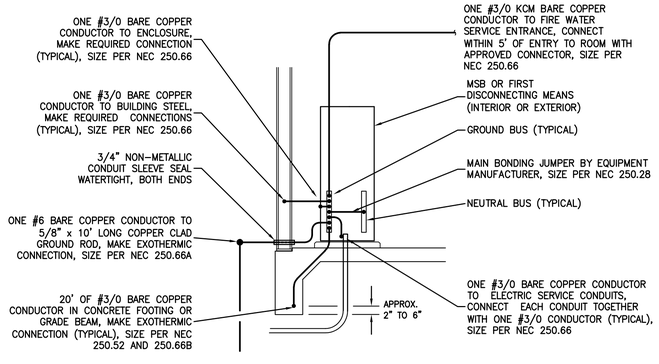
UTILITY COMPANY TO DETERMINE SERVICE TRANSFORMER SIZES. DO NOT BEGIN ANY UTILITY WORK UNTIL UTILITY DRAWINGS HAVE BEEN ISSUED BY UTILITY COMPANY. UTILITY COMPANY TO PROVIDE AVAILABLE FAULT CURRENT WHEN AVAILABLE.

**THE ELECTRICAL RISER DIAGRAM IS SHOWN SCHEMATICALLY IN NATURE TO INDICATE THE RELATIONSHIP OF THE ELECTRICAL SYSTEM COMPONENTS. IT DOES NOT REFLECT THE ACTUAL ROUTING OF CONDUITS. CONTRACTOR SHALL DETERMINE OVERHEAD OR UNDERGROUND CONDUIT ROUTING AND COORDINATE ALL ROUTING WITH LANDSCAPE ARCHITECT AND CIVIL TO MINIMIZE IMPACT TO EXISTING TREES AND NATURAL AREAS. CONDUIT SHALL NOT BE ROUTED EXPOSED ON EXTERIOR WALLS EXCEPT OUT OF THE BOTTOM OF THE PANEL TO RUN UNDER SLAB OR TO AN ADJACENT PANEL WITHIN 24". EXTERIOR EXPOSED CONDUIT SHALL BE MINIMIZED.**



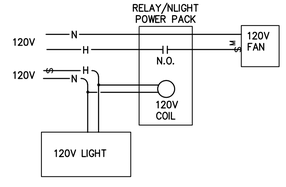

## 05 ELECTRICAL RISER DIAGRAM - SERVICE 'E'

SCALE: NONE INTERPRETIVE CENTER




## TYPICAL ELECTRIC SERVICE GROUNDING DETAIL

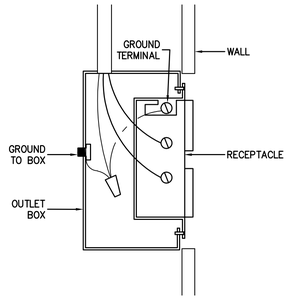
NO SCALE (CONDUCTOR SIZES SHOWN MAY BE ADJUSTED PER NEC FOR THE ACTUAL AMPACITY OF SERVICE) EDE-53




120V FAN CONTROLLED WITH 120V LIGHT ON SEPERATE CIRCUIT. IF FAN AND LIGHT ARE BOTH ON SAME CIRCUIT SIMPLE WIRE IN PARALLEL.

## EXHAUST FAN/HEATER CONTROL

SCALE: NONE EDE-90




## RECEPTACLE GROUNDING DETAIL

NO SCALE EDE-57

**ELECTRICAL CONTRACTOR TO COORDINATE METER AND SERVICE LOCATION WITH DOOR LOCATION. CLEARANCES TO MEET N.E.C.**

**GEAR MANUFACTURER TO PROVIDE COORDINATION STUDY, FAULT CURRENT ANALYSIS AND DETERMINE FINAL KAIC RATINGS FOR ALL GEAR.**

REFERENCE GENERAL NOTES ON SHEETS M000, P000 AND E000 FOR ADDITIONAL INFORMATION

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# RIVER RANCH COUNTY PARK INTERPRETIVE CENTER

WILLIAMSON COUNTY, TX

STATE OF TEXAS
B.J. HENDRIX
94813
LICENSED
PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY B.J. HENDRIX, P.E. NO. 94813 ON: 02/22/2019

ISSUE DATE: FEBRUARY 22, 2019

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DRAWN: REVIEWED:

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PROJECT NUMBER: 5619

**SCHEDULES & DETAILS - ELECTRICAL**

SHEET NUMBER

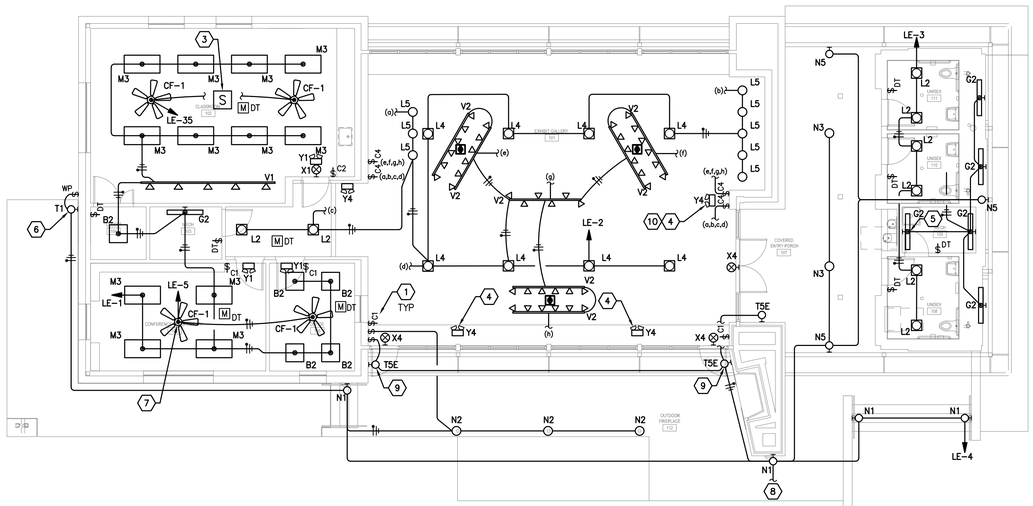
**E002**

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## KEYED NOTES

THESE NOTES APPLY TO THIS SHEET ONLY

1. LOW VOLTAGE LIGHTING CONTROL BUTTON. REFERENCE MISCELLANEOUS EQUIPMENT SCHEDULE AND NLIGHT INTERIOR LIGHTING SCHEDULE.
2. COORDINATE LIGHTS WITH ARCHITECTURAL CEILING TREATMENT.
3. 2'X2' LAY-IN SPEAKER BY OTHERS. SHOWN FOR INFORMATION ONLY.
4. EMERGENCY FIXTURE MOUNTED IN CEILING.
5. MOUNT FIXTURES ABOVE DOOR ELEVATION. COORDINATE HEIGHT WITH MECHANICAL EQUIPMENT AND DUCTWORK IN ROOM.
6. EXTERIOR WALLPACK IS SWITCHED TO USE FOR MAINTENANCE.
7. PROVIDE T-BAR J-BOX TO SUPPORT FAN. J-BOX TO BE INDEPENDENTLY SUPPORTED FROM STRUCTURE. J-BOX TO HAVE APPROPRIATE CUBIC INCHES PER NEC FOR SPECIFIED WIRE SIZE.
8. ROUTE SWITCHLEG THROUGH LIGHTING CONTACTOR FOR PHOTOCELL/TIMECLOCK CONTROL.
9. MOUNT AS HIGH AS POSSIBLE IN EAVE, APPROXIMATELY 11' AFF. COORDINATE ELEVATION WITH ARCHITECT PRIOR TO ROUGH-IN.
10. EMERGENCY LIGHT SHALL BE WALL MOUNTED. FIXTURE SHOWN AWAY FROM WALL FOR CLARITY ONLY.




## ALL LIGHT FIXTURES ARE TYPE 'M3' UNLESS OTHERWISE NOTED.

# 01 FLOOR PLAN - LIGHTING

SCALE: 1/8" = 1'-0"

REFERENCE GENERAL NOTES ON SHEETS M000, P000 AND E000 FOR ADDITIONAL INFORMATION

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# RIVER RANCH COUNTY PARK INTERPRETIVE CENTER

## WILLIAMSON COUNTY, TX

STATE OF TEXAS
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Engineer: B. J. MICHAEL HENDRIX, PE
P.E. No.: CENSED 98199
Date: XX-XX-XX
NAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY B.J. HENDRIX, P.E. NO. 94813
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## FLOOR PLAN - LIGHTING

SHEET NUMBER

# E210

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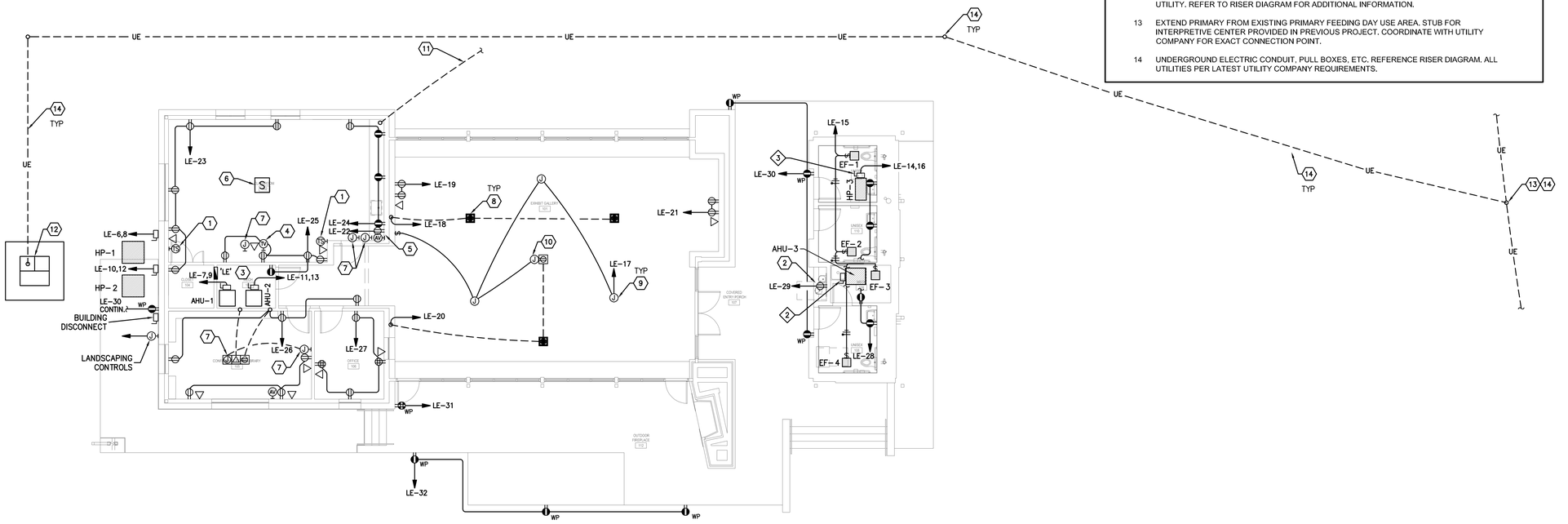
**FOR LOCATIONS WHERE POWER AND DATA ARE SHOWN TOGETHER, DEVICE ROUGH-IN IS TO BE A MAXIMUM OF 6" APART. PROVIDE CADDY BRACKETS AS REQUIRED.**

**REFERENCE MECHANICAL FAN SCHEDULE FOR EXHAUST FAN SWITCHING REQUIREMENTS**

## KEYED NOTES

THESE NOTES APPLY TO THIS SHEET ONLY

1. RECEPTACLE, DATA, TEACHER STATION (FOR AV CONTROLS) FOR TEACHER'S DESK LOCATION. REFERENCE TELECOM/DATA SYMBOL SCHEDULE AND DETAILS FOR EXACT ROUGH-IN INFORMATION.
2. WASH FOUNTAIN / EWC POWER. RECEPTACLE FOR POWER BEHIND WASH FOUNTAIN OR EWC TO HAVE GFCI BREAKER AT PANEL. COORDINATE FINAL ROUGH-IN LOCATION.
3. ELECTRICAL PANELS. DO NOT RUN ANY PIPING OR DUCTWORK OVER ELECTRIC PANELS.
4. CONVENIENCE RECEPTACLE MOUNTED ON WALL AT STANDARD RECEPTACLE HEIGHT. TV RECEPTACLE MOUNTED HIGH IN WALL. COORDINATE TV RECEPTACLE LOCATION WITH ARCHITECTURAL ELEVATIONS PRIOR TO ROUGH-IN.
5. POWER AND AV IN CABINET FOR AMPLIFIER AND AV CABLING. COORDINATE LOCATION WITH OWNER AND ARCHITECT PRIOR TO ROUGH-IN.
6. 2'X2' LAY-IN SPEAKER BY OTHERS. SHOWN FOR INFORMATION ONLY.
7. J-BOX WITH 1 1/2"C TO ABOVE CEILING. COORDINATE ROUGH-IN LOCATION WITH OWNER PRIOR TO ROUGH-IN.
8. FLOOR DEVICES. VERIFY EXACT LOCATION OF ALL FLOOR DEVICES WITH ARCHITECT PRIOR TO ROUGH-IN.
9. POWER IN CEILING FOR EXHIBITS. COORDINATE LOCATIONS WITH ARCHITECT PRIOR TO ROUGH-IN.
10. SURFACE MOUNTED J-BOX WITH POWER FOR EXHIBIT. CENTER EXPOSED CONDUIT ON BOTTOM OF RIDGE BEAM. COORDINATE EXPOSED CONDUIT ROUTING WITH ARCHITECT PRIOR TO INSTALLATION. COORDINATE EXACT LOCATION OF J-BOX WITH ARCHITECT.
11. 2-2"C FOR TECHNOLOGY TO NEAREST POWER POLE. REFERENCE SITE PLAN. COORDINATE LOCATION WITH GENERAL CONTRACTOR. STUB COMMUNICATION CONDUITS AT BASE OF POLE PER SERVICE PROVIDER REQUIREMENTS. VERIFY FINAL REQUIREMENTS WITH SERVICE PROVIDER. PROVIDE 3 CHAMBER MAX-CELL INNERDUCT FOR 2" CONDUITS.
12. APPROXIMATE UTILITY TRANSFORMER LOCATION. COORDINATE FINAL LOCATION WITH UTILITY. REFER TO RISER DIAGRAM FOR ADDITIONAL INFORMATION.
13. EXTEND PRIMARY FROM EXISTING PRIMARY FEEDING DAY USE AREA. STUB FOR INTERPRETIVE CENTER PROVIDED IN PREVIOUS PROJECT. COORDINATE WITH UTILITY COMPANY FOR EXACT CONNECTION POINT.
14. UNDERGROUND ELECTRIC CONDUIT, PULL BOXES, ETC. REFERENCE RISER DIAGRAM. ALL UTILITIES PER LATEST UTILITY COMPANY REQUIREMENTS.




## 01 FLOOR PLAN - POWER

SCALE: 1/8" = 1'-0"

REFERENCE GENERAL NOTES ON SHEETS M000, P000 AND E000 FOR ADDITIONAL INFORMATION

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# RIVER RANCH COUNTY PARK INTERPRETIVE CENTER

WILLIAMSON COUNTY, TX

STATE OF TEXAS
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PROJECT NUMBER: 5619

**FLOOR PLAN - POWER**

SHEET NUMBER

**E310**

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# AIR DEVICE SCHEDULE

PDSCH

| MARK | NECK SIZE | FRAME SIZE | FRAME TYPE | VOLUME DAMPER | SUPPLY | RETURN | EXHAUST | MODEL | FLEX SIZE | MAXIMUM CFM |
|---|---|---|---|---|---|---|---|---|---|---|
| A1 | 9 x 9 | 24 x 24 | LAY-IN | – | ● | – | – | PRICE MODEL SMD | 6"ø | 100 |
| A2 | 12 x 12 | 24 x 24 | LAY-IN | – | ● | – | – | PRICE MODEL SMD | 8"ø | 220 |
| A3 | 12 x 12 | 24 x 24 | LAY-IN | – | ● | – | – | PRICE MODEL SMD | 10"ø | 350 |
| | | | | | | | | | | |
| B1 | 22 x 10 | 24 x 12 | LAY-IN | – | – | ● | – | PRICE MODEL 530TB | 12"ø | 700 |
| B2 | 22 x 22 | 24 x 24 | LAY-IN | – | – | ● | – | PRICE MODEL 530TB | 18"ø | 1400 |
| | | | | | | | | | | |
| C1 | 6 x 6 | 15 x 15 | SURFACE | – | ● | – | – | PRICE MODEL AMD | 6"ø | 100 |
| C2 | 12 x 12 | 18 x 18 | SURFACE | – | ● | – | – | PRICE MODEL AMD | 8"ø | 220 |
| C3 | 12 x 12 | 18 x 18 | SURFACE | – | ● | – | – | | 10"ø | 350 |
| | | | | | | | | PRICE MODEL SMD | | |
| D1 | 8 x 8 | 10 x 10 | SURFACE | ● | – | – | ● | PRICE MODEL 630DF | – | 250 |
| | | | | | | | | | | |
| E1 | 12 x 4 | 14 x 6 | SURFACE | ● | ● | – | – | PRICE MODEL 620DLA | 8"ø | 170 |
| E2 | 16 x 4 | 18 x 6 | SURFACE | ● | ● | – | – | PRICE MODEL 620DLA | 8"ø | 200 |
| E3 | 28 x 4 | 30 x 6 | SURFACE | ● | ● | – | – | PRICE MODEL 620DLA | 12"ø | 380 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

**NOTES:**

1. COORDINATE EXACT LOCATION OF DIFFUSERS WITH ARCHITECTURAL REFLECTED CEILING PLAN.
2. ALL SUPPLY DIFFUSERS SHALL BE 4-WAY THROW UNLESS NOTED OTHERWISE.
3. ALL FLEX SHALL BE SIZED AS SCHEDULED UNLESS NOTED OTHERWISE.
4. ALL DIFFUSERS SHALL BE OFF-WHITE UNLESS NOTED OTHERWISE.
5. VERIFY FRAME TYPE WITH ACTUAL CEILING TYPE PRIOR TO PURCHASE OF AIR DEVICES.
6. ALL VOLUME DAMPERS SHALL BE OPPOSED BLADE TYPE.
7. RUN-OUTS AND DROPS FROM R/A MAIN TRUNKS SHALL BE AS FOLLOWS: UP TO 250 CFM USE 10" DIAMETER OR 10" x 8"; 251 CFM TO 450 CFM USE 12" DIAMETER OR 12" x 10"; 451 CFM TO 700 CFM USE 14" DIAMETER OR 12" x 12"; 701 CFM TO 1000 CFM USE 16" DIAMETER OR 14" x 16"; 1001 CFM TO 1400 CFM USE 18" DIAMETER OR 16" x 18", UNLESS SHOWN OTHERWISE.
8. INSULATE BACKS OF ALL AIR DEVICES.
9. PROVIDE PRICE PLASTER FRAME FOR ALL AIR DEVICES LOCATED IN GYP OR PLASTER CEILINGS.
10. AIR DEVICES LOCATED IN DAMP AREAS (SHOWERS/LOCKER ROOMS/TRAINING ROOMS) ARE TO BE OF THE SAME SIZE AND TYPE AS SHOWN ON THE AIR DEVICE SCHEDULE BUT MUST BE OF ALL ALUMINUM CONSTRUCTION. ALL DEVICES SCHEDULED TO BE ALUMINUM MUST BE ALUMINUM NO MATTER WHERE THEY ARE LOCATED.
11. TRANSITION TO AIR DEVICE NECK SIZE AS REQUIRED.
12. ALL LAY-IN AIR DEVICES ARE TO BE CONNECTED WITH FLEX DUCT. PROVIDE WITH MINIMUM 3" HIGH ROUND NECK OR SQUARE TO ROUND ADAPTER WITH 3" HIGH NECK FOR PROPER CONNECTION OF FLEX DUCT (SIZED PER SCHEDULE) TO AIR DEVICE.

*

# GENERAL NOTES

A. THE CONTRACTOR IS TO VISIT THE SITE PRIOR TO BID TO FAMILIARIZE HIMSELF WITH ALL CONDITIONS AS THEY EXIST. SUBMISSION OF BID INDICATES THE CONTRACTOR'S UNDERSTANDING OF EXISTING CONDITIONS AND HIS WILLINGNESS TO WORK WITH THESE CONDITIONS. NO ADDITIONAL TIME OR MONEY WILL BE ALLOTTED DUE TO LACK OF COORDINATION WITH EXISTING CONDITIONS OR OTHER TRADES.

B. CONTRACTORS TO REVIEW AND COMPARE ALL DRAWINGS SO ALL WORK IN THEIR RESPECTIVE TRADE IS INCLUDED IN BID. EACH CONTRACTOR SHALL INCLUDE ALL MATERIALS AND INSTALLATION REQUIRED FOR HIS PARTICULAR TRADE AFTER COMPLETE REVIEW OF ALL CONTRACT DRAWINGS AND SPECIFICATIONS.

C. ALL WORK SHALL COMPLY WITH THE CURRENT APPLICABLE LOCAL, STATE AND FEDERAL CODES AND ORDINANCES. FOLLOW RECOMMENDED PRACTICES AS SET DOWN BY ASME, SMACNA, ASHRAE, NFPA, APPLICABLE BUILDING CODE, APPLICABLE MECHANICAL CODE, APPLICABLE PLUMBING CODE, NATIONAL ELECTRICAL CODE, AGA, ADA AND OSHA, AS THEY APPLY TO THIS PROJECT, EXCEPT IN CASES WHERE LOCAL STATUTES GOVERN. THE CONTRACTOR SHALL VERIFY WITH THE LATEST ADOPTED LOCAL CODES, ORDINANCES AND AMENDMENTS THAT APPLY TO THIS PROJECT WITH THE AUTHORITY HAVING JURISDICTION.

D. MECHANICAL CONTRACTOR TO COMPLETE A MECHANICAL/ELECTRICAL EQUIPMENT COORDINATION SHEET IN SPECIFICATION SECTION 20 00 00 AND SUBMIT COMPLETED FORM WITH EQUIPMENT SUBMITTAL AND PROVIDE A COMPLETED FORM TO THE ELECTRICAL CONTRACTOR.

E. PROVIDE TRAP AND PROPER VENTING AT EACH A/C UNIT PER THE MANUFACTURER'S RECOMMENDATIONS. ROUTE CONDENSATE TO NEAREST CODE APPROVED DISPOSAL POINT.

F. TRANSITION FROM DUCT SIZE SHOWN TO ROOF OPENING SIZE FOR EXHAUST FANS AND OTHER ROOF MOUNTED EQUIPMENT. ALLOW FOR CLEARANCE BETWEEN STRUCTURAL JOISTS.

G. PROVIDE SEVEN (7) DAY PROGRAMMABLE THERMOSTATS FOR EACH AHU AND/OR RTU EQUAL TO ECOBEE EB-EMS-02 THERMOSTAT. WI-FI ENABLED WITH 1 BUTTON OVERRIDE, DEHUMIDIFICATION CAPABILITY, FREE MOBILE PHONE APPS AND EASY TO USE ECOBEE WEB PORTAL. THERMOSTAT TO HAVE FULL COLOR TOUCH SCREEN, 365 DAY SCHEDULING AND 7 DAY PROGRAMMABILITY. REFERENCE GENERAL NOTES, SCHEDULE SHEETS, PLANS AND JOB SPECIFICATIONS FOR MORE INFORMATION.

H. CONFIRM LOCATION AND MOUNTING HEIGHT OF EACH THERMOSTAT/SENSOR PRIOR TO INSTALLATION. COORDINATE WITH ARCHITECT, OWNER, MILLWORK, SWITCHES, EQUIPMENT, FURNITURE, ETC. PROVIDE INSULATED SUBBASE FOR EACH THERMOSTAT/SENSOR.

I. PROVIDE ENGRAVED LABELS FOR ALL EQUIPMENT. LABEL ALL THERMOSTATS/SENSORS TO CORRESPONDING EQUIPMENT NUMBER. PROVIDE ENGRAVED ACCESS PANEL MARKERS ON THE CEILING GRID TO INDICATE ACCESS LOCATIONS FOR EQUIPMENT ABOVE CEILING.

J. COORDINATE FRAMED OPENING THROUGH ROOF FOR EQUIPMENT. VERIFY SIZE AND METHOD WITH STRUCTURAL ENGINEER. PROVIDE ROOF SHOP DRAWING INDICATING SIZE AND LOCATION OF ROOF OPENINGS FOR COORDINATION PURPOSES.

K. COORDINATE PLACEMENT AND SUPPORT OF ALL ROOF MOUNTED EQUIPMENT CURBS AND SUPPORTS WITH STRUCTURAL PRIOR TO INSTALLATION.

L. RETURN AIR PLENUMS ON BACK OF AIR HANDLING UNITS TO BE FULL SIZE OF RETURN OPENING ON UNITS. PROVIDE MINIMUM 16" x 16" ACCESS DOOR IN RETURN PLENUM IN ACCESSIBLE LOCATION.

M. WHERE STRUCTURAL BRIDGING IS REMOVED, RE-BRIDGE ON EACH SIDE OF JOIST. VERIFY WITH STRUCTURAL ENGINEER PRIOR TO REMOVING ANY BRIDGING.

N. COORDINATE WITH ALL STRUCTURAL BRACING FOR ROUTING OF DUCT AND DIFFUSERS.

O. BEFORE ANY CUTTING OR TRENCHING OPERATIONS BEGIN, VERIFY WITH OWNER'S REPRESENTATIVE, UTILITY COMPANIES AND OTHER INTERESTED PARTIES THAT ALL AVAILABLE INFORMATION HAS BEEN PROVIDED CONCERNING EXISTING UTILITY LOCATION. VERIFY LOCATIONS GIVEN. CONTACT ARCHITECT IMMEDIATELY UPON UNCOVERING UNKNOWN UTILITIES FOR FURTHER DIRECTION. INDICATE ALL UNCOVERED UTILITIES ON RECORD DRAWINGS.

P. REFRIGERANT PIPING: THE REFRIGERATION SYSTEM SHALL BE INSTALLED COMPLETE AS A SYSTEM WITH ALL REFRIGERANT, OIL, VALVES, DEHYDRATORS, GAUGES AND CONTROLS AS REQUIRED FOR PROPER OPERATION OF THE SYSTEM. PIPING SHALL BE HARD DRAWN ACR REFRIGERANT PIPING WITH WROT FITTINGS IN ACCORDANCE WITH ARI STANDARDS, USE LONG RADIUS ELBOWS. INSULATE SUCTION LINES AND SEAL ALL CUT ENDS AND EDGES WITH ADHESIVE TO PROVIDE AN AIR TIGHT SEAL. USE 3/4" ARMAFLEX AP II INSULATION. REFRIGERANT PIPING IN INACCESSIBLE SPACES, SUCH AS WALL CAVITIES, OR IN UNDERGROUND SLEEVES IS TO BE SOFT DRAWN COPPER WITH NO FITTINGS IN THE INACCESSIBLE AREAS. ALL BENDS IN SOFT COPPER ARE TO BE MADE WITH REFRIGERATION TUBING BENDER. INSTALL COMBINATION SIGHT GLASS/MOISTURE INDICATOR NEAR LIQUID LINE CONNECTION TO OUTDOOR UNIT.

Q. FIRE/SMOKE AND/OR FIRE DAMPERS: INSTALL DAMPERS AT ALL DUCT PENETRATIONS OR RATED WALLS, TUNNELS AND CEILINGS. ALL DAMPERS TO BE OUT OF AIRSTREAM TYPE. DAMPERS TO BE INSTALLED PER MANUFACTURER'S INSTALLATION INSTRUCTIONS. PROVIDE FACTORY WALL SLEEVE AND ANGLE KIT. ACCESS PANEL TO BE PROVIDED IN DUCT FOR ACCESS TO FUSIBLE LINK AND FOR INSPECTION AND MAINTENANCE. VERIFY THE EXACT LOCATION OF ALL RATED WALLS, TUNNELS AND CEILINGS WITH ARCHITECTURAL DRAWINGS. COMBINATION FIRE/SMOKE DAMPERS TO BE INSTALLED IN ALL SMOKE WALLS AND RATED EGRESS WAYS.

R. COORDINATE LOCATION AND MOUNTING TYPE OF ALL CEILING AIR DEVICES IN ACCORDANCE WITH ARCHITECTURAL REFLECTED CEILING PLANS.

S. ROOFTOP MOUNTED EQUIPMENT TO BE PROVIDED WITH FACTORY FULL PERIMETER SLOPED CURBS TO MATCH ROOF FOR EACH UNIT. ALL OTHER ROOF MOUNTED EQUIPMENT REQUIRING A CURB LESS THAN 30" IN ANY DIMENSION TO BE PROVIDED WITH FULL PERIMETER CURB. ALL CURBS AND ROOF SUPPORTS TO ALLOW FOR ROOF SLOPE SO EQUIPMENT WILL SIT LEVEL. TOP OF CURB TO BE A MINIMUM OF 12" ABOVE FINISHED ROOF ON SHORT SIDE OR 8" ABOVE TOP OF CRICKET IF APPLICABLE.

T. INSTALL CLEAN SET OF FILTERS THROUGHOUT AT COMPLETION OF PROJECT. ANY UNITS THAT ARE OPERATED DURING CONSTRUCTION SHALL HAVE FILTER MEDIA (FIBERBOND DUAL-PLY DUSTLOK MEDIA) PLACED OVER THE EXTERIOR OF RETURN AIR GRILLES. MEDIA SHALL BE CHANGED AS FREQUENTLY AS REQUIRED TO KEEP DUCTWORK CLEAN. WHEN RETURN AIR FILTERS ARE LOCATED AT UNIT, PROVIDE INSULATED FILTER RACK SUITABLE FOR 2" THICK, FACTORY STANDARD FILTER SIZES, THAT IS AIRTIGHT WITH HINGED ACCESS DOOR AND LATCH, UNLESS SUCH A RACK IS INTEGRAL TO UNIT CONSTRUCTION.

U. ALL MECHANICAL EQUIPMENT OR GROUPS OF EQUIPMENT SERVING A COMMON AREA AND DISCHARGING OVER 2000 CFM OR SERVING EGRESS PATHWAYS SHALL HAVE SMOKE DETECTORS LOCATED IN RETURN AND DISCHARGE AIR DUCTS, AS REQUIRED BY CODE AND LOCAL AHJ. THE MECHANICAL CONTRACTOR IS TO PROVIDE, INSTALL AND WIRE SMOKE DETECTORS COMPLETE WITH REMOTE TEST SWITCH INDICATOR UNLESS THE BUILDING HAS A FIRE ALARM SYSTEM. WHEN BUILDING HAS A FIRE ALARM SYSTEM THE ELECTRICAL/FIRE ALARM CONTRACTOR IS TO PROVIDE AND WIRE THE DUCT DETECTORS BACK INTO THE FIRE ALARM CONTROL PANEL AND PROVIDE A RELAY AT THE UNIT FOR LOCAL SHUTDOWN. MECHANICAL CONTRACTOR (CONTROLS CONTRACTOR) IS TO WIRE HIS CONTROL CIRCUIT THROUGH THE RELAY CONTACTS. REFERENCE MECHANICAL AND ELECTRICAL GENERAL NOTES, SCHEDULES, PLANS AND SPECIFICATIONS FOR MORE INFORMATION.

V. PROVIDE ALL APPROPRIATE TOOLS, WRENCHES, KEYS, ETC. AS REQUIRED FOR ACCESS AND OPERATION OF VALVES, COVERS, ETC.

W. SEAL AROUND ALL DUCTWORK AND PIPING AT PENETRATIONS THROUGH SOUND WALLS WITH ACOUSTICAL SEALANT.

X. ALL ACCESS DOORS SHALL BE INSTALLED IN EASILY ACCESSIBLE LOCATIONS. RELOCATE ANY ACCESS DOOR THAT IS NOT INSTALLED IN THIS MANNER. THIS SHALL BE DONE AT NO ADDITIONAL COST TO OWNER. INSTALL MINIMUM 12" x 12" HINGED ACCESS DOORS WITH CAM LOCKS AT THE END OF ALL DUCT RUNS, AT 20' INTERVALS ALONG LENGTH OF RUN, AND ON EACH SIDE OF ELBOWS WITH TURNING VANES. REFERENCE SPECIFICATIONS FOR MORE INFORMATION.

Y. COORDINATE LOCATION OF DUCTWORK WITH LOCATION AND DEPTH OF ALL LIGHT FIXTURES PRIOR TO INSTALLATION.

Z. ABSOLUTELY NO PIPING OR DUCTWORK CAN BE ROUTED ABOVE ELECTRICAL PANELS, GEAR OR TRANSFORMERS. THE ONLY HVAC, PLUMBING, SPRINKLER PIPING OR DUCTWORK THAT CAN ENTER AN ELECTRIC ROOM ARE THOSE SPECIFICALLY SERVING THAT ROOM. THESE SERVICES CAN ONLY ENTER INTO ELECTRIC ROOM ABOVE ENTRY DOOR.

AA. ALL ROOF MOUNTED MECHANICAL EQUIPMENT MUST BE LOCATED A MINIMUM OF 10' AWAY FROM THE EDGE OF THE ROOF OR A CHANGE IN ROOF ELEVATION THAT IS GREATER THAN 30". PER OSHA REQUIREMENTS, IF ROOF MOUNTED EQUIPMENT MUST BE LOCATED CLOSER TO THE EDGE OF THE ROOF THAN 10', THERE MUST BE A PARAPET THAT IS A MINIMUM OF 42" TALL OR PROVIDE AN OSHA APPROVED SAFETY RAIL. REFERENCE THE LATEST OSHA REGULATIONS FOR MORE INFORMATION AND PROVIDE LATEST REQUIREMENTS.

BB. SEAL AROUND ALL DUCTWORK AND PIPING AT PENETRATIONS THROUGH RATED WALLS WITH FIRE SEALANT. ALL PENETRATIONS THROUGH RATED WALLS ARE TO BE SEALED ACCORDING TO THE FIRE SEALANT MANUFACTURER'S INSTALLATION INSTRUCTIONS. SUBMIT ON U.L. SYSTEM TO BE USED FOR EACH TYPE OF PENETRATION, POST A COPY OF INSTALLATION INSTRUCTIONS AT JOB SITE ACCESSIBLE TO ALL WORKERS PERFORMING WORK.

CC. ALL OPENINGS OF DUCTWORK AND MECHANICAL EQUIPMENT MUST BE COVERED WITH PLASTIC AND TIGHTLY SEALED TO PREVENT DUST AND CONSTRUCTION DEBRIS FROM ENTERING SYSTEMS, THIS INCLUDES EQUIPMENT AND DUCTWORK STORED ON SITE. IF THE MECHANICAL EQUIPMENT IS OPERATED PRIOR TO ACCEPTANCE OF THE BUILDING BY OWNER, ALL OUTLET AND INLETS OF THE SYSTEM MUST BE PROTECTED WITH ROLLED FILTER MEDIA EQUAL TO (FIBERBOND DUAL-PLY DUSTLOC MEDIA). UNITS MUST BE SHUT DOWN WHEN PAINTING, SANDING AND SIMILAR CONSTRUCTION OPERATIONS ARE BEING PERFORMED. SYSTEMS THAT ARE OPERATED DURING CONSTRUCTION MUST BE CLEANED TO NEW CONDITION BEFORE FINAL PAYMENT WILL BE APPROVED. ITEMS TO BE CLEANED INCLUDE: WHOLE DUCT SYSTEM, AIR DEVICES, BLOWERS, MOTORS, UNIT CASING, EVAPORATOR COILS, CONDENSER COILS AND ALL OTHER COMPONENT EFFECTED BY THE OPERATION OF THE SYSTEMS.

DD. ALL SUPPLY BRANCH DUCTS ARE TO HAVE BALANCING DAMPERS WITH MANUAL LOCKING QUADRANT OPERATORS, PROVIDE STAND-OFF BRACKETS EQUIVALENT TO INSULATION THICKNESS,PROVIDE BALANCING DAMPERS IN OTHER DUCT SYSTEMS AS REQUIRED TO PROPERLY BALANCE SYSTEMS. SINGLE BLADE DAMPERS ARE ACCEPTABLE IN DUCTS 14" ROUND OR 14" TALL, LARGER DUCTS TO HAVE MULTIPLE BLADE DAMPERS. ALL DAMPER BLADES AND HARDWARE ARE TO BE FABRICATED OF SUFFICIENT GAGE AND HAVE REINFORCEMENTS AS REQUIRED TO PREVENT VIBRATION.

# MECHANICAL LEGEND

| SYMBOL | ABB. | DESCRIPTION |
|---|---|---|
| | FD | FIRE DAMPER (RE: ARCHITECTURAL DRAWINGS FOR RATED WALL LOCATIONS) |
| | FSD | COMBINATION FIRE/SMOKE DAMPER |
| | DB | DUCT BARRIER WITH SECURITY 1/2" BARS (6 x 6) EQUAL TO PRICE MODEL MSBG |
| T | TSTAT | THERMOSTAT/CONTROL DEVICE |
| TS | | REMOTE TEMPERATURE SENSOR |
| H | | HUMIDISTAT |
| CO2 | | CARBON DIOXIDE SENSOR |
| F | | FIRESTAT |
| SD | | SMOKE DETECTOR |
| AH | | ABSOLUTE HUMIDITY SENSOR |
| M | MOD | MOTOR OPERATED DAMPER |
| VS | | VENTILATION SWITCH |
| SA — SINGLE LINE | | LONG RADIUS 90° ELBOW |
| SA — DOUBLE LINE / SINGLE LINE | | BRANCH TAKE-OFF WITH DAMPER |
| SA — DOUBLE LINE / SINGLE LINE | | RADIUS DUCT SPLIT W/LOCKING SPLITTER DAMPER |
| | | CEILING SUPPLY AIR DEVICE |
| | | CEILING RETURN OR EXHAUST DEVICE |
| D | | CONDENSATE DRAIN |
| | | BALL VALVE – 2" AND SMALLER BUTTERFLY VALVE – LARGER THAN 2" |
| | O.B.D. | OPPOSED BLADE DAMPER |
| | | SMOKE SUPPLY GRILLE |
| | | POINT OF CONNECTION |
| | | MANUAL DAMPER (OBD WHEN ON MAU DUCTWORK) |
| AD | | DUCT ACCESS DOOR |

# M/P ABBREVIATION SCHEDULE

| | | | |
|---|---|---|---|
| AD | ACCESS DOOR | MAINT | MAINTENANCE |
| ABV | ABOVE | MAU | MAKEUP AIR UNIT |
| AFF | ABOVE FINISHED FLOOR | MAX | MAXIMUM |
| ARCH | ARCHITECT | MC | MECHANICAL CONTRACTOR |
| AUTO | AUTOMATIC | MBH | 1000 BTU PER HOUR |
| AUX | AUXILIARY | MECH | MECHANICAL |
| AHU | AIR HANDLING UNIT | MH | MANHOLE |
| | | MIN | MINIMUM |
| BD | BALANCE DAMPER | MISC | MISCELLANEOUS |
| BFF | BELOW FINISHED FLOOR | MTD | MOUNTED |
| BLDG | BUILDING | MOD | MOTOR OPERATED DAMPER |
| BOD | BOTTOM OF DUCT | | |
| BOP | BOTTOM OF PIPE | NIC | NOT IN CONTRACT |
| BF | BOOSTER FAN | N.O. | NORMALLY OPEN |
| | | N.C. | NORMALLY CLOSED |
| CLG | CEILING | NO. | NUMBER |
| CLR | CLEAR/CLEARANCE | NTS | NOT TO SCALE |
| CO | CLEANOUT | | |
| COL | COLUMN | O/A | OUTDOOR AIR |
| CONC | CONCRETE | OBD | OPPOSED BLADE DAMPER |
| CONTR | CONTRACTOR | OC | ON CENTER(S) |
| CW | COLD WATER | OPNG | OPENING |
| CONN | CONNECTION | ORL | OVERFLOW RAINLEADER |
| CU | CONDENSING UNIT | OAH | OUTSIDE AIR HOOD |
| CU | COPPER | | |
| CHS | CHILLED WATER SUPPLY | PC | PLUMBING CONTRACTOR |
| CHR | CHILLED WATER RETURN | PH | PHASE |
| | | PLBG | PLUMBING |
| DIA | DIAMETER | | |
| DN | DOWN | R/A | RETURN AIR |
| DWG | DRAWING | RE: | REFERENCE/REFER TO |
| DH | DUCT HEATER | REFRIG | REFRIGERANT |
| E/A | EXHAUST AIR | REF | REFRIGERATOR |
| EC | ELECTRICAL CONTRACTOR | REQD | REQUIRED |
| EF | EXHAUST FAN | RHP | RADIANT HEAT PANEL |
| ELEC | ELECTRIC/ELECTRICAL | RL | RAINLEADER |
| EQ | EQUAL | RM | ROOM |
| EQMP | EQUIPMENT | RTU | ROOFTOP UNIT |
| EX | EXISTING | | |
| EXH | EXHAUST | S/A | SUPPLY AIR |
| E.S.P. | EXTERNAL STATIC PRESSURE | SCH | SCHEDULE |
| ERV | ENERGY RECOVERY VENTILATOR | SP | STATIC PRESSURE |
| | | SPEC | SPECIFICATION |
| FCO | FLOOR CLEAN OUT | SD | STORM DRAIN |
| FCU | FAN COIL UNIT | SF | SUPPLY FAN |
| FF | FINISHED FLOOR | | |
| FLEX | FLEXIBLE | TSP | TOTAL STATIC PRESSURE |
| FLR | FLOOR/FLOORING | TYP | TYPICAL |
| GA | GAUGE | UON | UNLESS OTHERWISE NOTED |
| GC | GENERAL CONTRACTOR | UG | UNDERGROUND |
| GEN | GENERAL | UH | UNIT HEATER |
| GYP | GYPSUM BOARD | V | VENT (PLUMBING) |
| | | V | VOLTAGE (ELECTRICAL) |
| HP | HEAT PUMP | VTR | VENT THROUGH ROOF |
| Hp | HORSEPOWER | | |
| HT | HEIGHT | W/ | WITH |
| HW | HOT WATER | W/O | WITHOUT |
| HWC | HOT WATER CIRC | WP | WATERPROOF |
| HR | HOUR | WT | WEIGHT |
| HWR | HEATING WATER RETURN | WTR | WATER |
| HWS | HEATING WATER SUPPLY | WW | WASTE WATER |
| | | WCO | WALL CLEANOUT |
| LOC | LOCATION | WH | WATER HEATER |

REFERENCE GENERAL NOTES ON SHEETS M000, P000 AND E000 FOR ADDITIONAL INFORMATION

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# RIVER RANCH COUNTY PARK INTERPRETIVE CENTER

WILLIAMSON COUNTY, TX

STATE OF TEXAS
B.J. HENDRIX
94813
LICENSED
PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY B.J. HENDRIX, P.E. NO. 94813
ON: 02/22/2019

ISSUE DATE: FEBRUARY 22, 2019

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DRAWN: _____ REVIEWED: _____

ISSUE FOR BIDS

PROJECT NUMBER: 5619

**SCHEDULES, NOTES, AND LEGENDS - MECHANICAL**

SHEET NUMBER

**M000**

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# SPLIT SYSTEM MASTER SCHEDULE

240/1

## RIVER RANCH COUNTY PARK PHASE 1 IMPROVEMENTS

JOB NO. 17-061

### UNIT TYPE BREAKDOWN

C = COOLING WITH ELECTRIC HEAT
H = HEAT PUMP WITH ELECTRIC EMERGENCY HEAT
GH = COOLING WITH HORIZONTAL SINGLE STAGE GAS HEAT
GV = COOLING WITH VERTICAL SINGLE STAGE GAS HEAT
2CM = TWO STAGE COOLING WITH MULTI-SPEED AHU AND ELECTRIC HEAT
2C = TWO STAGE COOLING WITH VARIABLE SPEED AHU AND ELECTRIC HEAT
2CM = TWO STAGE COOLING WITH MULTI-SPEED AHU AND ELECTRIC HEAT
2C = TWO STAGE COOLING WITH VARIABLE SPEED AHU AND ELECTRIC HEAT
2HM = TWO STAGE HEAT PUMP WITH MULTI-SPEED AHU AND ELECTRIC EMERGENCY HEAT
2H = TWO STAGE HEAT PUMP WITH VARIABLE SPEED AHU AND ELECTRIC EMERGENCY HEAT
2GH = TWO STAGE COOLING WITH HORIZONTAL SINGLE STAGE GAS HEAT
2GV = TWO STAGE COOLING WITH VERTICAL SINGLE STAGE GAS HEAT

### STANDARD NOTES:

A. SOME UNITS SHOWN ON THE MASTER SCHEDULE(S) MAY NOT BE USED ON THIS JOB.
B. ALL EFFICIENCIES AND CAPACITIES LISTED ARE AT ARI DEFINED CONDITIONS (80/67 ° F, 95° F AMBIENT).
C. ALL CONDENSING UNITS TO BE CAPABLE OF OPERATING AT 105°F AMBIENT.
D. VERIFY AVAILABLE VOLTAGE, PHASE AND CIRCUIT FUSE SIZE(S) WITH ELECTRICAL PLANS AND ELECTRICAL CONTRACTOR PRIOR TO RELEASING EQUIPMENT ORDER. MECHANICAL CONTRACTOR IS TO FILL IN THE "MECH/ ELECT COORDINATION SHEET" FOUND IN THE SPECIFICATIONS AND FURNISH ONE COPY TO THE ELECTRICAL CONTRACTOR AND ALSO ATTACH THIS INFORMATION TO THE EQUIPMENT SUBMITTAL PRIOR TO SUBMITTING TO ENGINEER.
E. WHEN NEUTRAL OUT SIDE AIR IS SCHEDULED, IT WILL BE PROVIDED FROM A DEDICATED OUTSIDE AIR UNIT TO THE RETURN AIR PLENUM OF THE UNIT OR DIRECTLY TO THE SPACE.
F. WHEN RAW OUTSIDE AIR IS SCHEDULED, PROVIDE AN INSULATED FILTER BOX WITH HINGED ACCESS DOOR. ROUTE OUTSIDE AIR DUCT FROM ROOF CAP OR EXTERIOR WALL LOUVER TO RETURN AIR PLENUM. PROVIDE A MANUAL BALANCING DAMPER AND A MOTORIZED DAMPER IN OUTSIDE AIR DUCT. THE FILTER BOX AND DAMPERS MUST BE EASILY ACCESSIBLE FROM THE AIR HANDLER SERVICE AREA. FILTER SIZE TO BE 12X12X2 IN DUCTS WITH UP TO 200 CFM AND 16X20X2 IN DUCTS WITH 200 TO 800 CFM.
G. ALL UNITS TO BE PROVIDED WITH HARD START KIT.
H. PROVIDE WITH STANDARD 2" FILTER BASE WITH HINGED ACCESS DOOR.
I. AIR PURIFICATION: PROVIDE GLOBAL PLASMA SOLUTIONS, BI-POLAR ION GENERATOR MODEL NUMBER - GPS-FC-3-BAS FOR ALL UNITS LISTED IN SCHEDULE BELOW. INSTALL PER MANUFACTURERS INSTALLATION INSTRUCTIONS. POWER SUPPLY IS 24 VAC AT 12VA COORDINATE ELECTRICAL REQUIREMENTS WITH UNIT MANUFACTURER PRIOR TO INSTALLING. PROVIDE LARGER UNIT TRANSFORMER IF REQUIRED. CONTACT HTS FOR PRICING. 512-745-0555 OR derrick.vanwest@hts.com

### SEE SPECIFICATIONS FOR ALL STANDARD ACCESSORIES, FEATURES, AND CONTROLS REQUIRED.

### ACCESSORIES AND NOTES: (ONLY ACCESSORIES NOTED IN THE SCHEDULE BELOW ARE TO BE PROVIDED)

1. DUCT SMOKE DETECTOR IN SUPPLY AND / OR RETURN AIR DUCT AS REQUIRED BY AUTHORITY HAVING JURISDICTION, PROVIDED AND WIRED BY FIRE ALARM CONTRACTOR AND INSTALLED BY MECHANICAL CONTRACTOR. FIRE ALARM CONTRACTOR SHALL PROVIDE A SHUT DOWN RELAY AND MAKE CONNECTIONS FROM DETECTOR TO RELAY. CONTROLS CONTRACTOR SHALL PROVIDE WIRE AND CONNECTIONS FROM CONTROL RELAY TO AIR HANDLING UNIT. IF A FIRE ALARM SYSTEM IS NOT PROVIDED, THE MECHANICAL CONTRACTOR IS TO PROVIDE AND INSTALL DUCT DETECTOR, SHUT DOWN RELAY, REMOTE TEST SWITCH AND AUDIBLE/ VISUAL INDICATOR.
2. PROVIDE HIGH EFFICIENCY / CAPACITY (MERV 8) 5" THICK PLEATED FILTER AND CASING EQUAL TO LENNOX BMAC.
3. PROVIDE CONDENSATE PUMP.
4. PROVIDE CO2 SENSOR MOUNTED 18" FROM UNIT THERMOSTAT/SENSOR TO MONITOR SPACE CONDITIONS. OUTSIDE AIR DAMPER IS TO CLOSE WHEN UNIT IS OFF AND OPEN TO MAXIMUM O/A POSITION (100% OF RAW O/A CFM SCHEDULED) ANY TIME SPACE IS OCCUPIED AND CO2 LEVEL IS ABOVE 800 PPM.
5. PROVIDE LOW AMBIENT CONTROL DOWN TO 30 DEGREES F, FREEZESTAT AND COMPRESSOR LOW AMBIENT CUT-OFF
6. PROVIDE UNIT WITH THERMOSTAT HAVING TWO REMOTE SENSORS EACH HAVING 50% AUTHORITY EACH.
7. PROVIDE UNIT WITH ECONOMIZER.

### TWO STAGE HEAT PUMP SPLIT SYSTEM WITH AUXILLARY ELECTRIC HEAT

| INDOOR/OUTDOOR | | UNIT TYPE | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 2H2 | 2H3 | 2H4 | 2H5 | | | |
| CFM | | 800 | 1200 | 1600 | 1950 | | | |
| MINIMUM GROSS SENSIBLE BTUH | | 19504 | 27660 | 37494 | 45673 | | | |
| MINIMUM GROSS TOTAL BTUH | | 24720 | 35306 | 47931 | 57382 | | | |
| SEER | | 18 | 17 | 17 | 16.5 | | | |
| EER | | 13 | 12 | 12 | 12.5 | | | |
| HSPF | | 9 | 9.5 | 9 | 9.2 | | | |
| COP | | 3.34 | 3.68 | 3.48 | 3.48 | | | |
| INDOOR UNIT VOLTAGE/ PHASE | | 240/1 | 240/1 | 240/1 | 240/1 | | | |
| FAN MOTOR HP | | 0.5 | 0.5 | 1 | 1 | | | |
| EXTERNAL STATIC PRESSURE (IN. WC) | | 0.5 | 0.5 | 0.5 | 0.5 | | | |
| HEAT KW AT RATED VOLTAGE | | 6 | 9 | 12.5 | 15 | | | |
| OUTDOOR UNIT VOLTAGE/ PHASE | | 240/1 | 240/1 | 240/1 | 240/1 | | | |
| TRANE | INDOOR UNIT (AHU) | TEM6A0B24 | TEM6A0C36 | TEM6A0D48 | TAM7B0C60 | | | |
| | ELECTRIC HEATER | BAYHTR1508 | BAYHTR1516BR | BAYHTR15163R | BAYEVBC15BK | | | |
| | OUTDOOR UNIT (HP) | 4TWR7024 | 4TWR7036 | 4TWR7048 | 4TWR7060 | | | |
| MAXIMUM INDOOR UNIT WEIGHT (LBS) | | 200 | 200 | 225 | 300 | | | |
| MAXIMUM OUTDOOR UNIT WEIGHT (LBS) | | 270 | 275 | 350 | 350 | | | |

TOTAL RAW O/A = 0 TOTAL TONS = 0
TOTAL NEW O/A = 0 TOTAL HEATING KW = 0

| UNIT MARK | UNIT TYPE | O/A CFM RAW | O/A CFM NEAUTRAL | ACCESSORIES AND NOTES | UNIT MARK | UNIT TYPE | O/A CFM RAW | O/A CFM NEAUTRAL | ACCESSORIES AND NOTES |
|---|---|---|---|---|---|---|---|---|---|
| AHU/HP-1 | 2H5 | 200 | | 1, 4, 5, 7 | | | | | |
| AHU/HP-2 | 2H5 | 150 | | 1, 4, 5, 7 | | | | | |

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SHEET NUMBER

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# MISCELLANEOUS EQUIPMENT SCHEDULES

## ROOF HOODS

**ROOF HOOD (H):**
GREENHECK WALL OR ROOF CAP AS DESCRIBED BELOW.

MODEL WC EXHAUST: (4", 6" OR 8" ROUND) HOODED WALL CAP. ALUMINUM CONSTRUCTION WITH BUILT IN BIRD SCREEN AND BACKDRAFT DAMPER.

MODEL WC INTAKE: (4", 6" OR 8" ROUND) HOODED WALL CAP. ALUMINUM CONSTRUCTION WITH BUILT IN BIRD SCREEN.

GRS: (8" TO 48" ROUND IN 2" INCREMENTS) ROUND RO0F CAP WITH BUG SCREEN AND CURB (CURB MUST EXTEND A MINIMUM OF 12" ABOVE FINISHED ROOF COORDINATE WITH ROOFING CONSULTANT DRAWINGS).

FABRAHOOD: SQUARE OR RECTANGULAR ROOF CAP WITH BUG SCREEN AND CURB (CURB MUST EXTEND A MINIMUM OF 12" ABOVE FINISHED ROOF COORDINATE WITH ROOFING CONSULTANT DRAWINGS).

NOTES:
A. HOODS INSTALLED ON METAL STANDING SEAM ROOFS: ROOF CURB IS TO BE FURNISHED, INSTALLED, FLASHED AND COUNTER FLASHED BY ROOFING CONTRACTOR. MECHANICAL CONTRACTOR IS TO COORDINATE SIZE AND LOCATION. CURB IS TO EXTEND A MINIMUM OF 12" ABOVE FINISHED ROOF ON SHORT SIDE.

B. HOODS INSTALLED ON BUILT-UP ROOF: ROOF CURB IS TO BE FLASHED AND COUNTER FLASHED BY ROOFING CONTRACTOR. MECHANICAL CONTRACTOR IS TO FURNISH AND INSTALL ROOF CURB AND COORDINATE LOCATION. CURB IS TO EXTEND A MINIMUM OF 12" ABOVE FINISHED ROOF ON SHORT SIDE.

| MARK NO. | GREENHECK WC EXHAUST | GREENHECK WC INTAKE | GREENHECK GRS | GREENHECK FABRAHOOD | NOT USED | NOT USED |
|---|---|---|---|---|---|---|
| H-1 | . | . | 8" | . | . | . |
| . | . | . | . | . | . | . |
| . | . | . | . | . | . | . |
| . | . | . | . | . | . | . |

## LOUVERS

**LOUVER (L):**
GREENHECK MODEL ESD-403, 4 INCH DEEP EXTRUDED ALUMINUM CONSTRUCTION. VERIFY FINISH WITH ARCHITECT PRIOR TO ORDERING. COORDINATE FRAME TYPE WITH ARCHITECT AND BUILDING CONSTRUCTION. PROVIDE WITH 1/8" X 1/8" GALVANIZED HARDWARE CLOTH BEE SCREEN.

| MARK NO. | SIZE ( W x H ) | CFM | VELOCITY FPM | PRESSURE DROP | WATER PENETRATION | STORM/WND RESISTANT |
|---|---|---|---|---|---|---|
| L1 | 48 x 12 | . | . | . | . | . |
| L2 | 48 x 12 | . | . | . | . | . |
| L3 | 36 x 12 | . | . | . | . | . |

## BAROMETRIC RELIEF DAMPERS

**BAROMETRIC RELIEF DAMPER (BRD):**
IF NO ACTUATOR IS SHOWN USE THIS DAMPER:
GREENHECK MODEL BR-30, VERTICAL MOUNT HORIZONTAL AIRFLOW OR BR-10, HORIZONTAL MOUNT VERTICAL AIRFLOW UP. FRAME IS TO BE 16 GAUGE GALVANIZED STEEL. BLADES ARE TO BE HEAVY GAUGE FORMED ALUMINUM (0.063") ECCENTRICALLY PIVOTED, 3/8" SQUARE PLATED STEEL AXLES WITH 316 STAINLESS STEEL PRESS-FIT BALL BEARINGS WITH ACETAL RACES. SIDE MOUNT OUT OF AIRSTREAM LINKAGE PRESSURE ACTIVATED VINYL BLADE SEALS, EPDM SEGMENTED JAMB SEALS, BLADE MOUNTED ADJUSTABLE COUNTER BALANCE WEIGHTS WITH SELECTABLE START OPEN FROM .05 TO .13 IN. WG. SET TO MAINTAIN .05" W.G. POSITIVE PRESSURE (ADJUSTABLE) INSIDE BUILDING.

IF THERE IS AN ACTUATOR SCHEDULED USE THIS DAMPER:
GREENHECK MODEL, VCD-23 WITH BELIMO NFB ACTUATOR. FRAME IS TO BE 16 GAUGE GALVANIZED STEEL. BLADES ARE TO BE 16 GAUGE GALVANIZED STEEL. 1/2" ROUND STEEL AXLES WITH 304 STAINLESS STEEL BEARINGS. SIDE MOUNT OUT OF AIRSTREAM LINKAGE, TPE BLADE SEALS, 304SS JAMB SEALS. PROVIDE TWO POSITION OR MODULATING CONTROL AS SCHEDULED. COORDINATE WITH CONTROLS CONTRACTOR AND SPECIFICATIONS.

| MARK NO. | SIZE | CFM | FPM | 2 POSITION ACTUATOR | MODULATING ACTUATOR | NOT USED |
|---|---|---|---|---|---|---|
| BRD | 36 x 12 | . | . | . | . | . |
| . | . | . | . | . | . | . |

# FAN SCHEDULE

EFSCH

| MARK NO. | GREENHECK MODEL NO. | CFM | S.P. | RPM | DRIVE | H.P. | VOLT/PH | WATTS OR AMPS | ACCESSORIES |
|---|---|---|---|---|---|---|---|---|---|
| EF-1 | SP-B110 | 75 | .375" | 950 | DIRECT | – | 120/1 | 80 W | 12 |
| EF-2 | SP-B110 | 75 | .375" | 950 | DIRECT | – | 120/1 | 80 W | 12 |
| EF-3 | SP-B110 | 75 | .375" | 950 | DIRECT | – | 120/1 | 80 W | 12 |
| EF-4 | SP-B110 | 75 | .375" | 950 | DIRECT | – | 120/1 | 80 W | 12 |
| | . | . | . | . | . | . | . | . | . |
| | . | . | . | . | . | . | . | . | . |

**STANDARD NOTES - APPLIES TO ALL FANS**
A. BALANCE ALL FANS TO ACTUAL CFM SHOWN ON FLOOR PLANS.
B. BIRD SCREEN.
C. FANS INSTALLED ON METAL STANDING SEAM ROOFS: ROOF CURB IS TO BE FURNISHED, INSTALLED, FLASHED AND COUNTER FLASHED BY ROOFING CONTRACTOR. MECHANICAL CONTRACTOR IS TO COORDINATE SIZE AND LOCATION. CURB IS TO EXTEND A MINIMUM OF 12" ABOVE FINISHED ROOF ON SHORT SIDE.
D. FANS INSTALLED ON BUILT-UP ROOF: ROOF CURB IS TO BE FLASHED AND COUNTER FLASHED BY ROOFING CONTRACTOR. MECHANICAL CONTRACTOR IS TO FURNISH AND INSTALL ROOF CURB AND COORDINATE LOCATION. CURB IS TO EXTEND A MINIMUM OF 12" ABOVE FINISHED ROOF ON SHORT SIDE.
E. FACTORY DISCONNECT.
F. PROVIDE EACH ROOF MOUNTED FAN WITH OPPOSED BLADE DAMPER WITH HEAVY DUTY MOTORIZED ACTUATOR (MATCH FAN VOLTAGE) UNLESS SPECIFICALLY NOTED OTHERWISE. ELECTRICAL CONTRACTOR TO TIE DAMPER ACTUATOR IN TO FAN POWER.
G. UNIT WEIGHT LESS THAN 100 LBS, UNLESS NOTED OTHERWISE.
H. COORDINATE ALL FINAL FAN LOCATIONS AND FRAMING WITH STRUCTURAL.
I. ALL ALTERNATE MANUFACTURER'S FANS MUST OPERATE WITH CFM, RPM AND HP RANGE AS FANS LISTED ABOVE TO ALLOW FLEXIBILITY. FANS MAY NOT BE DOWN SIZED.
J. FAN SPEED CONTROL (MOUNTED UNDER DOME ON ROOF FANS OR NEXT TO CABINET FANS FOR ALL DIRECT DRIVE FANS).
K. DUCT DROPS ARE TO BE FULL SIZE OF DAMPER OR SIZED AT .08" SP WHICHEVER IS GREATER OR AS SPECIFICALLY NOTED.
L. POWDER COATED METAL IS NOT ALLOWED TO BE USED IN LIEU OF GALVANIZED UNLESS SPECIFICALLY SCHEDULED.
M. EXHAUST FANS / OUTLETS TO BE LOCATED A MINIMUM OF 10' AWAY FROM OUTSIDE AIR INTAKES OR AS REQUIRED BY LOCAL CODES.

**ACCESSORIES AND NOTES**
1. UPBLAST GREASE FAN ACCESSORIES: FAN TO BE UL AND cUL LISTED FOR GREASE REMOVAL, HEAT BAFFLE, BIRD GUARD, HINGE KIT, DRAIN CONNECTION, GREASE TRAP AND VENTED CURB EXTENSION (MUST MEET THE NFPA 96 REQUIREMENT FOR A 40" DISCHARGE HEIGHT). PROVIDE WITH SEPARATE CURB FROM ANY SUPPLY FAN.
2. KITCHEN SUPPLY FAN ARRANGEMENT "DB" ACCESSORIES: EXHAUST FAN AND SUPPLY FAN TO BE MOUNTED ON **SEPARATE** CURBS AND PROVIDE MOPPED IN EQUIPMENT SUPPORT RAIL WITH GALVANIZED UNISTRUT SUPPORT FOR WEATHER HOOD, MOTORIZED INTAKE DAMPER, SPACER SECTION (TO MAINTAIN 10 FEET SEPARATION FROM EXHAUST FAN), FILTER SECTION THAT ACCOMMODATES 2" FILTERS, WEATHER HOOD, SUPPLY FAN INTERLOCKED TO RUN WITH KITCHEN EXHAUST FAN. KITCHEN EXHAUST FAN IS TO RUN AND SUPPLY FAN IS TO GO OFF IN THE EVENT THAT A FIRE IS DETECTED. FURNISH WITH REMOTE OR FAN CASING MOUNT PREWIRED KITCHEN FAN CONTROL CENTER WITH STARTERS, DISCONNECTS, CONTROL TRANSFORMERS, AND SINGLE POINT ELECTRICAL CONNECTION. ELECTRICAL CONTRACTOR TO MAKE ALL CONTROL AND LINE VOLTAGE TERMINATIONS AND FEED THROUGH CONNECTIONS REQUIRED FOR A COMPLETE AND OPERATIONAL SYSTEM. 120 VOLT CONTROL VOLTAGE FOR HOOD FAN PACKAGE IS TO BE OBTAINED FROM HOOD LIGHTING CIRCUIT.
3. DIRECT FIRED GAS HEAT.
4. ELECTRIC HEAT.
5. PERFORATED BAFFLE INSTALLED AT INLET.
6. GRAVITY BACK DRAFT DAMPER.
7. RADIATION DAMPER (CEILING MOUNTED FANS).
8. COMBINATION NEOPRENE / SPRING VIBRATION ISOLATION.
9. INLET GUARD.
10. BELT GUARD.
11. MAGNETIC MOTOR STARTER.
12. SWITCHED WITH LIGHTS BY ELECTRICAL CONTRACTOR. ELECTRICAL CONTRACTOR TO PROVIDE ALL RELAYS AND APPURTENANCES.
13. SWITCHED BY SPRING WOUND TIMER ( I HR MAX) PROVIDED BY ELECTRICAL CONTRACTOR. LOCATE NEXT TO ROOM LIGHT SWITCH UNLESS OTHERWISE NOTED.
14. SWITCHED BY WALL SWITCH WITH PILOT LIGHT BY ELECTRICAL CONTRACTOR. LOCATE NEXT TO ROOM LIGHT SWITCH UNLESS OTHERWISE NOTED.
15. SWITCHED BY HOOD MOUNTED SWITCH WITH PILOT LIGHT BY ELECTRICAL CONTRACTOR.
16. SWITCHED BY THERMOSTAT. THERMOSTAT PROVIDED BY MECHANICAL CONTRACTOR. INSTALLED BY ELECTRICAL CONTRACTOR.
17. CONTROLLED BY ENERGY MANAGEMENT SYSTEM.
18. 120V/1PH MOTORIZED DAMPER FOR INLINE FAN TIED IN TO FAN POWER.
19. EXPLOSION PROOF FAN, WIRE TO RUN CONTINUOUSLY
20. PERFORATED BAFFLE INSTALLED AT INLET.
21. INTERLOCKED WITH DISHWASHER.
22. DRYER BOOSTER FAN. PROVIDE ALL CONTROLS AND INTERLOCKING WIRING REQUIRED FOR A COMPLETE OPERABLE SYSTEM.
23. SIDEWALL PROPELLER FAN PROVIDE WITH HOUSING, MOTORIZED BACKDRAFT DAMPER, INTEGRAL DISCONNECT, MOTOR SIDE GUARD AND TRANSITIONS AS REQUIRED TO CONNECT TO WALL LOUVER.

## Williamson County River Ranch County Park Interpretive Center

### Daikin Heat Pump Schedule

| MARK | MODEL # | Manufacturer | Piping Limits | | Unit Type | NOMINAL TONS | CFM | SEER | VOLT-PH | MCA | MOP | WEIGHT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HP-3 (out) | RX09RMVJU | Daikin | Total | Vertical | Outdoor | 0.75 | 985 | 17.8 | 208/230-1 | 9 | 15 | 60 lbs |
| AHU-3 (in) | FDMQ09RVJU | | 65.6 | 49.2 | Ducted Concealed | | 240 | | Fed from outdoor | n/a | n/a | 64 lbs |

**Outdoor Unit Notes:**
**1. Provide Field Installed Hail Guard Accessory**
**2. Units shall meet or exceed Min Scheduled SEER Values per AHRI 210/240**

**Indoor Fan Coil Notes:**
**1. Provide field mounted condensate pumps on all indoor units**
**2. Provide wired thermostat**
**3. Provide 10 year parts, 10 year compressor warranty**
***For pricing contact Direct Expansion Solutions at (512) 940-3435**

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**WILLIAMSON COUNTY, TX**

STATE OF TEXAS
B.J. HENDRIX
94813
LICENSED
PROFESSIONAL ENGINEER

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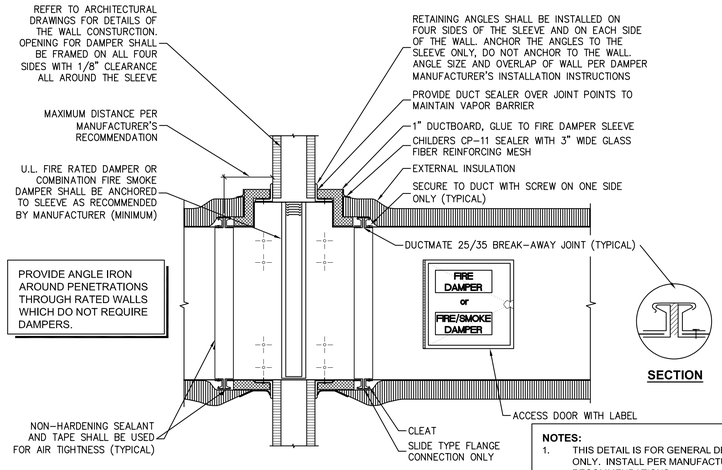
PROJECT NUMBER: 5619

**SCHEDULES - MECHANICAL**

SHEET NUMBER

**M002**

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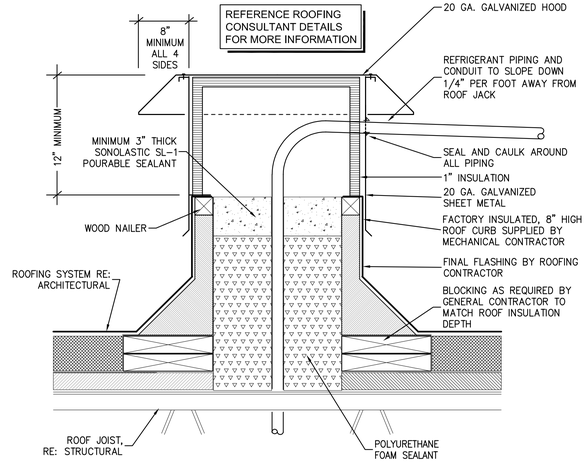

**FIRE DAMPER OR COMBINATION FIRE/SMOKE DAMPER**

## RATED WALL PENETRATION

NO SCALE

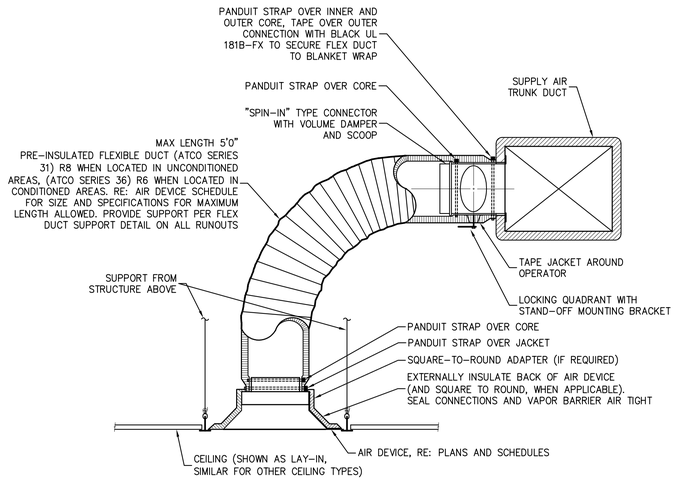
**NOTES:**

1. THIS DETAIL IS FOR GENERAL DETAIL ONLY. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.
2. SUBMIT MANUFACTURER'S RECOMMENDED INSTALLATION DETAIL AT SUBMITTAL TIME.
3. ONE COPY OF MANUFACTURER'S RECOMMENDED INSTALLATION DETAIL TO BE KEPT ON JOB SITE.
4. PROVIDE DAMPERS WITH UL RATINGS (1.5 OR 3 HR) THAT MATCH WALL RATINGS. VERIFY WALL TYPE WITH ARCHITECTURAL PLANS PRIOR TO ORDERING DAMPERS.
5. ALL TAPES AND MASTICS MUST COMPLY WITH IECC.



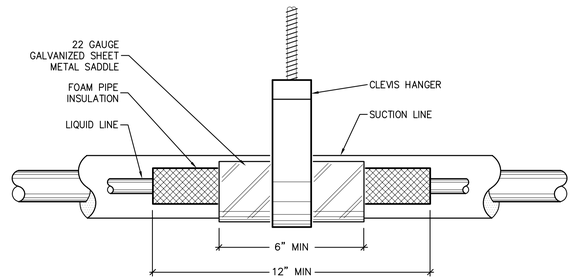

## ROOF JACK DETAIL

NO SCALE MDE69



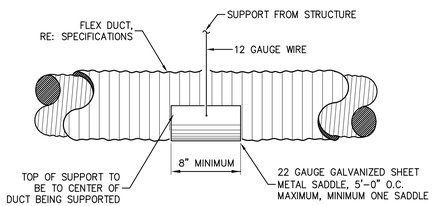

## CEILING SUPPLY AIR DEVICE CONNECTION DETAIL

NO SCALE




## REFRIGERANT PIPING SUPPORT DETAIL

NO SCALE MDE24




## FLEX. DUCT SUPPORT DETAIL

NO SCALE

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# RIVER RANCH COUNTY PARK INTERPRETIVE CENTER

WILLIAMSON COUNTY, TX

STATE OF TEXAS
B.J. HENDRIX
94813
LICENSED PROFESSIONAL ENGINEER

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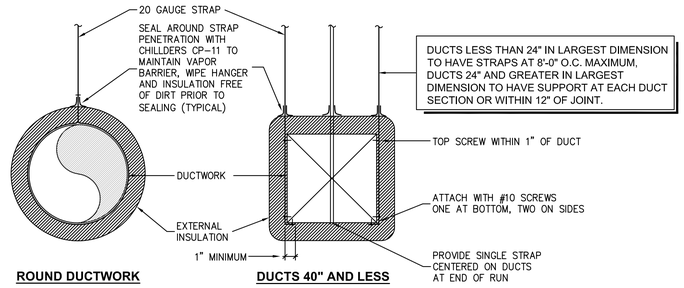
PROJECT NUMBER: 5619

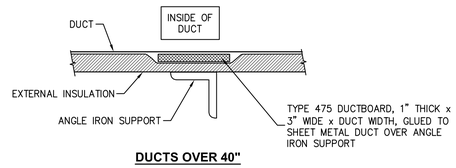
**DETAILS - MECHANICAL**

SHEET NUMBER

**M003**

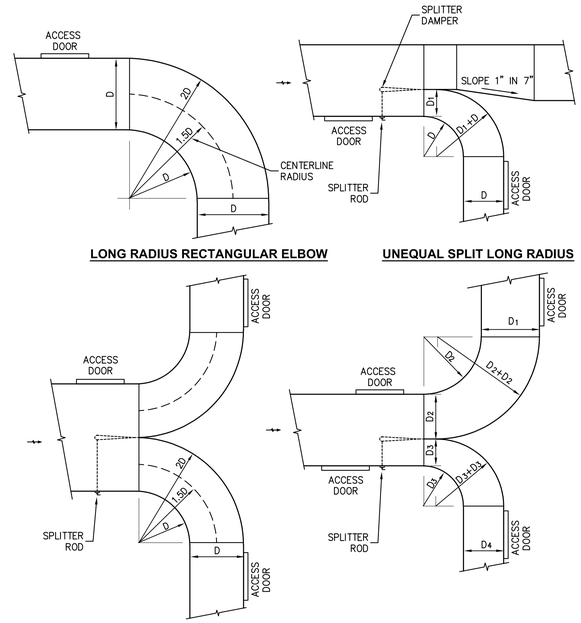
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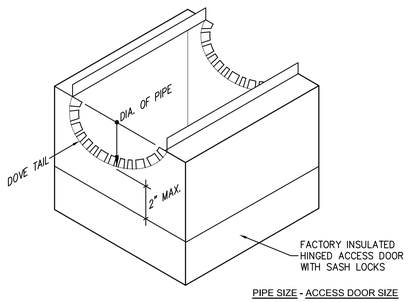

## DUCT DETAILS

NO SCALE




## SPLITTER DETAIL

NO SCALE

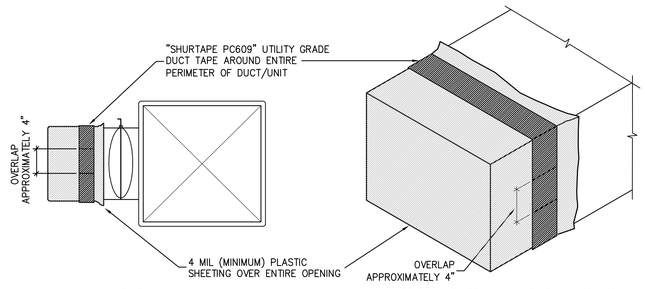



PIPE SIZE - ACCESS DOOR SIZE

6" ø – 10 x 10
8" ø – 10 x 10
10" ø – 10 x 10
12" ø – 12 x 12
14" ø – 12 x 12

## SADDLE TAP FOR ACCESS DOOR IN ROUND PIPE

NO SCALE MDE67



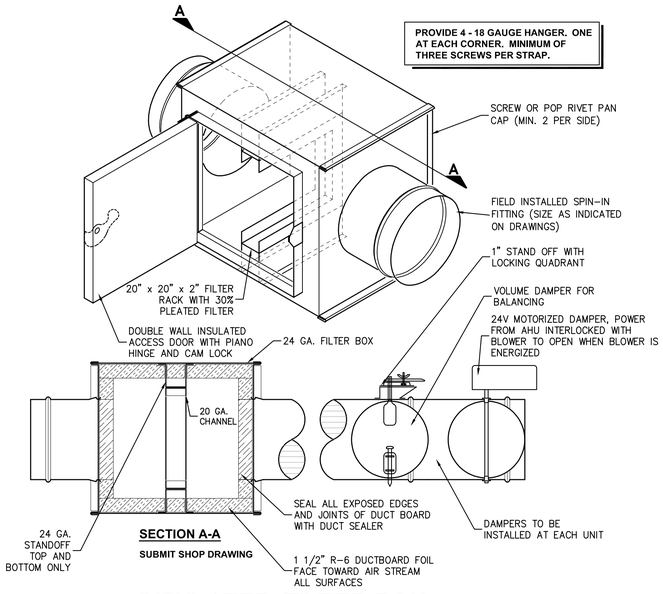

**A. CAP OPEN ENDS OF ALL DUCTS (INCLUDING SPIN-INS) AND EQUIPMENT WITH PLASTIC TO PREVENT CONSTRUCTION DEBRIS AND DUST FROM ENTERING OPENINGS DURING CONSTRUCTION.**

**B. COVER ALL OPEN ENDS OF DUCTWORK WHILE SITTING ON GROUND (NOT INSTALLED). ALL PREFABRICATED DUCTWORK IN SHOP SHALL COME WITH ENDS PREWRAPPED WHEN DELIVERED TO THE SITE.**

**C. CONTRACTOR SHALL CLEAN ALL DUCTWORK THAT IS NOT PROTECTED PROPERLY DURING CONSTRUCTION.**

## DIRT BUSTER DETAIL

NO SCALE MDE10




## INSULATED FILTER BOX

NO SCALE MDE70

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# RIVER RANCH COUNTY PARK INTERPRETIVE CENTER

WILLIAMSON COUNTY, TX

STATE OF TEXAS
B.J. HENDRIX
94813
LICENSED
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PROJECT NUMBER: 5619

**DETAILS - MECHANICAL**

SHEET NUMBER

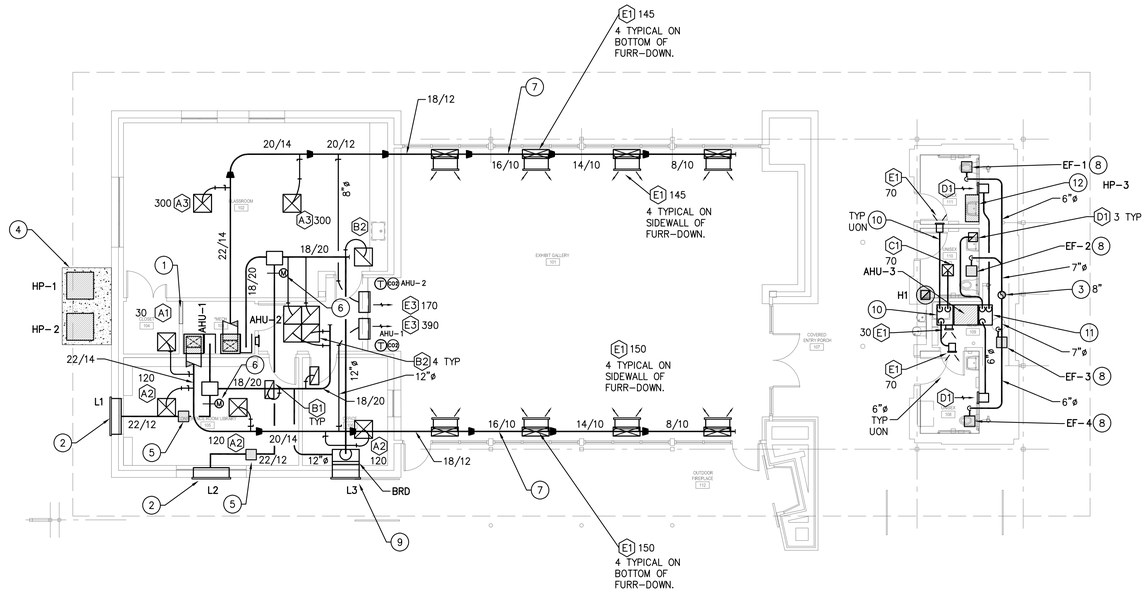
**M004**

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## KEYED NOTES

THESE NOTES APPLY TO THIS SHEET ONLY

1. DO NOT ROUTE ANY DUCTWORK ABOVE THIS AREA.
2. OUTSIDE AIR INTAKE LOUVER. REFERENCE ARCHITECTURAL FOR EXACT LOCATION. PROVIDE 24" DEEP EXTERNALLY WRAPPED SHEET METAL PLENUM FULL SIZE OF LOUVER ON BACK OF LOUVER. BOTTOM OF PLENUM TO BE WELDED WATERTIGHT AND SLOPED TO DRAIN TOWARDS EXTERIOR.
3. INDIVIDUAL EXHAUST DUCTS FROM EACH EXHAUST FAN TO BE ROUTED AS LOW AS POSSIBLE TO 8" EXHAUST DUCT. 8"Ø EXHAUST DUCT UP TIGHT TO STRUCTURE AND ROUTED TO ROOF EXHAUST HOOD "H1". COORDINATE ROUTING OF EXPOSED DUCT WITH ARCHITECT.
4. 4" THICK REINFORCED CONCRETE PAD BY GENERAL CONTRACTOR. COORDINATE EXACT SIZE WITH ACTUAL EQUIPMENT AND SIDEWALK. UNITS CAN BE NO CLOSER THAN 24" FROM THE BUILDING.
5. INSULATED FILTER FOR OUTSIDE AIR. RE: DETAIL ON DETAIL SHEETS.
6. OUTSIDE AIR DUCT TO CONNECT TO TO ECONOMIZER. PROVIDE THREE POSITION 120V MOTORIZED DAMPER. DAMPER TO REMAIN CLOSED WHEN UNIT IS NOT OPERATING; DAMPER TO OPEN TO POSITION REQUIRED FOR SCHEDULED OUTSIDE AIR QUANTITY ONLY WHEN ASSOCIATED COMPRESSOR IS OPERATING; DAMPER TO OPEN FULLY WHEN UNIT GOES INTO ECONOMIZER MODE.
7. SUPPLY AIR DUCT IN FURR-DOWN ENCLOSURE. COORDINATE EXACT DIMENSIONS OF ENCLOSURE WITH ARCHITECT.
8. ROUTE 6"Ø EXHAUST DUCT FROM EXHAUST FAN UP THROUGH ENCLOSURE CAP TO 8"Ø COMMON EXHAUST DUCT. DUCTS TO RUN AS LOW AS POSSIBLE ON TOP OF ENCLOSURE.
9. EXHAUST/RELIEF AIR LOUVER. REFERENCE ARCHITECTURAL FOR EXACT LOCATION. PROVIDE 24" DEEP EXTERNALLY WRAPPED SHEET METAL PLENUM FULL SIZE OF LOUVER ON BACK OF LOUVER. BOTTOM OF PLENUM TO BE WELDED WATERTIGHT AND SLOPED TO DRAIN TOWARDS EXTERIOR.
10. SUPPLY AIR PLENUM FULL SIZE OF AHU CONNECTION SIZE.
11. RETURN AIR PLENUM FULL SIZE OF AHU CONNECTION SIZE.
12. CONDENSING UNIT TO SET ON 4X4 WOOD RUNNERS ON WALKWAY PAD MATERIAL ON LOW ROOF. HIGH ROOF TO BE VENTILATED AT RIDGE. COORDINATE WITH ARCHITECT FOR EXACT LOCATION OF CONDENSING UNIT PRIOR TO ROUGH-IN.
13. DUCTS SERVING RESTROOMS TO BE ROUTED THRU WEBS OF STRUCTURE. FIELD VERIFY EXACT LOCATIONS.




# 01 FLOOR PLAN - MECHANICAL

SCALE: 1/8" = 1'-0"

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PROJECT NUMBER: 5619

## FLOOR PLAN - MECHANICAL

SHEET NUMBER

# M210

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# PIPE SIZING REQUIREMENTS

1. ALL FLOOR DRAINS AND FLOOR SINKS MUST HAVE TRAP PRIMERS. PROVIDE INVERTED TEE CONNECTION FROM SINK TAILPIECE OR FLUSH VALVE TYPE TRAP PRIMER CONNECTION TO ALL FLOOR DRAINS, FLOOR SINKS AND HUB DRAINS. AS LAST RESORT PROVIDE MECHANICAL TYPE TRAP PRIMER (PPP INC. "OREGON #1" TYPE). CONNECT TO NEAREST WATER SERVING THAT AREA PER MANUFACTURER'S INSTALLATION INSTRUCTIONS. IN JURISDICTIONS WHERE PRESSURE ACTIVATED MECHANICAL PRIMERS ARE NOT ALLOWED, USE ELECTRONIC TRAP PRIMERS. COORDINATE POWER REQUIREMENTS WITH ELECTRICAL CONTRACTOR. PROSET "TRAP GUARD" DEVICE MAY BE USED IN LIEU OF TRAP PRIMERS WHEN ALLOWED BY LOCAL CODE AUTHORITY HAVING JURISDICTION. BEFORE USING PROSET "TRAP GUARD" CONTRACTOR MUST OBTAIN WRITTEN APPROVAL FROM LOCAL CODE AUTHORITY HAVING JURISDICTION AND PROVIDE COPIES TO ARCHITECT AND ENGINEER.
2. AT ALL PUBLIC LAVATORIES A HOT WATER MANIFOLD WILL BE ROUTED PARALLEL TO HOT WATER RECIRC MAIN DOWN FULL SIZE INTO ONE SIDE OF CHASE AND WILL BE CONNECTED BACK TO HOT WATER RECIRC MAIN OUT OF OPPOSITE SIDE OF CHASE TO COMPLY WITH INTERNATIONAL ENERGY CODE (IECC) MAXIMUM ALLOWABLE HOT WATER PIPING LENGTH FROM MANIFOLD. (TAP SIZE: FOR 3/8", PIPING MAXIMUM LENGTH = 3 FEET; FOR 1/2" MAXIMUM LENGTH = 2 FEET)
3. PIPING SIZE FOR WATER MAIN DROPS AND MANIFOLD IN CHASE OR WALL TO REMAIN FULL SIZE OF DROP INDICATED. REFERENCE FIXTURE CONNECTION SCHEDULE FOR INDIVIDUAL LINE SIZE TO EACH FIXTURE.
4. COORDINATE ALL WASTEWATER FLOOR PENETRATIONS AND PIPING PENETRATIONS WITH STRUCTURAL PRIOR TO INSTALLATION. PIPING MAY BE OFFSET SLIGHTLY TO AVOID STRUCTURAL CONFLICTS.
5. ROUTE VENT FROM EACH FIXTURE TO HORIZONTAL VENT HEADER IN CHASE/WALL OR TO NEAREST COMMON VTR ABOVE CEILING. REFERENCE FIXTURE CONNECTION SCHEDULE FOR INDIVIDUAL FIXTURE VENT SIZES. VENT HEADERS IN CHASE TO BE SIZED ACCORDINGLY: 1 1/2" VENT UP TO 6 DRAIN FIXTURE UNITS MAXIMUM DEVELOPED LENGTH OF 60 FEET (EXCEPT FOR WATER CLOSETS), 2" VENT UP TO 20 DRAIN FIXTURE UNITS MAXIMUM DEVELOPED LENGTH OF 120 FEET, 3" VENT UP TO 84 DRAIN FIXTURE UNITS MAXIMUM DEVELOPED LENGTH OF 212 FEET AND 4" VENT UP TO 256 DRAIN FIXTURE UNITS MAXIMUM DEVELOPED LENGTH OF 300 FEET. BRANCH VENTS EXCEEDING 40 FEET IN DEVELOPED LENGTH ARE TO BE INCREASED BY ONE PIPE SIZE. NO MORE THAN 1/3 OF THE CODE PERMITTED DEVELOPED LENGTH SHALL BE IN HORIZONTAL POSITION. EXTEND COMMON VENT UP THROUGH ROOF.
6. ROUTE ALL VENTS TO NEAREST COMMON VENT THRU ROOF (VTR) TO MINIMIZE ROOF PENETRATIONS. **VTR TO BE MINIMUM 15 FEET AWAY FROM OUTSIDE AIR INTAKES. COORDINATE WITH MECHANICAL CONTRACTOR PRIOR TO INSTALLATION.**

# FIXTURE CONNECTION SCHEDULE

| MARK | CW | HW | WASTE | DRAIN FIXTURE UNITS | VENT | |
|---|---|---|---|---|---|---|
| WATER CLOSET (FLUSH VALVE) | 1" | – | 4" | 6 | 2" | |
| WATER CLOSET (TANK TYPE) | 1/2" | – | 4" | 4 | 2" | |
| URINAL | 3/4" | – | 2" | 2 | 2" | |
| PUBLIC LAVATORY∗ | 3/8" | 3/8" | 2" | 1 | 1 1/2" ∗∗ | |
| SINK ∗∗∗ | 1/2" | 1/2" | 2" | 2 | 1 1/2" ∗∗ | |
| SERVICE SINK | 3/4" | 3/4" | 3" | 2 | 2" | |
| WASH FOUNTAIN ∗ | 1/2" | 1/2" | 2" | 2 | 1 1/2" ∗∗ | |
| EWC | 1/2" | – | 2" | 1 | 1 1/2" ∗∗ | |
| WASHING MACHINE | 3/4" | 3/4" | 2" | 2 | 2" | |
| HOSE BIBB | 3/4" | – | – | – | – | |
| SHOWER ∗ ∗∗∗ | 1/2" | 1/2" | 3" | 2 | 1 1/2" | |
| FLOOR DRAIN | – | – | 3" | 2 | 2" | |

∗ HOT AND COLD WATER REQUIRED UNLESS NOTED OTHERWISE ON PLUMBING FIXTURE SCHEDULE. PROVIDE TEMPERATURE MIXING VALVE (ASSE 1070) AT THE FIXTURE.

∗∗ IF HORIZONTAL VENT LENGTH EXCEEDS 20 FEET, INCREASE VENT SIZE TO TWO INCHES.

∗∗∗ COMMERCIAL KITCHEN SINKS GET HOT WATER, REMAINDER TO BE PROVIDED WITH TEMPERATURE MIXING VALVE (ASSE 1070) AT THE FIXTURE.

∗∗∗∗ SHOWER VALVES TO BE BALANCED-PRESSURE, THERMOSTATIC OR COMBINATION BALANCED-PRESSURE/THERMOSTATIC CONFORMING TO ASSE 1016.

# GENERAL NOTES

A. THE CONTRACTOR IS TO VISIT THE SITE PRIOR TO BID TO FAMILIARIZE HIMSELF WITH ALL CONDITIONS AS THEY EXIST. SUBMISSION OF BID INDICATES THE CONTRACTOR'S UNDERSTANDING OF EXISTING CONDITIONS AND HIS WILLINGNESS TO WORK WITH THESE CONDITIONS. NO ADDITIONAL TIME OR MONEY WILL BE ALLOTTED DUE TO LACK OF COORDINATION WITH EXISTING CONDITIONS OR OTHER TRADES.

B. CONTRACTORS TO REVIEW AND COMPARE ALL DRAWINGS SO ALL WORK IN THEIR RESPECTIVE TRADE IS INCLUDED IN BID. EACH CONTRACTOR SHALL INCLUDE ALL MATERIALS AND INSTALLATION REQUIRED FOR HIS PARTICULAR TRADE AFTER COMPLETE REVIEW OF ALL CONTRACT DRAWINGS AND SPECIFICATIONS.

C. ALL WORK SHALL COMPLY WITH THE APPLICABLE LOCAL, STATE AND FEDERAL CODES AND ORDINANCES. FOLLOW RECOMMENDED PRACTICES AS SET DOWN BY ASME, SMACNA, ASHRAE, NFPA, APPLICABLE BUILDING CODE, APPLICABLE MECHANICAL CODE, APPLICABLE PLUMBING CODE, NATIONAL ELECTRICAL CODE, AGA, ADA AND OSHA, AS THEY APPLY TO THIS PROJECT EXCEPT IN CASES WHERE LOCAL STATUTES GOVERN.

D. THE CONTRACTOR SHALL VERIFY WITH AUTHORITY HAVING JURISDICTION THE LATEST ADOPTED LOCAL CODES, ORDINANCES AND AMENDMENTS THAT APPLY TO THIS PROJECT. PROVIDE CONDENSATE DISPOSAL POINT FOR ALL MECHANICAL EQUIPMENT TO CODE APPROVED DISPOSAL. COORDINATE WITH MECHANICAL CONTRACTOR.

E. ABSOLUTELY NO PIPING OR DUCTWORK CAN BE ROUTED ABOVE ELECTRICAL PANELS, GEAR OR TRANSFORMERS. THE ONLY HVAC, PLUMBING, SPRINKLER OR DUCTWORK THAT CAN ENTER AN ELECTRIC ROOM ARE THOSE SPECIFICALLY SERVING THAT ROOM. THESE SERVICES CAN ONLY ENTER INTO ELECTRIC ROOM ABOVE ENTRY DOOR.

F. PROVIDE VALVE TAGS FOR ALL VALVES. PROVIDE CEILING ACCESS MARKERS FOR VALVES LOCATED ABOVE CEILING OR BEHIND WALL MOUNTED PANEL.

G. PLUMBING PIPING SHALL NOT BLOCK ACCESS TO EQUIPMENT, JUNCTION BOXES, DISCONNECTS, ACCESS DOORS, ETC.

H. ALL VALVES ARE TO BE ACCESSIBLE AND SHALL NOT BE LOCATED MORE THAN FOUR FEET ABOVE THE CEILING.

I. CONTRACTOR TO CONNECT COLD WATER, TEMPERED WATER, WASTE WATER AND VENT PIPING TO ALL FIXTURES PER MANUFACTURER'S RECOMMENDATIONS, UNLESS OTHERWISE NOTED ON DRAWINGS.

J. BEFORE ANY CUTTING OR TRENCHING OPERATIONS BEGIN, VERIFY WITH OWNER'S REPRESENTATIVE, UTILITY COMPANIES AND OTHER INTERESTED PARTIES THAT ALL AVAILABLE INFORMATION HAS BEEN PROVIDED CONCERNING EXISTING UTILITY LOCATION. VERIFY LOCATIONS GIVEN. CONTACT ARCHITECT IMMEDIATELY UPON UNCOVERING UNKNOWN UTILITIES FOR FURTHER DIRECTION. INDICATE ALL UNCOVERED UTILITIES ON RECORD DRAWINGS.

K. FIRE SEAL AROUND ALL PIPING AT PENETRATIONS THROUGH RATED WALLS, CEILINGS AND TUNNELS PER UL LISTED MATERIAL FOR ACTUAL SEALANT BEING USED. COORDINATE WITH ARCHITECTURAL PLANS FOR RATED WALL LOCATION.

L. PROVIDE ALL APPROPRIATE TOOLS, WRENCHES, KEYS, ETC. AS REQUIRED FOR ACCESS AND OPERATION OF VALVES, COVERS, ETC.

M. DO NOT ROUTE PIPING UNDER EQUIPMENT LOCATED ABOVE CEILING. ROUTE PIPING AROUND EQUIPMENT TO ALLOW FOR ACCESS AROUND EQUIPMENT AND FOR FUTURE REMOVAL OF EQUIPMENT.

N. PROVIDE HEAT TRAPS ON INCOMING AND DISCHARGE LINES FROM WATER HEATERS WHICH DO NOT HAVE THEM FACTORY INSTALLED OR ARE NOT CONNECTED TO A RECIRCULATING SYSTEM.

# PLUMBING LEGEND

| SYMBOL | ABB. | DESCRIPTION |
|---|---|---|
| | CW | COLD WATER PIPING |
| | HW | HOT WATER PIPING |
| | HWR | HOT WATER RETURN PIPING |
| | WW | WASTE WATER |
| | | VENT PIPING |
| — T — | | TEMPERED WATER |
| — G — | | GAS PIPING |
| — F — | | FIRE LINE |
| — GT — | | GREASE TRAP LINE |
| — A — | | COMPRESSED AIR PIPING |
| — D — | | RELIEF OR CONDENSATE DRAIN PIPING |
| — SD — | SD | STORM DRAIN |
| — RL — | RL | RAIN LEADER |
| — ORL — | ORL | OVERFLOW RAIN LEADER |
| | | FULL PORT BALL PIPE ISOLATION VALVE |
| | HB | HOSE BIBB/WALL HYDRANT |
| | | UNION |
| | FD/FS | FLOOR DRAIN/FLOOR SINK |
| | HD | HUB DRAIN |
| | CO | CLEAN OUT |
| | | DOUBLE CLEAN OUT |
| | WCO | WALL CLEAN OUT |
| | | GAS COCK |
| | | BALANCE VALVE |
| | | CHECK VALVE |
| | | POINT OF CONNECTION |
| | | GAS PRESSURE REGULATOR |

# M/P ABBREVIATION SCHEDULE

| | | | |
|---|---|---|---|
| AD | ACCESS DOOR | MAINT | MAINTENANCE |
| ABV | ABOVE | MAU | MAKEUP AIR UNIT |
| AFF | ABOVE FINISHED FLOOR | MAX | MAXIMUM |
| ARCH | ARCHITECT | MC | MECHANICAL CONTRACTOR |
| AUTO | AUTOMATIC | MBH | 1000 BTU PER HOUR |
| AUX | AUXILIARY | MECH | MECHANICAL |
| AHU | AIR HANDLING UNIT | MH | MANHOLE |
| | | MIN | MINIMUM |
| BD | BALANCE DAMPER | MISC | MISCELLANEOUS |
| BFF | BELOW FINISHED FLOOR | MTD | MOUNTED |
| BLDG | BUILDING | MOD | MOTOR OPERATED DAMPER |
| BOD | BOTTOM OF DUCT | | |
| BOP | BOTTOM OF PIPE | NIC | NOT IN CONTRACT |
| BF | BOOSTER FAN | N.O. | NORMALLY OPEN |
| | | N.C. | NORMALLY CLOSED |
| CLG | CEILING | NO. | NUMBER |
| CLR | CLEAR/CLEARANCE | NTS | NOT TO SCALE |
| CO | CLEANOUT | | |
| COL | COLUMN | O/A | OUTDOOR AIR |
| CONC | CONCRETE | OBD | OPPOSED BLADE DAMPER |
| CONTR | CONTRACTOR | OC | ON CENTER(S) |
| CW | COLD WATER | OPNG | OPENING |
| CONN | CONNECTION | ORL | OVERFLOW RAINLEADER |
| CU | CONDENSING UNIT | OAH | OUTSIDE AIR HOOD |
| Cu | COPPER | | |
| CHS | CHILLED WATER SUPPLY | PC | PLUMBING CONTRACTOR |
| CHR | CHILLED WATER RETURN | PH | PHASE |
| | | PLBG | PLUMBING |
| DIA | DIAMETER | | |
| DN | DOWN | R/A | RETURN AIR |
| DWG | DRAWING | REF | REFERENCE/REFER TO |
| DH | DUCT HEATER | REFRG | REFRIGERANT |
| E/A | EXHAUST AIR | REF | REFRIGERATOR |
| EC | ELECTRICAL CONTRACTOR | REQD | REQUIRED |
| EF | EXHAUST FAN | RHP | RADIANT HEAT PANEL |
| ELEC | ELECTRIC/ELECTRICAL | RL | RAINLEADER |
| EQ | EQUAL | RM | ROOM |
| EQUIP | EQUIPMENT | RTU | ROOFTOP UNIT |
| EX | EXISTING | | |
| EXH | EXHAUST | S/A | SUPPLY AIR |
| E.S.P. | EXTERNAL STATIC PRESSURE | SCH | SCHEDULE |
| ERV | ENERGY RECOVERY VENTILATOR | SP | STATIC PRESSURE |
| | | SPEC | SPECIFICATION |
| FCO | FLOOR CLEAN OUT | SD | STORM DRAIN |
| FCU | FAN COIL UNIT | SF | SUPPLY FAN |
| FF | FINISHED FLOOR | | |
| FLEX | FLEXIBLE | TSP | TOTAL STATIC PRESSURE |
| FLR | FLOOR/FLOORING | TYP | TYPICAL |
| GA | GAUGE | UON | UNLESS OTHERWISE NOTED |
| GC | GENERAL CONTRACTOR | UG | UNDERGROUND |
| GEN | GENERAL | UH | UNIT HEATER |
| GYP | GYPSUM BOARD | | |
| | | V | VENT (PLUMBING) |
| HP | HEAT PUMP | V | VOLTAGE (ELECTRICAL) |
| hp | HORSEPOWER | VTR | VENT THROUGH ROOF |
| HT | HEIGHT | | |
| HW | HOT WATER | W/ | WITH |
| HWC | HOT WATER CIRC | W/O | WITHOUT |
| HR | HOUR | WP | WATERPROOF |
| HWR | HEATING WATER RETURN | WT | WEIGHT |
| HWS | HEATING WATER SUPPLY | WTR | WATER |
| | | WW | WASTE WATER |
| LOC | LOCATION | WCO | WALL CLEANOUT |
| | | WH | WATER HEATER |

# PLUMBING FIXTURE SCHEDULE

**NOTES:**

1. REFERENCE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
2. ALL WALL HUNG FIXTURES TO BE INSTALLED WITH WALL CARRIERS, VERIFY CONFIGURATION TYPE.
3. PROVIDE VANDAL RESISTANT SCREWS AT ALL FIXTURES.
4. INSTALL STAINLESS STEEL CAPS AT ALL UNUSED LAVATORY FAUCET HOLES.
5. NO OFFSET FLANGES WILL BE ALLOWED FOR WATER CLOSET INSTALLATIONS.
6. GROUT FOR LEVELING WATER CLOSETS SHALL NOT EXTEND UP ON SIDE OF WATER CLOSET BASES. TAKE GROUT BACK TO MINIMUM 1/8" UNDER BASE AND CAULK FOR FINAL FINISH. VERIFY CAULK COLOR AND TYPE WITH ARCHITECT.
7. REFERENCE ARCHITECTURAL CONTRACT DOCUMENTS FOR EXACT LOCATION AND MOUNTING HEIGHTS OF ALL PLUMBING FIXTURES. CONTACT ARCHITECT FOR ADDITIONAL INFORMATION AS REQUIRED.
8. PROVIDE INVERTED TEE CONNECTION FROM SINK TAILPIECE OR FLUSH VALVE TYPE TRAP PRIMER CONNECTION TO ALL FLOOR DRAINS, FLOOR SINKS AND HUB DRAINS. AS LAST RESORT PROVIDE MECHANICAL TYPE TRAP PRIMER (PPP INC. "OREGON #1" TYPE). CONNECT TO NEAREST WATER SERVING THAT AREA PER MANUFACTURER'S INSTALLATION INSTRUCTIONS.
9. ALL PLUMBING FIXTURES TO BE "LEAD FREE" AB1953 COMPLIANT (.25% OR LESS AVERAGE LEAD CONTENT). PROVIDE DOCUMENTATION IN SUBMITTALS THAT THIS REQUIREMENT IS MET FOR EACH APPLICABLE FIXTURE.

**WCWH**
WATER CLOSET (ADA): AMERICAN STANDARD #2257.001, WALL MOUNTED, VITREOUS CHINA, 1-1/2" TOP SPUD, ELONGATED BOWL. REFERENCE ARCHITECTURAL DRAWINGS FOR MOUNTING HEIGHT.
EXPOSED FLUSH VALVE: SLOAN ROYAL #111 WITH EBV-500-A SIDE MOUNT BATTERY PACK AUTO FLUSH, 1.28 GALLON FLUSH.
SEAT: BEMIS 1955C OR EQUIVALENT. STAINLESS STEEL HARDWARE ONLY (NO PLASTIC ALLOWED).

**LH**
LAVATORY (ADA): AMERICAN STANDARD 0356.015, 20" x 18" VITREOUS CHINA, WALL HUNG, 8" FAUCET CENTERS AND GRID STRAINER. PROVIDE WITH TEMPERATURE MIXING VALVE EQUAL TO POWERS HYDROGUARD T/P e480 SERIES, .5 GPM MINIMUM FLOW, ASSE 1070, INTEGRAL CHECKS, 1.9 GPM AT 10 psi DROP.
FAUCET: CHICAGO #116.122.AB.1 DUAL BEAM INFRARED SENSOR FAUCET WITH USER ADJUSTABLE MIXER, .5 GPM AERATOR, 12 SECOND RUN TIME. PROVIDE WITH 8" DECK PLATE AND PLUG IN TRANSFORMERS AS REQUIRED FOR BANK OF FAUCETS. PROVIDE ONE (1) HAND HELD PROGRAMMING UNIT MODEL#116.585.00.1 FOR PROJECT FOR ADJUSTING RUN TIME ON ALL FAUCETS.

**SKH**
SINK (ADA): ELKAY #LRAD-2219-55 (OFF-CENTER DRAIN), 18 GAUGE STAINLESS STEEL, SELF-RIM, 18" x 14" x 5.5" DEEP BOWL, THREE (3) FAUCET HOLES WITH STAINLESS STEEL BASKET STRAINER. PROVIDE WITH TEMPERATURE MIXING VALVE EQUAL TO POWERS HYDROGUARD T/P e480 SERIES, .5 GPM MINIMUM FLOW, ASSE 1070, INTEGRAL CHECKS, 1.9 GPM AT 10 psi DROP.
FAUCET: ELKAY #2442BHC, SWING GOOSENECK, WRIST BLADE HANDLES.

**SS**
SERVICE SINK: FIAT #MSB-3624, ONE-PIECE MOLDED STONE WITH #832-AA HOSE AND HOSE BRACKET #E-77-AA VINYL BUMPER GUARD, MSG-3624 STAINLESS STEEL WALL GUARD.
FAUCET: MOEN #8230 SERVICE SINK FAUCET WITH VACUUM BREAKER, THREADED SPOUT, SERVICE STOPS AND WALL BRACKET.

**DFH**
DRINKING FOUNTAIN (ADA): ELKAY #EHW217FPK, HEAVY DUTY, NON-FILTERED, NON-REFRIGERATED, TWO (2) STATION, VANDAL RESISTANT PUSH BUTTON IN FRONT, VANDAL RESISTANT BUBBLERS, STAINLESS STEEL FINISH, TWO (2) FREEZE RESISTANT BOXES and CANE APRON. PROVIDE WITH WALL MOUNTING PLATE OR CARRIER AS REQUIRED.

**HB**
HOSE BIBB: WOODFORD MODEL B67 SERIES, IN FLUSH MOUNTING WALL BOX, ASSE 1052 OR 1011 BACKFLOW PROTECTED AUTOMATIC DRAINING, FREEZELESS, NO SPRAYBACK. PROVIDE SHUT-OFF VALVE INSIDE BUILDING IN ACCESSIBLE LOCATION. SLOPE LINE FROM SHUT-OFF VALVE TO WALL HYDRANT TO ALLOW DRAINING OF LINE FOR FREEZE PROTECTION.

**FD**
FLOOR DRAIN (GENERAL PURPOSE): C.I. BODY, FLASHING COLLAR, WEEPHOLES, ADJUSTABLE HEAVY DUTY STAINLESS STEEL ROUND TOP (6" DIAMETER) AND STAINLESS STEEL SEDIMENT BASKET. MIFAB F1000-C-3-5-6-7 SERIES.

**WH1**
WATER HEATER: A.O.SMITH MODEL DEL-10, 10 GALLON STORAGE, 3KW-120V-1PH NON-SIMULTANEOUS ELEMENTS, 15 GPH RECOVERY AT 80 DEGREES RISE.

**IH1**
INSTANTANEOUS WATER HEATER UNDER LAVATORY: STEIBEL ELTRON MODEL 231045, 1.8KW-120V-1PH. THIRTY NINE (39) DEGREE F RISE AT .32 GPM. T&P RELIEF NOT REQUIRED.

**DN**
DISCHARGE NOZZLE: JAY R. SMITH #1775, STAINLESS STEEL WITH HINGED PERFORATED COVER. SAME SIZE AS RAINLEADER.

**AD**
AREA DRAIN: C.I. BODY, FLASHING COLLAR, WEEPHOLES, ADJUSTABLE HEAVY DUTY **STAINLESS STEEL** ROUND TOP (6" DIAMETER) AND STAINLESS STEEL SEDIMENT BASKET. MIFAB F1000-C-3-5-6-7 SERIES.

REFERENCE GENERAL NOTES ON SHEETS M000, P000 AND E000 FOR ADDITIONAL INFORMATION

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**RIVER RANCH COUNTY PARK INTERPRETIVE CENTER**
**WILLIAMSON COUNTY, TX**

STATE OF TEXAS · BRIAN J. HENDRIX · 94813 · LICENSED PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY B.J. HENDRIX, P.E. NO. 94813 ON: 02/22/2019

ISSUE DATE: FEBRUARY 22, 2019

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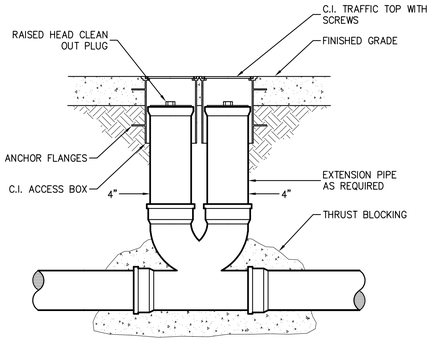
PROJECT NUMBER: 5619

**SCHEDULES, NOTES, AND LEGENDS - PLUMBING**

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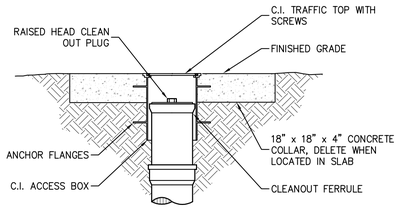
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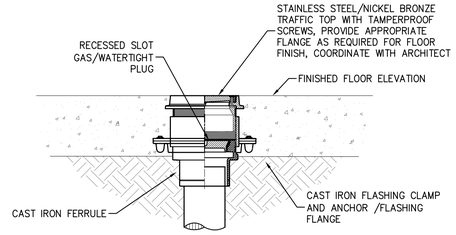

## DOUBLE CLEANOUT DETAIL

NO SCALE PDE43



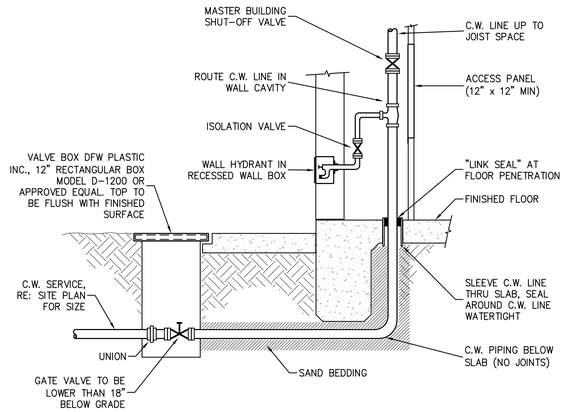

## EXTERIOR CLEANOUT

NO SCALE PDE88



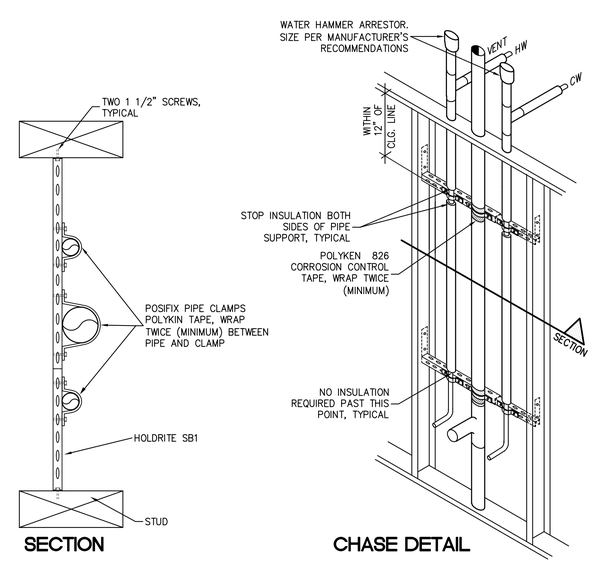

## INTERIOR FLOOR CLEANOUT

NO SCALE PDE55



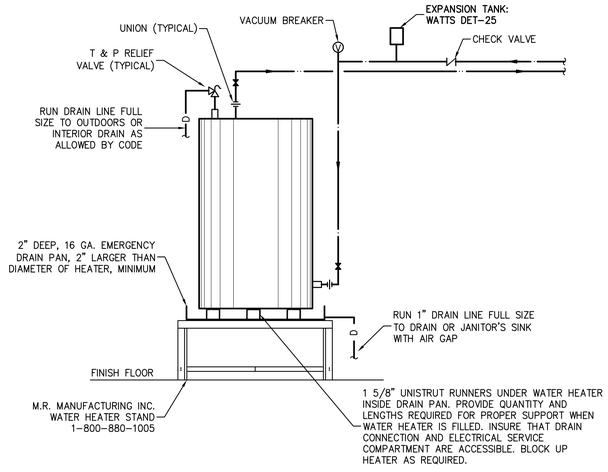

## C.W. BUILDING ENTRY DETAIL

NO SCALE PDE52



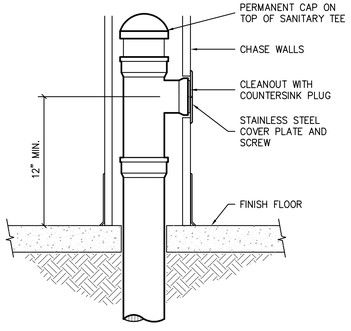

## TYP. PLUMBING CHASE SUPPORT DETAIL

NO SCALE PDE30



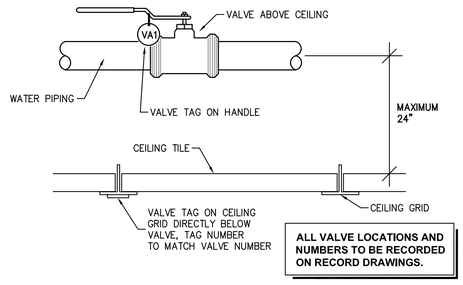

## WATER HEATER DETAIL

NO SCALE PDE72




## WALL CLEANOUT

NO SCALE PDE89




## TYPICAL VALVE IDENTIFICATION DETAIL

SCALE: NO SCALE PDE27

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# RIVER RANCH COUNTY PARK INTERPRETIVE CENTER

## WILLIAMSON COUNTY, TX

STATE OF TEXAS
B.J. HENDRIX
94813
LICENSED PROFESSIONAL ENGINEER

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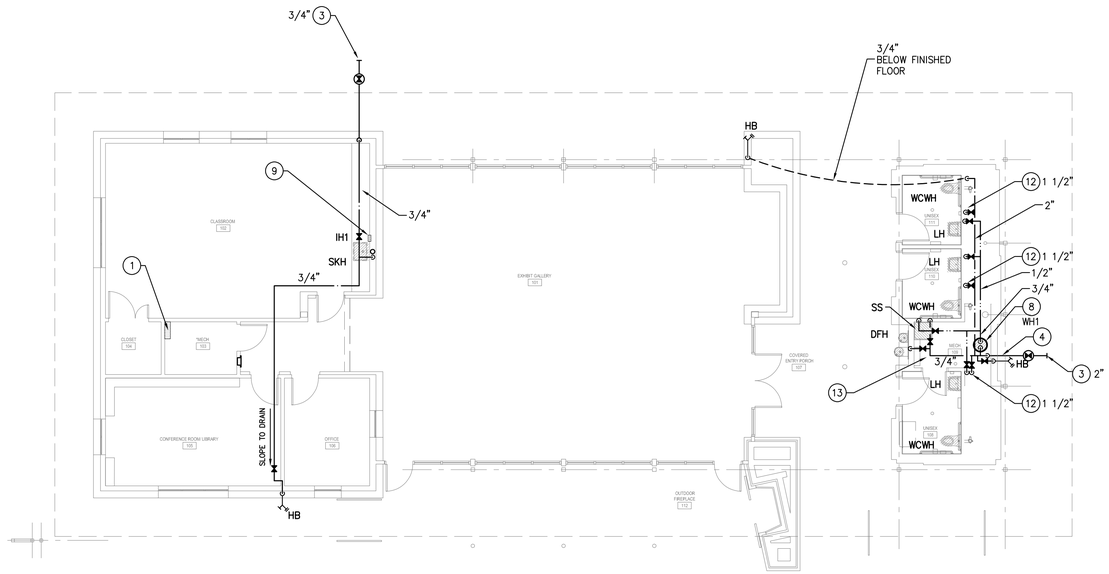
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**DETAILS - PLUMBING**

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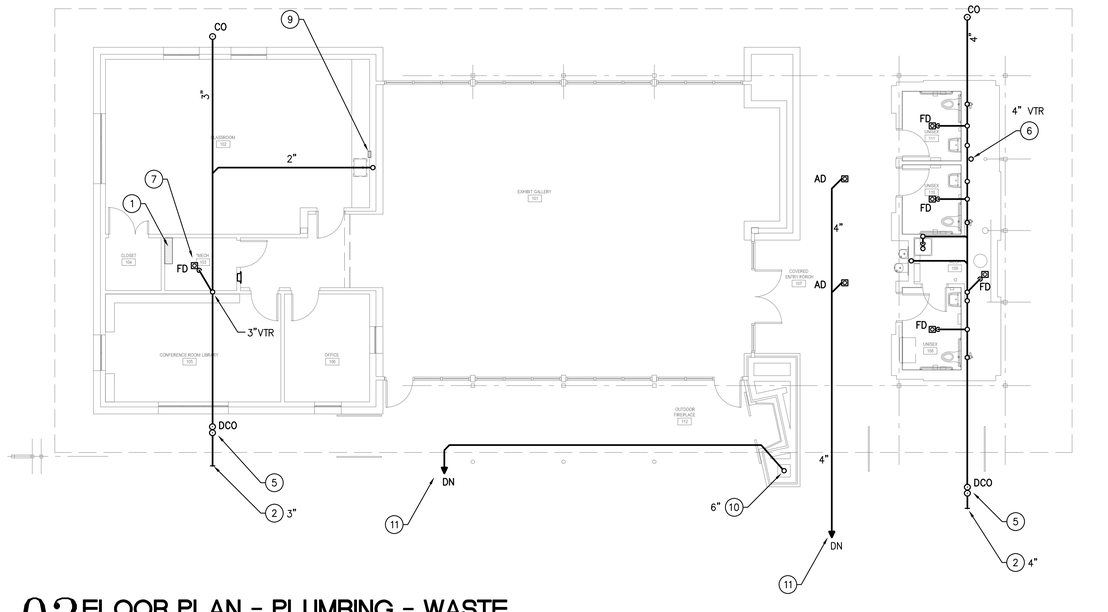
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## 01 FLOOR PLAN - PLUMBING - SUPPLY

SCALE: 1/8" = 1'-0"




## 02 FLOOR PLAN - PLUMBING - WASTE

SCALE: 1/8" = 1'-0"

## KEYED NOTES

THESE NOTES APPLY TO THIS SHEET ONLY

1. DO NOT ROUTE ANY PIPING OVER THIS AREA.
2. CONNECT TO WASTEWATER (WW) STUB PROVIDED BY CIVIL. FIELD VERIFY EXACT LOCATION AND INVERT. PROVIDE ADAPTER AS REQUIRED TO MAKE SIZE AND/OR MATERIAL TRANSITION.
3. CONNECT TO COLD WATER (CW) STUB PROVIDED BY CIVIL. FIELD VERIFY EXACT LOCATION. PROVIDE ADAPTER AS REQUIRED TO MAKE SIZE AND/OR MATERIAL TRANSITION.
4. RE: CW BUILDING ENTRY DETAIL ON PLUMBING DETAIL SHEET(S).
5. RE: DOUBLE CLEANOUT DETAIL ON PLUMBING DETAIL SHEET(S).
6. PLUMBING VENT TIGHT TO STRUCTURE UP TO VTR. COORDINATE WITH ARCHITECT FOR HIDING OF VENT.
7. FLOOR DRAIN FOR CONDENSATE FROM AIR HANDLING UNITS. COORDINATE EXACT LOCATION WITH MECHANICAL CONTRACTOR.
8. WATER HEATER. RE: DETAIL ON DETAIL SHEET(S).
9. INSTANTANEOUS WATER HEATER "IH1" TO BE INSTALLED UNDER SINK. INSTALL PER MANUFACTURERS INSTALLATION INSTRUCTIONS.
10. RAIN LEADER FROM GUTTER (REFERENCE ARCHITECTURAL DETAILS 08 & 09 ON SHEET A613.) PROVIDE 4" FROM EACH COLLECTOR BOX ON EACH SIDE OF CHIMNEY TO A COMMON 6" VERTICAL MAIN. TO DISCHARGE NOZZLE (DN) IN SIDE OF WALL. VERIFY EXACT CONNECTION TO GUTTER AND DISCHARGE LOCATION WITH ARCHITECT.
11. DISCHARGE NOZZLE IN SIDE OF WALL. COORDINATE EXACT LOCATION WITH ARCHITECT.
12. CW DOWN TO SERVE WATER CLOSET AND LAVATORY. KEEP UTILITIES TIGHT TO WALL TO LEAVE MAXIMUM SPACE AVAILABLE IN CHASE.
13. COORDINATE EXACT LOCATIONS OF WATER PIPING WITH MECHANICAL EQUIPMENT SUSPENDED HERE. WATER PIPING CANNOT INTERFERE WITH UNIT ACCESS. COORDINATE WITH MECHANICAL CONTRACTOR.

REFERENCE GENERAL NOTES ON SHEETS M000, P000 AND E000 FOR ADDITIONAL INFORMATION

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PROJECT NUMBER: 5619

**FLOOR PLAN - PLUMBING**

SHEET NUMBER

**P210**

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| BID ITEM REF. NUMBER | ITEM DESCRIPTION | DETAIL | SPECIFICATION SECTION | QUANTITY | UNIT OF MEASURE | UNIT PRICE (IN USD) | TOTAL (IN USD) |
|---|---|---|---|---|---|---|---|
| | **BASE BID DRAWINGS** | | | | | | |
| | **SITE PREPARATION** | | | | | | |
| 1 | Mobilization/General Conditions complete in place per plan | _ | 700S | 1 | LS | | $0.00 |
| 2 | Demolition and Haul off including, tree removal, trail removal, fence removal, Building removal, and removal of 24" CMP w/hDwlls complete in place per plan | _ | 024119 | 1 | LS | | $0.00 |
| 3 | TCEQ-SWPPP Development/Implementation - including area/curb inlet protection, barricades, and temporary construction fence complete in place per plan | _ | _ | 1 | LS | | $0.00 |
| 4 | Silt Fence and Erosion control including materials and Nat. Vegetation Filter Strip complete in place per plan and maintain throughout construction | 642S-1 | 607S | 281 | LF | | $0.00 |
| 5 | Tree Protection Fencing complete in place per plan | 610S-6 | 610S | 736 | LF | | $0.00 |
| 6 | Clearing and Grubbing | - | 102S | 1 | LS | | $0.00 |
| 7 | Unclassified Excavation including, preparing the Limits of Construction (LOC), Removal of P.C. Concrete, Embankment, Subgrade preparation, Proof Rolling, and Grading within the LOC complete in place per plan | – | 110S, 120S, 130S, 132S | 1 | LS | | $0.00 |
| 8 | Layout - survey & stake complete in place per plan | - | - | 1 | LS | | $0.00 |
| | **SITE PREPARATION SUBTOTAL** | | | | | | |
| | | | | | | | |
| | **SITE IMPROVEMENTS** | | | | | | |
| | **Pavement, Ramps, Curbs** | | | | | | |
| 9 | Concrete walkway to be completed in place per plan, detail, and specification | 1.1 | 321313 | 1,076 | SF | | $0.00 |
| 10 | Concrete Pad to be completed in place per plan, detail, and specification | 1.2 | 321313 | 950 | SF | | $0.00 |
| 11 | Truncated Dome Plates to be completed in place per plan, detail, and specification | 1.3 | 32173 | 10 | SF | | $0.00 |
| 12 | Metal Landscape Edging | 1.4 | | 130 | LF | | $0.00 |
| 13 | Gravel Type 1 - Cibolo Rock to be completed in place per plan, detail, and specification | 1.5 | 321540 | 45 | CY | | $0.00 |
| 14 | Gravel Type 2 - Decomp. Granite to be completed in place per plan, detail, and specification | 1.6 | 321540 | 212 | CY | | $0.00 |
| | **Pavement, Ramps, Curbs SUBTOTAL** | | | | | | |
| | | | | | | | |
| | **Jointing** | | | | | | |
| 15 | Expansion Joints to be completed in place per plan, detail, and specification | 2.1 | 408S | 80 | LF | | $0.00 |
| 16 | Control Joint to be completed in place per plan, detail, and specification | 2.2 | 408S | 308 | LF | | $0.00 |
| | **Jointing SUBTOTAL** | | | | | | |
| | | | | | | | |
| | **Site Walls/Embankments** | | | | | | |
| 17 | Cast In Place Wall - Concrete Wall to be completed in place per plan, detail, and specification | 4.1 | 044300 | 81 | LF | | $0.00 |
| 18 | Boulder Wall to be completed in place per plan, detail, and specification | 4.2 | 044301 | 60 | LF | | $0.00 |
| | **Site Wall/Embankments SUBTOTAL** | | | | | | |
| | | | | | | | |
| | **Site Furnishings** | | | | | | |
| 19 | Bicycle Rack complete in place per plan, detail, and specification | 5.1 | 129300 | 4 | EA | | $0.00 |
| | **Site Furnishings SUBTOTAL** | | | | | | |
| | | | | | | | |
| | **Railings, Barriers, Fencing** | | | | | | |
| 20 | Handrail complete in place per plan, detail, and specification | 6.1 | 055213 | 20 | LF | | $0.00 |
| | **Railings, Barriers, Fencing SUBTOTAL** | | | | | | |
| | | | | | | | |
| | **Site Lighting** | | | | | | |
| 21 | Path light install in place per plan, detail and specification | 7.1 | 265619 | 5 | EA | | $0.00 |
| 22 | Uplight install in place per plan, detail, and specification | 7.2 | mep | 12 | EA | | $0.00 |
| | **Site Lighting SUBTOTAL** | | | | | | |
| | | | | | | | |
| | **Planting** | | | | | | |
| | **Shrubs & Perennials** | | | | | | |
| 23 | Texas Kidneywood - 45 gal ET including planting and staking complete in place per plan and detail | 9.1 | 329300 | 7 | EA | | $0.00 |
| 24 | Texas Nolina - 5 gal NT complete in place per plan and detail | 9.1 | 329300 | 14 | EA | | $0.00 |
| 25 | Prickly Pear Cactus - 15 gal OF complete in place per plan and detail | 9.1 | 329300 | 15 | EA | | $0.00 |
| 26 | Buckley Yucca - 30 gal YC complete in place per plan and detail | 9.1 | 329300 | 8 | EA | | $0.00 |
| 27 | Twistleaf Yucca - 5 gal YR complete in place per plan and detail | 9.1 | 329300 | 22 | EA | | $0.00 |
| 28 | **Grasses/ Turf** | | | | | | $0.00 |
| 29 | Big Muhly - 5 gal ML, complete in place per plan and detail | 9.1 | 329300 | 20 | EA | | $0.00 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 30 | Seed Mix, including fine grading as necessary, soil prep, establishment complete in place per plan | -- | 329200 | 10,167 | SF | | $0.00 |
| 31 | 2" - revegetate topsoil complete in place per plan, detail, and spec | 9.2 | 329113 | 63 | CY | | $0.00 |
| 32 | Mulch Bed - Shovel Cut Edge | 9.3 | | 3,743 | SF | | $0.00 |
| | **Landscaping SUBTOTAL** | | | | | | |
| | | | | | | | |
| | **Irrigation** | | | | | | |
| 33 | Irrigation System - Complete and in place | | 328400 | 1 | ALLOW | $20,000.00 | $20,000.00 |
| 34 | 1" Water Meter (Irrigation) | WT-02 | 511 | 1 | EA | | $0.00 |
| 35 | 1" HDPE, with Restrained Joints, Complete & In Place | REF PLAN | 510 | 487 | LF | | $0.00 |
| 36 | RPZ Backflow Preventer | REF PLAN | 510 | 1 | EA | | $0.00 |
| 37 | RPZ Backflow Preventer | REF PLAN | 510 | 1 | EA | | $0.00 |
| | **Irrigation SUBTOTAL** | | | | | | |
| | | | | | | | |
| | **Site Utilities** | | | | | | |
| 38 | 2" HDPE, with Restrained Joints, Complete & In Place | REF PLAN | 510 | 497 | LF | | $0.00 |
| 39 | 2" Gate Valve & Box, Complete & In Place | WT-06, 22 | 511 | 1 | EA | | $0.00 |
| 40 | 1" Water Meter (Domestic), Complete & In Place | WT-02 | 511 | 1 | EA | | $0.00 |
| 41 | Underground Electric Conduit, Complete & In Place, sizes per MEP Plan | MEP | MEP | 19 | LF | | $0.00 |
| 42 | Stormwater Pollution Prevention Plan | | | 1 | LS | | $0.00 |
| | **Site Utilities SUBTOTAL** | | | | | | |
| | | | | | | | |
| | **Architecture Elements - Building 1** | | | | | | |
| 43 | Division 1 - General Requirements | | | 1 | LS | | $0.00 |
| 44 | Division 3 - Concrete | | | | | | |
| | Foundation | | | 1 | LS | | $0.00 |
| | Concrete Sealing | | 033500 | 1 | LS | | $0.00 |
| 45 | Division 4 - Masonry | | | | | | |
| | Material | | | 1 | LS | | $0.00 |
| | Labor | | | 1 | LS | | $0.00 |
| 46 | Division 5 - Metal | | | | | | |
| | Structural Steel | | | 1 | LS | | $0.00 |
| | Misc Metal Fabrications | | 055000 | 1 | LS | | $0.00 |
| 47 | Division 6 - Wood & Plastics | | | | | | |
| | Rough Carpentry | | 061000 | 1 | LS | | $0.00 |
| | Finish Carpentry | | 062000 | 1 | LS | | $0.00 |
| | Exterior Finish Carpentry | | 062013 | 1 | LS | | $0.00 |
| | Casework | | 064100 | 1 | LS | | $0.00 |
| 48 | Division 7 - Thermal & Moisture Protection | | | | | | |
| | Butiminous Dampproofing | | 071600 | 1 | LS | | $0.00 |
| | Building Insulation | | 072000 | 1 | LS | | $0.00 |
| | Sheet-Applied Membrane Air Barrier | | 072726 | 1 | LS | | $0.00 |
| | Metal Roofing | | 074100 | 1 | LS | | $0.00 |
| | Metal Siding | | 074213 | 1 | LS | | $0.00 |
| | TPO Roofing | | 075423 | 1 | LS | | $0.00 |
| | Sheet Metal Flashing, Trim, & Roof Accessories | | 076200 | 1 | LS | | $0.00 |
| | Sealants | | 079200 | 1 | LS | | $0.00 |
| 49 | Division 8 - Doors & Windows | | | | | | |
| | Interior Doors | | 082010 | 1 | LS | | $0.00 |
| | Exterior Doors | | 082020 | 1 | LS | | $0.00 |
| | Alum Entrances & Storefront | | 084000 | 1 | LS | | $0.00 |
| | Windows | | 085000 | 1 | LS | | $0.00 |
| | Door Hardware | | 087100 | 1 | LS | | $0.00 |
| 50 | Division 9 - Finishes | | | | | | |
| | Gypsum Board | | 092900 | 1 | LS | | $0.00 |
| | Tiling | | 093000 | 1 | LS | | $0.00 |
| | Acoustical Panel Ceilings | | 095113 | 1 | LS | | $0.00 |
| | Resilient Base | | 099000 | 1 | LS | | $0.00 |
| | Painting | | 099000 & 099010 | 1 | LS | | $0.00 |
| 51 | Division 10 - Specialties | | | 1 | LS | | $0.00 |
| 52 | Division 12 - Furnishings | | | 1 | LS | | $0.00 |
| 53 | Division 22 - Plumbing | | | | | | |
| | Rough-in & Piping | | | 1 | LS | | $0.00 |
| | Fixtures | | | 1 | LS | | $0.00 |
| 54 | Division 23 - HVAC | | | | | | |
| | Ducting & Accessories | | | 1 | LS | | $0.00 |
| | Equipment | | | 1 | LS | | $0.00 |
| 55 | Electrical | | | | | | |
| | Labor, Wire and Devices | | | 1 | LS | | $0.00 |
| 56 | Division 31 - Earthwork | | | 1 | LS | | $0.00 |
| 57 | Other | | | 1 | LS | | $0.00 |
| | **Architecture Elements - Building 1 SUBTOTAL** | | | | | | |
| | | | | | | | |
| | **Mechanical** | | | | | | |
| 44 | Mechanical A/C Equipment | | 237000 | 1 | LS | | $0.00 |
| 45 | Ductwork | | 233000 | 1 | LS | | $0.00 |
| 46 | Ductwork Insulation | | 200700 | 1 | LS | | $0.00 |
| 47 | Diffusers and Trim Out | | 233000 | 1 | LS | | $0.00 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 48 | Exhaust Systems | | 233000 | 1 | LS | | $0.00 |
| 49 | Condensate Piping | | 221316 | 1 | LS | | $0.00 |
| 50 | Balancing and Testing | | 230593 | 1 | LS | | $0.00 |
| 51 | Controls | | Plans | 1 | LS | | $0.00 |
| 52 | Owner Training Controls | | Plans | 1 | LS | | $0.00 |
| 53 | Labeling Equipment | | 200100 | 1 | LS | | $0.00 |
| 54 | Record Drawings/O & M Manuals | | 200000 | 1 | LS | | $0.00 |
| | **Mechanical SUBTOTAL** | | | | | | |
| | | | | | | | |
| | **Plumbing** | | | | | | |
| 55 | Plumbing Rough-in Below Slab | | 221116/221316 | 1 | LS | | $0.00 |
| 56 | Plumbing Rough-in Above Slab | | 221116/221316 | 1 | LS | | $0.00 |
| 57 | Rainleader Piping System Below Slab | | 221316 | 1 | LS | | $0.00 |
| 58 | Rainleader Piping System Above Slab | | 221316 | 1 | LS | | $0.00 |
| 59 | Insulation (water and rainleader piping) | | 200700 | 1 | LS | | $0.00 |
| 60 | Plumbing Fixture/Trim - Materials and Labor | | 223000 | 1 | LS | | $0.00 |
| 61 | Water Heater | | 221117 | 1 | LS | | $0.00 |
| 62 | Testing/Sterilization (Water/Wastewater) | | 200100 | 1 | LS | | $0.00 |
| 63 | Labeling Equipment | | 200100 | 1 | LS | | $0.00 |
| 64 | Record Drawings/O & M Manuals | | 200000 | 1 | LS | | $0.00 |
| | **Plumbing SUBTOTAL** | | | | | | |
| | | | | | | | |
| | **Electrical** | | | | | | |
| 58 | Main Switchboard and Branch Circuit Panelboards | | 262413/262416 | 1 | LS | | $0.00 |
| 59 | Mobilization | | 260500 | 1 | LS | | $0.00 |
| 60 | Utility Company Fees | | 260500 | 1 | LS | | $0.00 |
| 61 | Service - Wiring and Conduit | | 260519/260533 | 1 | LS | | $0.00 |
| 62 | Site Light Fixtures, Wiring and Conduit | | 260519/260533 | 1 | LS | | $0.00 |
| 63 | Gear | | Multiple | 1 | LS | | $0.00 |
| 64 | Site Lighting Fixtures | | 265600 | 1 | LS | | $0.00 |
| 65 | Interior Lighting Fixtures | | 265100 | 1 | LS | | $0.00 |
| 66 | Branch Circuit - Wiring and Conduit | | 260519/260533 | 1 | LS | | $0.00 |
| 67 | Feeders - Wiring and Conduit | | 260519/260533 | 1 | LS | | $0.00 |
| 68 | Devices (switches and receptacles) | | 262726 | 1 | LS | | $0.00 |
| 69 | Fire Alarm System | | Plans | 1 | LS | | $0.00 |
| 70 | Testing/Labeling of Equipment | | 260500 | 1 | LS | | $0.00 |
| 71 | Record Drawings and O&M Manuals | | 260500 | 1 | LS | | $0.00 |
| | **Electrical SUBTOTAL** | | | | | | |
| | | | | | | | |
| | **SITE IMPROVEMENTS SUBTOTAL** | | | | | | |
| | | | | | | | |
| | **BASE BID DRAWINGS SUBTOTAL** | | | | | | |

# AGREEMENT
# BETWEEN OWNER AND CONTRACTOR

The **Owner**: Williamson County
710 Main Street, Ste. 101
Georgetown, Texas 78626

and **Contractor** _____
_____
_____ _____

for the **Project**: _____
_____
_____ _____

**Architect:** _____
_____
_____ _____

**AGREEMENT**, this Agreement Between Owner and Contractor (hereinafter called "Agreement") is entered into effective as of the date indicated herein below and all attachments (the "Effective Date"), by and between Williamson County a political subdivision of the State of Texas (hereinafter called the "Owner") and _____ (hereinafter called "Contractor").

**WHEREAS,** the Owner desires to retain a Contractor for the _____ (hereinafter called the "Project"),

**WHEREAS,** the Owner desires a Contractor who will render, diligently and competently in accordance with the highest standards used in the profession, all Contractor services which shall be necessary or advisable for the expeditious, economical and satisfactory completion of the Project, and

**NOW, THEREFORE**, in consideration of the mutual undertakings herein contained, the parties hereto agree as follows:

## ARTICLE 1 SCOPE OF WORK

The Contractor has overall responsibility for and shall provide complete construction services and furnish all materials, equipment, tools and labor as necessary or reasonably inferable to complete the Work, or any phase of the Work, in accordance with the Specifications and Drawings for the Project and the Owner's requirements. The Specifications and Drawings were prepared for Williamson County by the Architect. The Contractor shall do everything required by the Contract Documents.

## ARTICLE 2 CONTRACT DOCUMENTS

**2.1** The Contract Documents consist of the following, which are incorporated by reference for all purposes:

a. This Agreement and all exhibits and attachments listed, contained or referenced in this Agreement;
b. The Uniform General Conditions for Williamson County ("General Conditions");
c. The Supplementary or Special Conditions, if any;
d. All Addenda issued prior to the Effective Date of this Agreement;
e. The Bid/Proposal Documents as defined by the Invitation for Bidders/Request for Proposals;
f. All Change Orders issued after the Effective Date of this Agreement;
g. Minimum Insurance Coverages and Minimum Coverage Amounts, which is attached here to as **Exhibit 1**; and
h. The Drawings, Specifications, details and other documents developed by Architect to describe the Project and accepted by Owner, which are attached hereto **Exhibit 2**.

**2.2** The Contract Documents form the entire and integrated Contract and Agreement between Owner and Contractor and supersede all prior negotiations, representations or agreements, written or oral. Contractor acknowledges receipt of all Contract Documents as of the date of its execution hereof.

**2.3** The term "Contractor" shall be interchangeable with the terms "Proposer," "Bidder," Respondent" and "General Contractor" or other similar terms as appropriate in the Contract Documents.

## ARTICLE 3 CONTRACT TIME

The Owner shall provide a Notice to Proceed in which a date for commencement of the work shall be started. The Contractor shall achieve Substantial Completion of the Work within _____ (_____) calendar days after such commencement date, as such completion date may be extended by approved Change

Orders. Unless otherwise specified in writing, Contractor shall achieve Final Completion within _____ (_____) calendar days of Substantial Completion. The time set forth for completion of the work is an essential element of the Contract.

## ARTICLE 4 CONTRACTOR REPRESENTATIONS

**4.1** In order to induce Owner to enter into this Agreement, Contractor makes the following representations:

A. Contractor has examined and carefully studied the Contract Documents and the other related data identified in the Bid/Proposal Documents.

B. Contractor has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Contractor is familiar with and is satisfied as to all federal, state, and local laws and regulations that may affect cost, progress, and performance of the Work.

D. Contractor has considered the information known to Contractor; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Site-related reports and drawings identified in the Contract Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, including any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Contract Documents; and (3) Contractor's safety precautions and programs.

E. Based on the information and observations referred to in Paragraph 4.1.D above, Contractor does not consider that further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents.

F. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.

G. Contractor has given Architect written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Architect is acceptable to Contractor.

H. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

## ARTICLE 5 THE CONTRACT PRICE; OWNER'S CONSTRUCTION CONTINGENCY

**5.1 Contract Price.** Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents the amount of **$**_____

**5.2 Contract Payments.** Method and terms of payment of the Contract Price shall be in accordance with the Contract Documents.

**5.3 Owner's Construction Contingency.** The following lump sum amount shall serve as the Owner's Construction Contingency from which changes in the Work are to be paid in accordance with the General Conditions:

$_____

The Owner's Construction Contingency is controlled solely by the Owner and such amount is not included in the Contract Price set out in 5.1 above. Expenditures from the Owner's Construction Contingency must be made by Change Order issued by the Architect and approved by the Owner in accordance with the General Conditions. Contractor shall not be entitled to any compensation from the any unused amounts of the Owner's Construction Contingency.

**5.4 Allowable Overhead and Profit Markup on Changes in the Work.** In case of an increase in the Contract Price due to a change in the Work and in accordance with § 7.3.7 of the General Conditions, the amounts Contractor may add to the pricing of a change for overhead and profit are as follows:

a. For Work performed directly by Contractor with its Own Employees: Contractor may add up to 15% for Work performed directly by Contractor for any specific change.

b. For Managing Subcontracted Work: Contractor may add up to 10% for managing subcontracted Work for any specific change.

Only one percentage, referenced above, shall be used for the purpose of calculating the markup for a specific change amount. On changes involving both additions and deletions,

the allowed markup will be allowed only on the net addition. The allowed markup shall cover all overhead expenses and profit of any kind relating to the specific change.

## ARTICLE 6 TIME

**6.1 TIME LIMITS STATED IN THE CONTRACT DOCUMENTS ARE OF THE ESSENCE OF THIS AGREEMENT.**

**6.2** Unless otherwise approved in writing, the Owner and the Contractor shall perform their respective obligations under the Contract Documents as expeditiously as is consistent with reasonable skill and care and the orderly progress of the Work.

**6.3 Liquidated Damages.** Contractor and Owner recognize that time is of the essence and that Owner will suffer financial loss if the Work is not completed within the times specified in Article 3 above, plus any extensions thereof allowed in accordance with the General Conditions. The parties also recognize the delays, expense, and difficulties involved in proving in a legal proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, for each consecutive calendar day after the date of Substantial Completion that the Work is not substantially completed, the Owner may deduct the amount of:

***Five Hundred Dollars per calendar day ($500.00/calendar day)***

from any money due or that becomes due the Contractor, not as a penalty but as liquidated damages representing the parties' estimate at the time of contract execution of the damages that the Owner will sustain for late completion. The parties stipulate and agree that calculating Owner's actual damages for late completion of the Project would be impractical, unduly burdensome, and cause unnecessary delay and that the amounts of daily liquidated damages set forth are reasonable. Contractor expressly agrees that the amounts of daily liquidated damages are a reasonable forecast of the actual damages Owner will incur due to any such delay.

## ARTICLE 7 NOTICES

Notices of claims, disputes or other legal notices shall be in writing and shall be deemed to have been given when delivered in person to the representative of the Contractor or Owner for whom it is intended, as set out below or sent by U. S. Mail to the representative of the Contractor or Owner for whom it is intended, as set out below. Mail notices are deemed effective upon receipt or on the third business day after the date of mailing, whichever is sooner.

If to Owner: Williamson County Judge
710 Main Street, Ste. 101
Georgetown, Texas 78626

with copy to: Hal C. Hawes
General Counsel to the
Williamson County Commissioners Court
710 Main Street, Suite 102
Georgetown, Texas 78626

If to Contractor: _____
_____
_____ _____

The parties may make reasonable changes in the person or place designated for receipt of notices upon advance written notice to the other party.

**ARTICLE 8 PARTY REPRESENTATIVES**

The Owner's Designated Representative (sometimes referred to as the "ODR") authorized to act in the Owner's behalf with respect to the Project is:

_____
_____
_____ _____
Phone (512) _____
Fax (512) _____

The Contractor's designated representative authorized to act on the Contractor's behalf and bind the Contractor with respect to the Project is:

_____
_____
_____ _____
Phone (512) _____
Fax (512) _____

The parties may make reasonable changes in their designated representatives upon advance written notice to the other party.

**ARTICLE 9 ENTIRE AGREEMENT**

This Agreement supersedes all prior agreements, written or oral, between Contractor and Owner and shall constitute the entire agreement and understanding between the parties with respect to the Project. This Agreement and the terms of the Contact Documents shall

be binding upon the parties and may not be waived, modified, amended or altered except by a writing signed by Contractor and Owner.

BY SIGNING BELOW, the Parties have executed and bound themselves to this Agreement to be effective as of the date of the last party's execution below (the "Effective Date").

| | |
|---|---|
| WILLIAMSON COUNTY<br>Williamson County, Texas, | _____, a<br>Texas _____, |
| By: _____ | By: _____ |
| Printed Name: _____ | Printed Name: _____ |
| Title: _____ | Title: _____ |
| Date: _____ ____, 20____ | Date: _____ ____, 20____ |

# EXHIBIT 1

## Minimum Insurance Coverages and Minimum Coverage Amounts

A. All policies of insurance provided by the Contractor must comply with the requirements of this Exhibit, the Contract Documents and the laws of the State of Texas.

B. The Contractor shall provide and maintain, until the Work covered in the Agreement Between Owner and Contractor is completed and accepted by the Owner, the minimum insurance coverages in the minimum amounts as described below. Coverage shall be written on an occurrence basis by companies authorized and admitted to do business in the State of Texas and rated A- or better by A.M. Best Company, or otherwise acceptable to Owner.

| | Type of Coverage | Limits of Liability |
|---|---|---|
| 1. | Worker's Compensation | Statutory |
| 2. | Employer's Liability | |
| | Bodily Injury by Accident | $500,000 Ea. Accident |
| | Bodily Injury by Disease | $500,000 Ea. Employee |
| | Bodily Injury by Disease | $500,000 Policy Limit |

3. Comprehensive general liability including completed operations and contractual liability insurance for bodily injury, death, or property damages in the following amounts:

| COVERAGE | PER OCCURRENCE |
|---|---|
| Comprehensive General Liability (including premises, completed operations and contractual) | $1,000,000 |
| Aggregate policy limits: | $2,000,000 |

4. Comprehensive automobile and auto liability insurance (covering owned, hired, leased and non-owned vehicles):

| COVERAGE | PER PERSON | PER OCCURRENCE |
|---|---|---|
| Bodily injury (including death) | $1,000,000 | $1,000,000 |

| | | |
|---|---|---|
| Property damage | $1,000,000 | $1,000,000 |
| Aggregate policy limits | No aggregate limit | |

5. Builder's Risk Insurance (all risks)
An all risk policy, in the amount equal at all times to 100% of the Contract Price or Contract Sum. The policy shall be issued in the name of the Contractor and shall name its Subcontractors as additional insureds. The Owner shall be named as a loss payee on the policy. The builders risk policy shall have endorsements as follow:

a. This insurance shall be specific as to coverage and not considered as contributing insurance with any permanent insurance maintained on the present premises. If off-site storage is permitted, coverage shall include transit and storage in an amount sufficient to protect property being transported or stored.

b. This 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, caused by certified acts of terrorism as defined in the Terrorism Risk Insurance Act, 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 as well as coverage for building materials while in transit or building materials suitably stored at a temporary location. Property insurance provided by the Contractor shall not cover any tools, apparatus, machinery, scaffolding, hoists, forms, staging, shoring, and other similar items commonly referred to as construction equipment that may be on the site and the capital value of which is not included in the Work. The Contractor shall make its own arrangements for any insurance it may require on such construction equipment. Any such policy obtained by the Contractor under this section shall include a waiver of subrogation in accordance with the requirements of Section 11.3.4 of the General Conditions.

C. For renovation projects and or portions of work contained within an existing structure, the Owner waives subrogation for damage by fire to existing building structure(s), if the Builder's Risk Policy has been endorsed to include coverage for existing building structure(s) in the amount described in the Special Conditions. However, Contractor shall not be required to obtain such an endorsement unless specifically required by the

Special Conditions in the Contract Documents. The aforementioned waiver of subrogation shall not be effective unless such endorsement is obtained.

6. Flood insurance when specified in Supplementary General Conditions or Special Conditions.

7. Umbrella coverage in the amount of not less than $5,000,000.

C. Workers' Compensation Insurance Coverage:

a. Definitions:

(1) Certificate of coverage ("certificate") - A copy of a certificate of insurance, a certificate of authority to self-insure issued by the Texas Workers' Compensation Commission, or a coverage agreement (TWCC-81, TWCC-82, TWCC-83, or TWCC-84), showing statutory workers' compensation insurance coverage for the person's or entity's employees providing services on a project, for the duration of the Project.
(2) Duration of the Project - includes the time from the beginning of the work on the Project until the Contractor's/person's work on the Project has been completed and accepted by the Owner.
(3) Coverage – Workers' compensation insurance meeting the statutory requirements of the Texas Labor Code, §401.011(44).
(4) Persons providing services on the Project ("subcontractor") - includes all persons or entities performing all or part of the services the Contractor has undertaken to perform on the Project, regardless of whether that person contracted directly with the Contractor and regardless of whether that person has employees. This includes, without limitation, independent contractors, subcontractors, leasing companies, motor carriers, owner-operators, employees of any such entity, or employees of any entity which furnishes persons to provide services on the Project. "Services" include, without limitation, providing, hauling, or delivering equipment or materials, or providing labor, transportation, or other service related to a project. "Services" does not include activities unrelated to the Project, such as food/beverage vendors, office supply deliveries, and delivery of portable toilets.

b. The Contractor shall provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code, §401.011(44) for all employees of the Contractor providing services on the Project, for the duration of the Project.
c. The Contractor must provide a certificate of coverage prior to execution of the Agreement Between Owner and Contractor, and in no event later than ten (10)

days from Notice of Award. Failure to provide the insurance in a timely fashion may result in loss of Contractor's bid bond.

d. If the coverage period shown on the Contractor's current certificate of coverage ends during the duration of the Project, the Contractor must, prior to the end of the coverage period, file a new certificate of coverage with the Owner showing that coverage has been extended.
e. The Contractor shall obtain from each person providing services on a project, and provide to the Owner:

    (1) a certificate of coverage, prior to that person beginning work on the Project, so the Owner will have on file certificates of coverage showing coverage for all persons providing services on the Project; and
    (2) no later than seven days after receipt by the Contractor, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the Project.

f. The Contractor shall retain all required certificates of coverage for the duration of the Project and for one year thereafter.
g. The Contractor shall notify the Owner in writing by certified mail or personal delivery, within 10 days after the Contractor knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the Project.
h. The Contractor shall post on each project site a notice, in the text, form and manner prescribed by the Texas Workers' Compensation Commission, informing all persons providing services on the Project that they are required to be covered, and stating how a person may verify coverage and report lack of coverage.

i. The Contractor shall contractually require each person with who it contracts to provide services on a project, to:

    (1) provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas labor Code, Section 401.011(44) for all of its employees providing services on the Project, for the duration of the Project;
    (2) provide to the Contractor, prior to that person beginning work on the Project, a certificate of coverage showing that coverage is being provided for all employees of the person providing services on the Project, for the duration of the Project;
    (3) provide the Contractor, prior to the end of the coverage period, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the Project;

(4) obtain from each other person with whom it contracts, and provide to the Contractor:

a. a certificate of coverage, prior to the other person beginning work on the Project; and

b. a new certificate of coverage showing extension of coverage, prior to the end of the coverage period, if the coverage period shown on the current certificate of coverage ends during the duration of the Project;

(5) retain all required certificate of coverage on file for the duration of the Project and for one year thereafter;

(6) notify the Owner in writing by certified mail or personal delivery, within 10 days after the person knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the Project; and

(7) contractually require each person with whom it contracts, to perform as required by paragraphs (1)-(7), with the certificates of coverage to be provided to the person for whom they are providing services.

j. By signing the Agreement Between Owner and Contractor or providing or causing to be provided a certificate of coverage, the Contractor is representing to the Owner that all employees of the Contractor who will provide services on the Project will be covered by workers' compensation coverage for the duration of the Project, that the coverage will be based on proper reporting of classification codes and payroll amounts, and that all coverage agreements will be filed with the appropriate insurance carrier or, in the case of a self-insured, with the commission's Division of Self-Insurance Regulation. Providing false or misleading information may subject the Contractor to administrative penalties, criminal penalties, civil penalties, or other civil actions.

k. The Contractor's failure to comply with any of these provisions is a breach of contract by the Contractor which entitles the Owner to declare the Agreement Between Owner and Contractor void if the Contractor does not remedy the breach within ten days after receipt of notice of breach from the Owner.

D. If insurance policies are not written for the amounts specified in this Exhibit, Contractor shall carry Umbrella or Excess Liability Insurance for any differences in amounts specified. If Excess Liability Insurance is provided, it shall follow the form of primary coverage.

E. The furnishing of the above listed insurance coverage, as may be modified by the Contract Documents, must be tendered prior to execution of the Agreement Between Owner and Contractor, and in no event later than ten (10) days from Notice of Award. Failure to provide the insurance in a timely fashion may result in loss of Contractor’s bid bond.

F. Owner shall be entitled, upon request and without expense, to receive copies of the policies and all endorsements as they apply to the limits set out in this Exhibit.

G. Contractor shall be responsible for payment of premiums for all of the insurance coverages required under this Exhibit. Contractor further agrees that for each claim, suit or action made against insurance provided hereunder, with respect to all matters for which the Contractor is responsible hereunder, Contractor shall be solely responsible for all deductibles and self-insured retentions. Any deductibles or self-insured retentions over **$75,000** in the Contractor's insurance must be declared and approved in writing by Owner in advance.

# EXHIBIT 2 –DRAWINGS AND SPECIFICATIONS

## FOR

_____

LIST OF DRAWINGS

| DWG | DRAWING TITLE | ISSUE DATE |
|---|---|---|

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For
TECHNICAL SPECIFICATION SECTIONS

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FOR WILLIAMSON COUNTY

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 BASIC DEFINITIONS

§ 1.1.1 THE CONTRACT DOCUMENTS

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract as revised, 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 Owner or the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, 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 Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants or (4) between any persons or entities other than the Owner and the Contractor.

§ 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 and by separate contractors.

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

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

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

§ 1.1.8 KNOWLEDGE: The terms "knowledge," "recognize," and "discover," their respective derivatives, and similar terms in the Contract Documents, as used in reference to the Contractor, shall be interpreted to mean that which the Contractor knows (or should know), recognizes (or should recognize), and discovers (or should discover) in exercising the care, skill, and diligence required by the Contract Documents. Analogously, the expression "reasonably inferable" and similar terms in the Contract Documents shall be interpreted to mean reasonably inferable by a contractor familiar with the Project and exercising the care, skill, and diligence required of the Contractor by the Contract Documents.§1.1.10 PRODUCT: Materials, systems, and equipment incorporated or to be incorporated in the Work.

§1.1.9 PROVIDE: Furnish and install and shall include, without limitation, labor, materials, equipment, transportation, services and other items required to complete the referenced tasks.

§1.1.02 FURNISH: Pay for, deliver (or receive), unload, inspect, and store products, materials, equipment, and accessories as specified while retaining care, custody and control until received for installation based on a signed receipt.

§ 1.1.11 INSTALL: Receive, unload, inspect, and store as specified while retaining care, custody and control; set or place in position, make required connections; and adjust and test as specified in the Contract Documents for satisfactory performance and operation.

§ 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS
§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the intended results. In the event of inconsistencies within or between parts of the Contract Documents, or between the Contract Documents and applicable standards, codes, and ordinances, the Contractor shall (i) provide the better quality or greater quantity of Work or (ii) comply with the more stringent requirement; either or both in accordance with the Owner or the Architect’s

interpretation. The terms and conditions of this Section 1.2.1, however, shall not relieve the Contractor of any of the obligations set forth in the Contract Documents.

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

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

§ 1.2.3.1 Whenever a product is specified in accordance with a Federal Specification, an ASTM Standard, an American National Standards Institute Specification, or other Association Standard, the Contractor, if required by the Specifications or if requested by the Owner, shall present evidence from the manufacture, certifying the product complies with the particular Standard or Specification. When required by the Contract Documents, supporting data shall be submitted to substantiate compliance.

§ 1.2.3.2 Whenever a product is specified or shown by describing proprietary items, model numbers, catalog numbers, manufacturer, trade names, or similar reference, no substitutions may be made unless accepted in strict accordance with the Substitution requirements stated in the Specifications or, if no Substitution requirements are stated in the Specifications, in accordance with the requirements stated elsewhere in the Contract Documents. Where two or more products are shown or specified, the Contractor has the option to use either of those shown or specified.

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

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

§ 1.5 USE OF DRAWINGS AND OTHER INSTRUMENTS OF SERVICE
§ 1.5.1 The Architect and the Architect’s consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and will retain all common law, statutory and other reserved rights, including copyrights, except as provided in the Owner-Architect Agreement. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect’s or Architect’s consultants’ reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce the Instruments of Service provided to them solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect’s consultants.

§ 1.6 TRANSMISSION OF DATA IN DIGITAL FORM
If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall establish the necessary protocols governing such transmissions in writing, unless otherwise already provided in the Agreement or the Contract Documents.

ARTICLE 2 OWNER

§ 2.1 GENERAL

The Owner means Williamson County acting through any duly authorized representative as provided 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 ("Owner's Designated Representative"). The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.2 OWNER

§ 2.2.1 Appropriation of Funds by Owner. Owner believes it has sufficient funds currently available and authorized for expenditure to finance the costs of the Agreement between Owner and Contractor. Contractor understands and agrees that the Owner's payment of amounts under the Agreement between Owner and Contractor is contingent on the Owner receiving appropriations or other expenditure authority sufficient to allow the Owner, in the exercise of reasonable administrative discretion, to continue to make payments under the Agreement.

§ 2.2.2 Unless specifically stated otherwise in the Contract Documents, Contractor shall secure and pay for necessary permits, approvals, 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. Except for surveys or grade information, the Contractor shall compare the information furnished by the Owner, including, but not limited to, soil tests, with visibly observable physical conditions and the Contract Documents and, on the basis of such review, promptly report to the Owner and the Architect any known conflicts, errors or omissions. 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 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.2.5 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions.

§ 2.3 OWNER'S RIGHT TO STOP THE WORK

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity.

§ 2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-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, 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.

§2.5 EXTENT OF OWNER RIGHTS

§ 2.5.1 The rights stated in this Article 2 and elsewhere in the Contract Documents are cumulative and not in limitation of any rights of the Owner (i) granted in the Contract Documents, (ii) at law, or (iii) in equity.

§ 2.5.2 In no event shall the Owner have control over, charge of, or any responsibility for construction means, methods, techniques, sequences, or procedures or for safety precautions and programs in connection with the Work, notwithstanding any of the rights and authority granted the Owner in the Contract Documents.

§ 2.6 OWNER'S RIGHT TO RECORDS

§ 2.6.1 The Contractor's records, which shall include but not be limited to accounting records, written policies and procedures, subcontractor files (including proposals of successful bidders), original estimates, estimating work sheets, correspondence, schedules, change order files (including documentation covering negotiated settlements), and any other supporting evidence necessary to substantiate charges related to this contract (all foregoing hereinafter referred to as "records") and shall be open to inspection and subject to audit and/or reproduction, during normal working hours, by Owner's agent or its authorized representative to the extent necessary to adequately permit evaluation and verification of any invoices, payments or claims submitted by the Contractor or any of his payees. Such records subject to examination shall also include, but not be limited to, those records necessary to evaluate and verify direct and indirect costs (including overhead allocations) as they may apply to costs associated with this Contract.

§ 2.6.2 For the purpose of such audits, inspections, examinations and evaluations, the Owner's agent, or authorized representatives shall have access to said records from the effective date of this Contract for the duration of Work and until three (3) years (or longer if required by law) after the date of final payment by Owner to Contractor.

§ 2.6.3 Owner's agent or its authorized representative shall have access during normal business hours to the Contractor's facilities, shall have access to all necessary records and shall be provided adequate and appropriate work space, in order to conduct audits in compliance with this Article 2.6. Owner's agent or authorized representative shall give auditees reasonable advance notice of intended audits.

§ 2.6.4 Contractor shall require all subcontractors, insurance agents, and material suppliers (payees) with cost plus contracts, if permitted, and not fixed price contracts to comply with the provisions of this Article by insertion of the requirements hereof in a written contract agreement between Contractor and payee. Failure to obtain such written contracts which include such provisions shall be reason to exclude some or all of the related payee's costs from amounts payable to the Contractor pursuant to this contract.

ARTICLE 3 CONTRACTOR

§ 3.1 GENERAL

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative, and if these General Conditions are used in conjunction with the Agreement between Owner and Construction Manager-At-Risk, the term "Contractor" shall mean the Construction Manager.

§ 3.1.2 The Contractor shall perform the Work in strict 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 or entities other than the Contractor.

§ 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents. Prior to execution of the Agreement, the Contractor and each Subcontractor shall have evaluated and satisfied themselves as to the observable conditions and limitations under which the Work is to be performed, including, without limitation, (i) the location, condition, layout, and nature of the Project site and surrounding areas, (ii) generally prevailing climatic conditions, (iii) anticipated labor supply and costs, (iv) availability and cost of materials, tools, and equipment, and (v) other similar issues. The Owner assumes no responsibility or liability for the physical condition or safety of the Project site or any improvements located on the Project site. Except as set forth in Section 10.3, the Contractor shall be solely responsible for providing a safe place for the performance of the Work. The Owner shall not be required to make any adjustment in either the Contract Sum or the Contract Time in connection with any failure by the Contractor or any Subcontractor to have complied with the requirements of this Section 3.2.1.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Owner and Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information. 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. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that reasonably may be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the indicated result will be provided whether or not specifically called for, at no additional cost to Owner. The Contractor shall verify the accuracy of elevations, dimensions, locations, and field measurements. In all cases of the interconnection of its Work with existing or other Work, the Contractor shall verify at the site all dimensions relating to such existing or other Work.

.1 All of Contractor's work shall conform to the Contract Documents. Contractor shall be responsible for the details of the Work necessary to carry out the intent of the drawings and specifications, or which are customarily performed. When more detailed information is required for performance of the Work or when an interpretation of the Contract Documents is requested, the Contractor shall submit a written request for information to the Architect or Owner (as required), and the Owner or Architect shall furnish such information or interpretation. Where only part of the Work is indicated, similar parts shall be considered repetitive. Where any detail is shown and components thereof are fully described, similar details not fully described shall be considered to incorporate the fully described details and components.

.2 The Contractor has had an opportunity to examine, and has carefully examined, all of the Contract Documents and Project site, and has fully acquainted itself with the scope of work, design, availability of materials, existing facilities, access, general topography, soil structure, subsurface conditions, obstructions, and all other conditions pertaining to the Work, the site of the Work, and its surrounding; that it has made necessary investigations to a full understanding of the difficulties which may be encountered in performing the Work; and that anything in any Contract Documents, or in any representations, statements, or information made or furnished by Owner or its representatives notwithstanding, Contractor will complete the Work for the compensation stated in the Agreement. In addition thereto, Contractor represents that it is fully qualified to do the Work in accordance with the terms of this Agreement in the time specified.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Owner and the Architect any nonconformity discovered by or made known to the Contractor as a request for information.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall make Claims as provided in Article 15.

§ 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 loss or damage arising solely from those Owner-required means, methods, techniques, sequences or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 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.

§ 3.3.4 Inspection of the progress, quantity, or quality of the Work done by the Owner, any Owner's representative, any governmental agency, or the Architect, or any inspector, shall not relieve the Contractor of any responsibility for the compliance of the Work with the Contract Documents. The Owner or its approved representative (heretofore referred to as Owner's representative) shall have access to the worksite and all Work. No supervision or inspection by the Owner's representative, nor the authority to act nor any other actions taken by the Owner's representative shall relieve the Contractor of any of its obligations under the Contract Documents nor give rise to any duty on the part of the Owner.

§ 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.

§ 3.4.1.1 Duty to Pay Prevailing Wage Rates. The Contractor shall pay not less than the wage scale of the various classes of labor as shown on the "Prevailing Wage Schedule" provided by the Owner. The specified wage rates are minimum rates only, and are not representations that qualified labor adequate to perform the Work is available locally at the prevailing wage rates. The Owner is not bound to pay—and will not consider—any claims for additional compensation made by any Contractor because the Contractor pays wages in excess of the applicable minimum rate contained in the Contract Documents. The "Prevailing Wage Schedule" is not a representation that quantities of qualified labor adequate to perform the Work may be found locally at the specified wage rates.

.1 For classifications not shown, workers shall not be paid less than the wage indicated for Laborers. The Contractor shall notify each worker commencing work on the Project the worker's job classification and the established minimum wage rate required to be paid, as well as the actual amount being paid. The notice must be delivered to and signed in acknowledgement of receipt by the employee and must list both the monetary wages and fringe benefits to be paid or furnished for each classification in which the worker is assigned duties. When requested by Owner, competent evidence of compliance with the Texas Prevailing Wage Law shall be furnished by Contractor.

.2 A copy of each worker wage rate notification shall be submitted to the Owner with the Application for Payment for the period during which the worker began on-site activities.

§ 3.4.1.2 Prevailing Wage Schedule. The "Prevailing Wage Schedule" shall be determined by the Owner in compliance with Chapter 2258, Texas Government Code. Should the Contractor at any time become aware that a particular skill or trade not reflected on the Owner's Prevailing Wage Schedule will be or is being employed in the Work, whether by the Contractor or by a subcontractor, the Contractor shall promptly inform the Owner and shall specify a wage rate for that skill or trade, which shall bind the Contractor.

§ 3.4.1.3 Penalty for Violation. The Contractor and any Subcontractor shall pay to the Owner a penalty of sixty dollars ($60.00) for each worker employed for each calendar day, or portion thereof, that the worker is paid less than the wage rates stipulated in the Prevailing Wage Schedule or any supplement thereto pursuant to §3.4.1.2. The Contractor and each Subcontractor shall keep, or cause to be kept, an accurate record showing the names and occupations of all workers employed in connection with the Work, and showing the actual per diem wages paid to each worker, which records shall be open at all reasonable hours for the inspection by the Owner.

§ 3.4.1.4 Complaints of Violations of Prevailing Wage Rates. Within 31 days of receipt of information concerning a violation of Chapter 2258 of the Texas Government Code, the Owner shall make an initial determination as to whether good cause exists to believe a violation occurred. The Owner's decision on the initial determination shall be reduced to writing and sent to the Contractor or Subcontractor against whom the violation was alleged, and to the affected worker. When a good cause finding is made, the Owner shall retain the full amounts claimed by the claimant or claimants as the difference between wages paid and wages due under the Prevailing Wage Schedule and any supplements thereto, together with the applicable penalties, such amounts being subtracted from successive progress payments pending a final decision on the violation.

§ 3.4.1.5 Arbitration Required if Violation not Resolved. After the Owner makes its initial determination, the affected Contractor or Subcontractor and worker have 14 days in which to resolve the issue of whether a violation occurred, including the amount that should be retained by Owner or paid to the affected worker. If the Contractor or Subcontractor and affected worker reach an agreement concerning the worker's claim, the Contractor shall promptly notify the Owner in a written document signed by the worker. It the Contractor or Subcontractor and affected worker do not agree before the 15th day after the Owner's determination, the Contractor or Subcontractor and affected worker must participate in binding arbitration in accordance with the Texas General Arbitration Act, Chapter 171, Tex. Civ. Prac. & Rem. Code. The parties to the arbitration have 10 days after the expiration of the 15 days referred to above, to agree on an arbitrator; if by the 11th day there is no agreement to an arbitrator, a district court shall appoint an arbitrator on the petition of any of the parties to the arbitration.

§ 3.4.1.6 Arbitration Award. If an arbitrator determines that a violation has occurred, the arbitrator shall assess and award against the Contractor or Subcontractor the amount of penalty as provided in this Article 3.4 and the amount owed the worker. The Owner may use any amounts retained hereunder to pay the worker the amount as designated in the arbitration award. If the Owner has not retained enough from the Contractor or Subcontractor to pay the worker in accordance with the arbitration award, the worker has a right of action against the Contractor and Subcontractor as appropriate, and the surety of

either to receive the amount owed, attorneys' fees and court costs. The Contractor shall promptly furnish a copy of the arbitration award to the Owner.

§ 3.4.1.7 Prevailing Wage Retainage. Money retained pursuant to this Article 3.4 shall be used to pay the claimant or claimants the difference between the amount the worker received in wages for labor on the Project at the rate paid by the Contractor or Subcontractor and the amount the worker would have received at the general prevailing wage rate as provided by the agreement of the claimant and the Contractor or Subcontractor affected, or in the arbitrator's award. The full statutory penalty of $60.00 per day of violation per worker shall be retained by the Owner to offset its administrative costs, pursuant to Texas Government Code §2258.023. Any retained funds in excess of these amounts shall be paid to the Contractor on the earlier of the next progress payment or final payment. Provided, however, that the Owner shall have no duty to release any funds to either the claimant or the Contractor until it has received the notices of agreement or the arbitration award as provided under §§3.4.2 and 3.4.3.

§ 3.4.1.8 No Extension of Time. If the Owner determines that good cause exists to believe a violation has occurred, the Contractor shall not be entitled to an extension of time for any delay arising directly or indirectly from of the procedures set forth in this Article 3.4.

§ 3.4.2 Except in the case of minor changes in the Work authorized by the Owner or Architect in accordance with Sections 3.12.8 or 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive. If the Contractor desires to submit an alternate product or method in lieu of what has been specified or shown in the Contract Documents, the Contractor shall comply with the Substitution requirements listed in the Specifications, or if there are no Substitution requirements listed in the Specifications, then the following provisions apply:

§ 3.4.2.1 The Contractor must submit to the Architect and the Owner (i) a full explanation of the proposed substitution and submittal of all supporting data, including technical information, catalog cuts, warranties, test results, installation instructions, operating procedures, and other like information necessary for a complete evaluation of the substitution; (ii) the adjustment, if any, in the Contract Sum, in the event the substitution is acceptable; (iii) the adjustment, if any, in the time of completion of the Contract and the construction schedule in the event the substitution is acceptable; and (v) a statement indicating Contractor accepts the warranty and correction obligations in connection with the proposed substitution as if originally specified by the Architect. Proposals for substitutions shall be to the Architect in sufficient time to allow the Architect no less than ten (10) working days for review. No substitutions will be considered or allowed without the Contractor's submittal of complete substantiating data and information as stated hereinbefore.

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

§ 3.4.4 The Contractor shall only employ or use labor in connection with the Work capable of working harmoniously with all trades, crafts, and any other individuals associated with the Project.

§ 3.4.5. In case the progress of the Work is affected by any undue delay in furnishing or installing any items or materials or equipment required under the Contract Documents because of such conflict involving any such labor agreement or regulation, the Owner may require that other material or equipment of equal kind and quality be provided pursuant to a Change Order or Construction Change Directive.

§ 3.5 WARRANTY

§ 3.5.1 The Contractor warrants to the Owner: (1) that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise; (2) that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit; (3) that the Work will be done strictly in accordance with the Contract Documents; (4) that all products are installed

per the manufacturer's instructions, and in such a way that the manufacturer's warranties are preserved, including the use of a manufacturer-certified installer, if required by the manufacturer; (5) and that the Work, when finally completed, will provide a complete Project that meets the intent of the Contract Documents. The Contractor represents and warrants to the Owner that its materials and workmanship, including without limitation, construction means, methods, procedures and techniques necessary to perform the Work, use of materials, selection of equipment and requirements of product manufacturers are and shall be consistent with: (1) good and sound practices within the construction industry; (2) generally prevailing and accepted industry standards applicable to the Work; (3) requirements of any warranties applicable to the Work subject to Paragraph 3.2.3. Work, materials, or equipment not conforming to these requirements shall be considered defective, and promptly after written notification of non-conformance shall be repaired or replaced by Contractor with Work conforming to this warranty. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Owner or Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.5.1.1 Contractor further warrants that all materials or equipment of a category or classification will be a product of the same manufacturer and such materials or equipment shall be of the same lot, batch or type and that such materials and equipment will be as specified.

§ 3.5.2 The Contractor agrees to assign to the Owner at the time of final completion of the Work any and all manufacturer's warranties relating to materials and labor used in the Work and further agrees to perform the Work in such manner so as to preserve any and all such manufacturer's warranties.

§ 3.6 TAXES

State Sales and Use Taxes. Sales, use or similar taxes imposed by a governmental authority that are related to the Work and for which the Contractor is liable; provided, however, Owner is a body corporate and politic under the laws of the State of Texas and claims exemption from sales and use taxes under Texas Tax Code Ann. § 151.309, as amended, and the services and materials subject of the Agreement are being secured for use by Owner. Exemption certificates will be provided to Contractor upon request. As a precondition to the Owner reimbursing Contractor for allowable sales and use taxes, Contractor must, on its own, first attempt to use such tax exemption certificates in order to assert the exemption. In the event Contractor's efforts to use the tax exemption certificate is unsuccessful and provided that under the laws of the State of Texas an exemption from sales and use taxes is allowed, Owner will reimburse Contractor for such sales and use taxes upon Contractor providing sufficient and satisfactory documentation to the Williamson County Auditor.

§ 3.7 PERMITS, FEES, NOTICES, AND COMPLIANCE WITH LAWS

§ 3.7.1 Unless otherwise provided, the Contractor shall secure, pay for, and, as soon as practicable, furnish the Owner with copies or certificates of all permits and fees, licenses, and inspections necessary for the proper execution and completion of the Work, including, without limitation, all building permits. All connection charges, assessments, or inspection fees as may be imposed by any municipal agency or utility company are included in the Contract Sum and shall be the Contractor's responsibility.

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

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

§ 3.7.4 Concealed or Unknown Conditions. If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, that differ materially from

those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Owner will promptly investigate such conditions and, if the Owner determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will authorize an equitable adjustment in the Contract Sum or Contract Time, or both. If the Owner determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Owner shall promptly notify the Contractor in writing, stating the reasons. If the Contractor disputes the Owner's determination, the Contractor party may assert a Claim as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 ALLOWANCES

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

§ 3.8.2 Unless otherwise provided in the Contract Documents,

.1 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;

.2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and

.3 whenever costs are more than or less than allowances, the Contractor shall, prior to purchasing any such materials, notify the Owner in writing of the cost and whether such cost will exceed the amount of the allowance. If Owner authorizes Contractor to proceed, after receiving the Contractor's estimate of the total cost, then the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.9 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 or Contractor's project manager shall be as binding as if given to the Contractor. Important oral communications shall be immediately confirmed in writing.

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

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

§ 3.10.1 The Contractor, as provided in the Agreement, 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 a submittal schedule, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Architect's approval. The Architect's approval shall not unreasonably be delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

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

§ 3.10.4 The construction schedule shall be a detailed precedence-style critical path management ("CPM") schedule in a format satisfactory to the Owner that shall (i) provide a graphic representation of all activities and events that will occur during performance of the Work; (ii) identify each phase of construction and occupancy; and (iii) set forth dates that are critical in ensuring the timely and orderly completion of the Work in accordance with the requirements of the Contract Documents (hereinafter referred to as the "Milestone Date"). Upon review and acceptance by the Owner of the Milestone Dates, the construction schedule shall be deemed part of the Contract Documents. If not accepted, the construction schedule shall be promptly revised by the Contractor in accordance with the recommendations of the Owner and resubmitted for acceptance. The Contractor shall monitor the progress of the Work for conformance with the requirements of the construction schedule and shall promptly advise the Owner of any delays or potential delays. The accepted construction schedule shall be updated to reflect actual conditions as set forth in section 3.10.1 or if requested by the Owner. In the event any progress report indicates any delays, the Contractor shall propose an affirmative plan to correct the delay, including overtime and/or additional labor, if necessary. In no event shall any progress report constitute an adjustment in the Contract Time, any Milestone date, or the Contract Sum unless any such adjustment is agreed to by the Owner and authorize pursuant to a Change Order.

§ 3.10.5 In the event the Owner determines that the performance of the Work, as of a Milestone Date, has not progressed or reach the level of completion required by the Contract Documents, the Owner shall have the right to order the Contractor to take corrective measures necessary to expedite the progress of construction, including without limitation, (i) working additional shifts or overtime, (ii) supplying additional manpower, equipment, and facilities, and (iii) other similar measures. Such measures so continue until the progress of the Work complies with the stage of completion required by the Contract Documents. The Owner's right to require such measures is solely for the purpose of ensuring the Contractors compliance with the construction schedule.

§ 3.11 DOCUMENTS AT THE SITE

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

§ 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

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

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

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

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

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

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

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the 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 that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or

equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

§ 3.13 USE OF SITE

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

§ 3.14 CUTTING AND PATCHING

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

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

§ 3.15 CLEANING UP

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 ACCESS TO WORK

The Owner and Architect shall, at all times, have access to the Work in preparation and progress wherever located.

§ 3.17 ROYALTIES, PATENTS AND COPYRIGHTS

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 INDEMNITY – OTHER THAN EMPLOYEE PERSONAL INJURY CLAIMS. TO THE FULLEST EXTENT PERMITTED BY LAW, CONTRACTOR SHALL INDEMNIFY, DEFEND, AND HOLD HARMLESS OWNER, ITS EMPLOYEES, AND ASSIGNS (THE "INDEMNIFIED PARTIES" OR "INDEMNITEES") FROM AND AGAINST CLAIMS, DAMAGES, LOSSES AND EXPENSES, INCLUDING BUT NOT LIMITED TO ATTORNEYS' FEES, ARISING OUT OF OR ALLEGED TO BE RESULTING FROM THE PERFORMANCE OF THIS AGREEMENT, TO THE EXTENT CAUSED BY THE NEGLIGENT OR WILLFUL ACTS OR OMISSIONS OF THE CONTRACTOR, SUBCONTRACTORS, SUB-SUBCONTRACTORS, OR ANYONE DIRECTLY OR INDIRECTLY EMPLOYED BY THEM OR ANYONE FOR WHOSE ACTS THEY MAY BE LIABLE. CONTRACTOR SHALL NOT BE REQUIRED TO INDEMNIFY, HOLD HARMLESS OR DEFEND THE INDEMNIFIED PARTIES AGAINST A CLAIM CAUSED BY THE NEGLIGENCE OR FAULT, OR THE BREACH OR VIOLATION OF A STATUTE, ORDINANCE, GOVERNMENTAL REGULATION, STANDARD, OR RULE OF THE INDEMNITEE, OR OTHER PARTY OTHER THAN CONTRACTOR OR ITS AGENT, EMPLOYEE, OR SUBCONTRACTOR OF ANY TIER, EXCEPT THAT CONTRACTOR SHALL INDEMNIFY, HOLD HARMLESS AND DEFEND THE INDEMNIFIED PARTIES AGAINST ANY CLAIMS FOR THE BODILY INJURY OR DEATH OF AN EMPLOYEE OF CONTRACTOR, ITS AGENTS, OR IT SUBCONTRACTORS OF ANY TIER.**

**§3.18.2 INDEMNITY – EMPLOYEE <u>PERSONAL INJURY CLAIMS</u>. TO THE FULLEST EXTENT PERMITTED BY LAW, CONTRACTOR SHALL INDEMNIFY, DEFEND, AND HOLD HARMLESS THE INDEMNIFIED PARTIES AND SHALL ASSUME ENTIRE RESPONSIBILITY AND LIABILITY (OTHER THAN AS A RESULT OF AN INDEMNIFIED PARTY'S GROSS NEGLIGENCE) FOR ANY CLAIM OR ACTION BASED ON OR ARISING OUT OF THE PERSONAL INJURY, INCLUDING THE DEATH, OF ANY EMPLOYEE OF THE CONTRACTOR, SUBCONTRACTORS, OR ANY SUB-SUBCONTRACTOR, OR OF ANY OTHER ENTITY FOR WHOSE ACTS THEY MAY BE LIABLE, WHICH OCCURRED OR WAS ALLEGED TO HAVE OCCURRED ON THE PROJECT SITE OR IN CONNECTION WITH THE PERFORMANCE OF THE WORK OF THIS AGREEMENT. CONTRACTOR HEREBY INDEMNIFIES THE INDEMNIFIED PARTIES EVEN TO THE EXTENT THAT SUCH PERSONAL INJURY WAS CAUSED OR ALLEGED TO HAVE BEEN CAUSED BY THE COMPARATIVE OR CONCURRENT NEGLIGENCE OF THE STRICT LIABILITY OF ANY INDEMNIFIED PARTY. THIS INDEMNIFICATION SHALL NOT BE LIMITED TO DAMAGES, COMPENSATION, OR BENEFITS PAYABLE UNDER INSURANCE POLICIES, WORKERS COMPENSATION ACTS, DISABILITY BENEFITS ACTS, OR OTHER EMPLOYEES BENEFIT ACTS.**

**§3.18.3 THE CONTRACTOR'S INDEMNITY OBLIGATIONS UNDER THIS SECTION 3.18 SHALL ALSO SPECIFICALLY INCLUDE, WITHOUT LIMITATION, ALL FINES, PENALTIES, DAMAGES, LIABILITY, COSTS, EXPENSES (INCLUDING, WITHOUT LIMITATION, REASONABLE ATTORNEYS' FEES) ARISING OUT OF, OR IN CONNECTION WITH, ANY (I) VIOLATION OF OR FAILURE TO COMPLY WITH ANY LAW, STATUTE, ORDINANCE, RULE, REGULATION, CODE OR REQUIREMENT OF A PUBLIC AUTHORITY THAT BEARS UPON THE PERFORMANCE OF THE WORK BY THE CONTRACTOR, A SUBCONTRACTOR, OR ANY PERSON OR ENTITY FOR WHOM EITHER IS RESPONSIBLE, (II) MEANS, METHODS, PROCEDURES, TECHNIQUES, OR SEQUENCES OF EXECUTION OR PERFORMANCE OF THE WORK, AND (III) FAILURE TO SECURE AND PAY FOR PERMITS, FEES, APPROVALS, LICENSES, AND INSPECTIONS AS REQUIRED UNDER THE CONTRACT DOCUMENTS, OR ANY VIOLATION OF ANY PERMIT OR OTHER APPROVAL OF A PUBLIC AUTHORITY APPLICABLE TO THE WORK, BY THE CONTRACTOR, A SUBCONTRACTOR, OR ANY PERSON OR ENTITY FOR WHOM EITHER IS RESPONSIBLE.**

ARTICLE 4 ARCHITECT

§ 4.1 GENERAL

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

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

§ 4.1.3 In the event that Owner has not engaged an architect and an architect is not identified in the Agreement, but, rather, engages an engineer for the Project, all references made in these General Conditions to the "Architect" shall mean and include the engineer identified as the "Engineer" in the Agreement and all duties, responsibilities and limitations of authority of the Architect, as set forth in the Contract Documents, shall apply to the Engineer.

§ 4.2 ADMINISTRATION OF THE CONTRACT
§ 4.2.1 The Architect will provide administration of the Contract as described in the Owner-Architect Agreement. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the 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 not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and report to the Owner (1) known deviations from the Contract Documents and from the most recent construction schedule submitted by the Contractor, and (2) defects and deficiencies observed in the Work. 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.

§ 4.2.4 COMMUNICATIONS AND 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 relate relevant communications between Owner and Architect to the Architect. 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 If included in Architect's scope of work, the agreement between Owner and Architect, or if requested by the Owner, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts based on the Architect's evaluations of the Contractor's Applications for Payment.

§ 4.2.6 To the extent permitted by the agreement between Owner and Architect, the Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect, in consultation with the Owner, will have authority to require inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed. However, neither this authority of the 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 or the Owner 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 To the extent provided in the agreement between Owner and Architect, 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 in accordance with the submittal schedule approved by the Owner and Architect or, in the absence of an approved submittal schedule, with reasonable promptness 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 Sections 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 If requested by Owner, the Architect will prepare Change Orders and Construction Change Directives with the Owner's prior written consent, but the Architect may authorize minor changes in the Work as provided in the agreement between Owner and Architect, or in Section 7.4 of these General Conditions. If requested by Owner, the Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 If requested by Owner, the Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; 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 pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 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 If requested by Owner, 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. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Architect 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.

§ 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, and if approved by Owner.

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

ARTICLE 5 SUBCONTRACTORS

§ 5.1 DEFINITIONS

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

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

§ 5.2 AWARD OF SUBCONTRACTS

§ 5.2.1 For Construction Manager-At-Risk Agreements. The Construction Manager shall publicly advertise for bids or proposals and receive bids or proposals from trade contractors or Subcontractors for the performance of all major elements of the work other than the minor work that may be included in the general conditions. The Construction Manager may seek to perform portions of the work itself if:

(A) the Construction Manager submits its bid or proposal for those portions of the Work in the same manner as all other trade contractors or Subcontractors; and

(B) the Owner determines that the Construction Manager's bid or proposal provides the best value for the Owner.

§ 5.2.1.1 REVIEW OF BIDS OR PROPOSALS. Construction Manager shall review all trade contractor or Subcontractor bids or proposals in a manner that does not disclose the contents of the bid or proposal during the selection process to a person not employed by the Construction Manger, Architect, Engineer, or Owner. All bids or proposals shall be made available to the Owner on request and to the public after the later of the award of the contract or the seventh day after the date of final selection of bids or proposals. If the Construction Manager reviews, evaluates, and recommends to the Owner a bid or proposal from a trade contractor or subcontractor but the Owner requires another bid or proposal to be accepted, the Owner shall compensate the Construction Manager by a change in the Contract Sum, Contract Time, or Cost of the Work for any additional cost and risk that the Construction manager incurs because of the Owner's requirement that another bid or proposal be accepted.

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

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

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

§ 5.3 SUBCONTRACTUAL RELATIONS

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

execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.3.2 All subcontracts shall be in writing and, if requested, Contractor shall provide Owner with copies of executed subcontracts.

§ 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

§ 5.4.1 This Contract is for Owner's benefit, its successors and assigns who, as well as Contractor, may directly enforce all rights and warranties, express or implied herein, but Subcontractors shall have recourse only against Contractor and not against Owner. Owner may rely solely upon Contractor for enforcement of all Subcontracts. To effect such purpose, Contractor assigns to Owner all right to bring any actions against subcontractors and material vendors without waiver by Owner of his right against Contractor because of defaults, delays and effects for which a subcontractor or material vendor may also be liable, said assignment being effective only if:

.1 Contractor is in default under the Contract Documents; or

.2 Owner has terminated the Contract in accordance with the Contract Documents; and

.3 Only for those subcontract agreements which the Owner accepts by notifying the Subcontractor and Contractor in writing; and

.4 The assignment is subject to the prior rights of the surety, if any, obligated under any 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 may be equitably adjusted for increases in cost resulting from the suspension.

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

§5.4.4 The Architect and the Owner shall have the right to request from any Subcontractor at any time during the course of construction, a notarized affidavit stating the amount of monies which have been paid to the Subcontractor as of any certain stipulated date.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

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

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

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

§ 6.1.3 The Contractor shall participate with other separate contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to the construction schedule deemed

necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, separate contractors and the Owner until subsequently revised.

§ 6.2 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 and the Owner apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner's or separate contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

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

§ 6.2.4 The Contractor shall promptly remedy damage the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner, separate contractors as provided in Section 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 Section 3.14.

§ 6.3 OWNER'S RIGHT TO CLEAN UP

If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and 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 Owner or 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. Except as permitted in Section 7.3 and Section 9.7.2, a change in the Contract Sum or the Contract Time shall be accomplished only by Change Order. Accordingly, no course of conduct or dealings between the parties, nor express or implied acceptance of alterations or additions to the Work, and no claim that Owner has been unjustly enriched by any alteration of or addition to the Work, whether or not there is, in fact, any unjust enrichment to the Work, shall be the basis of any Claim to an increase in any amounts due under the Contract Documents or a change in any time period provided for in the Contract Documents.

§ 7.2 CHANGE ORDERS

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

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

§ 7.2.2 Contractor's Change Order shall set forth in clear and precise detail breakdowns of labor and materials for all trades involved and the estimated impact on the dates of Substantial Completion. Contractor shall furnish supporting data as reasonably requested by Owner.

§ 7.2.3 Agreement on any Change Order shall constitute a final settlement of all matters relating to the change in the Work that is the subject of the Change Order, including, but not limited to, all direct and indirect costs associated with such change and any and all adjustments to the Contract Sum and the construction schedule.

§ 7.3 CONSTRUCTION CHANGE DIRECTIVES

§ 7.3.1 A Construction Change Directive is a written order 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 Section 7.3.7.

§ 7.3.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 7.3.5 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with 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.

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

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

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

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

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

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

§ 7.4 MINOR CHANGES IN THE WORK
If permitted in the agreement between Owner and Architect, the Architect has 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.

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 Section 9.8.

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

§ 8.2 PROGRESS AND COMPLETION
§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract and are a material element 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.

§ 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 that the Architect and Owner determines may justify delay, then the Contract Time shall be extended by Change Order to the extent such delay will prevent the Contractor from achieving Substantial Completion within the Contract Time and if the performance of the Work is not, was not, or would not have been delayed by any other cause for which the Contractor is not entitled to an extension in the Contract Time under the Contract Documents. The Contractor further acknowledges and agrees that adjustments in the Contract Time will be permitted for a delay only to the extent such delay (i) is not caused, or could not have been anticipated, by the Contractor, and (ii) could not be limited or avoided by the Contractor's timely notice to the Owner of the delay or reasonable likelihood that a delay will occur.

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

§ 8.3.3 Notwithstanding anything contained in the Contract Documents to the contrary, the Contractor's sole remedy for any (1) delay in the commencement, prosecution or completion of the Work, (2) hindrance or obstruction in the performance of the Work, (3) loss of productivity, or (4) other similar claims (collectively referred in this Subparagraph 8.3.3 as "Delay or Delays"), whether or not such Delays are foreseeable, shall be an extension of time in which to complete the Work. In no event shall the Contractor be entitled to any other compensation or recovery of any damages, costs, or attorneys' fees, caused by any Delays, unknown site conditions, errors, inconsistencies, or omissions in the Drawings and Specifications, or concealed or unknown conditions, including, without limitation, consequential damages, lost opportunity costs, impact damages or other similar damages; provided however that Contractor may be entitled to additional time as provided under Section 8.3.1.

§ 8.3.4 If the Contractor submits a progress report indicating, or otherwise expresses an intention to achieve, completion of the Work prior to any completion date required by the Contract Documents or expiration of the Contract Time, no liability of the Owner to the Contractor for any failure of the Contractor to so complete the Work shall be created or implied.

§ 8.3.5 Owner shall have the right to occupy, without prejudice to rights of either party, any completed or substantially completed portions of the Work, notwithstanding the fact that time for completion of entire Work, or portions thereof, may not be expired. Occupancy and use by Owner shall not constitute, in itself, acceptance of the Work.

ARTICLE 9 PAYMENTS AND COMPLETION
§ 9.1 CONTRACT SUM
The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.2 SCHEDULE OF VALUES
Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit to the Owner and Architect, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the Owner may require. This schedule, unless objected to by the Owner, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 9.3 APPLICATIONS FOR PAYMENT

§ 9.3.1 As provided in the Agreement and in the Contract Documents, the Contractor shall submit to the Owner and Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2., for completed portions of the Work. 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 shall reflect retainage if provided for in the Contract Documents.

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

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

§ 9.3.1.3 If requested by Owner or required elsewhere in the Contract Documents, Each Application for Payment shall be accompanied by the following, all in a form and substance satisfactory to the Owner:

(i) With each Application for Payment: a current Sworn Statement from the Contractor setting forth all Subcontractors and all material suppliers with whom the Contractor has subcontracted, the amount of each such subcontract, the amount requested for any Subcontractor or material supplier in the Application for Payment, and the amount to be paid to the Contractor from such progress payment;

(ii) With each Application for Payment: a duly executed Conditional Waiver and Release on Progress Payment from the Contractor and Subcontractors establishing receipt of payment or satisfaction of the payment requested by the Contractor in the current Application for Payment;

(iii) Commencing with the second Application for Payment submitted by the Contractor, a duly executed Unconditional Waiver and Release on Progress Payment from Contractor and all Subcontractors, material suppliers and, where appropriate, lower tier subcontractors that have billed more than $5,000 on a single application of payment, establishing receipt of payment or satisfaction of payment of all amounts requested on behalf of such entities and disbursed prior to submittal by the Contractor of the current Application for Payment;

(iv) With the Final Application for Payment: Contractor shall submit a Conditional Waiver and Release on Final Payment as required by Texas Property Code 53.284. Upon receipt of final payment, Contractor shall submit an Unconditional Waiver and Release on Final Payment as required by Texas Property Code 53.284; and

(v) Such other information, documentation, and materials as the Owner, or the title insurer may require in order to ensure that Owner's property is free of lien claims. Such other documents may include, without limitation, original copies of lien or bond claim releases suitable for filing with the County Clerk in Williamson County, Texas.

§ 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, bond claims, 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.

§ 9.3.3.1 The Contractor further expressly undertakes to defend Owner, at the Contractor's sole expense, against any actions, lawsuits, or proceedings brought against Owner as a result of liens filed against the Work, the site of any of the Work, the Project site and any improvements thereon, or any portion of the property of any of Owner (referred to collectively as "liens" in this Section 9.3.3), provide the Owner has paid Contractor pursuant to the requirements of the Contract Documents. The Contractor hereby agrees to indemnify and hold Owner harmless against any such liens or claims of lien and agrees to pay any judgment or lien resulting from any such actions, lawsuits, or proceedings.

§ 9.3.3.2 The Owner shall release any payments withheld due to a lien or bond claims if the Contractor obtains security acceptable to the Owner, however, the Contractor shall not be relieved of any responsibilities or obligations under this Section 9.3.3, including, without limitation, the duty to defend and indemnify Owner.

§ 9.3.3.3 Retainage. The Owner shall withhold from each progress payment, as retainage, five percent (5%) of the total earned amount. Retainage so withheld shall be managed in conformance with Subchapter B, Chapter 2252 of the Texas Government Code. Any request for reduction or release of retainage shall be accompanied by written consent of the Contractor's Surety. No such request shall be made until the Contractor has earned at least sixty-five percent (65%) of the total Contract Price.

§ 9.3.3.4 For purposes of Texas Government Code § 2251.021 (a)(2), the date the performance of service is completed is the date when the Owner's representative approves the Application for Payment.

§ 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 Section 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, to the best of the Architect's knowledge, information and belief, the Work has progressed to the point indicated and that 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 Owner or Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Owner or Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Owner or Architect is unable to certify payment in the amount of the Application, the Owner or Architect will notify the Contractor. If the Contractor and Architect, or Contractor and Owner, as the case may be, cannot agree on a revised

amount, the Architect will promptly issue a Certificate for Payment for the amount that can be certified. The Owner or 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 Owner or Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

.1 defective Work not remedied;
.2 third party claims filed or reasonable evidence indicating probable filing of such claims;
.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 a separate contractor;
.6 failure to maintain the scheduled progress, or reasonable evidence that the Work will not be completed within the Contract Time;
.7 failure to comply with the requirements of Texas Government Code Chapter 2258 (Prevailing Wage Law);
.8 failure to include sufficient documentation to support the amount of payment requested for the Project;
.9 failure to obtain, maintain, or renew insurance coverage, payment/performance bonds or warranty bond required by the Contract Documents; or
.10 repeated 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 The Owner shall make payment in the manner and within the time provided in the Contract Documents and in accordance with Chapter 2251 of the Texas Government Code.

§ 9.6.2 The Contractor shall pay each Subcontractor no later than 10 days after receipt of payment from the Owner the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

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

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

§ 9.6.5 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.

§ 9.7 FAILURE OF PAYMENT

§ 9.7.1 If the Architect is required to issue Certificates for Payment and, through no fault of the Contractor, the Architect fails to timely issue Certificates for Payment in the time permitted in the Contract Documents, or if the Owner does not pay the Contractor by the date established in the Contract Documents, then the Contractor may, upon twenty-one days' written notice to the Owner and Architect, stop the Work until payment of the amount owing has been received.

§ 9.7.2 If the Owner is entitled to reimbursement or payment from the Contractor under or pursuant to the Contract Documents, such payment shall be made promptly upon demand by the Owner. Notwithstanding anything contained in the Contract Documents to the contrary, if the Contractor fails to promptly make any payment due the Owner, or if the Owner incurs any costs and expenses to cure any default of the Contractor or to correct defective work, the Owner shall have an absolute right to offset such amount against the Contract Sum and may, in the Owner's sole discretion, elect either to (i) deduct an amount equal to that which the Owner is entitled from any payment then or thereafter due the Contractor from the Owner, or (ii) issue a written notice to the Contractor reducing the Contract Sum by an amount equal to that which the Owner is entitled.

§ 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; provided, however, that as a condition precedent to Substantial Completion, the Owner has received all certificates of occupancy and any other permits, approvals, licenses, and other documents from any governmental authority having jurisdiction thereof necessary for the beneficial occupancy of the Project.

§ 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 Owner and Architect a comprehensive list of items to be completed or corrected prior to final payment (punch list). Failure to include an item on the punch 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 punch list, the Owner and Architect will examine the Work to determine whether the Work or designated portion thereof is substantially complete. If the Owner and/or Architect's examination discloses any item, whether or not included on the Contractor's punch list, that is not sufficiently complete in accordance with the Contract Documents, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Owner or Architect. In such case, the Contractor shall then submit a request for another examination by the Owner or Architect to determine Substantial Completion.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect, if required by the Contract Documents, or Owner will prepare a Certificate of Substantial Completion that 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. Unless otherwise provided, Contractor shall complete all items on the punch list within 30 days of Substantial Completion. 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.

§ 9.9 PARTIAL OCCUPANCY OR USE

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5, the surety, and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare

and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld.

§ 9.9.2 Immediately prior to 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 Partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 FINAL COMPLETION AND FINAL PAYMENT

§ 9.10.1 Upon receipt of the Contractor's written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Owner and Architect will make such inspection and, when the Owner and Architect find the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will 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 Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled. All warranties and guarantees required under or pursuant to the Contract Documents shall be assembled and delivered by the Contractor to the Architect as part of the final Application for Payment. The final Certificate for Payment will not be issued by the Architect until all warranties and guarantees have been received and accepted by the Owner.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Owner and Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work have been paid or otherwise satisfied, within the period of time required by Chapter 2251 of the Texas Government Code, (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 to final payment, (5) a warranty bond in a form acceptable to Owner, and (6) other data establishing payment or satisfaction of obligations, such as receipts, unconditional full and final 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.

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

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

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

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 SAFETY PRECAUTIONS AND PROGRAMS

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

§ 10.2 SAFETY OF PERSONS AND PROPERTY

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

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

§ 10.2.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss. Notwithstanding any language to the contrary, the Owner shall not have any responsibility for job site inspections or safety recommendations. Any inspections or observations by the Owner or the Architect are solely for the benefit of the Owner and shall not create any duties or obligations to anyone else.

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

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

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

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

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

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

§ 10.2.9 When all or a portion of the Work is suspended for any reason, the Contractor shall securely fasten down all covering and fully protect the Work, as necessary, from injury or damage by any cause.

§ 10.2.10 The Contractor shall promptly report in writing to the Owner and Architect all accidents arising out of or in connection with the Work that cause death, personal injury, or property damage.

§ 10.3 HAZARDOUS MATERIALS

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

§ 10.3.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written notice from the Owner.

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

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

§ 10.4 EMERGENCIES

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

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 CONTRACTOR'S LIABILITY INSURANCE

§ 11.1.1 The Contractor shall purchase from and maintain in a company or companies 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 and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

.1 Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed;

.2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;

.3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;

.4 Claims for damages insured by usual personal injury liability coverage;

.5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;

.6 Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;

.7 Claims for bodily injury or property damage arising out of completed operations, which coverage shall be maintained for no less than four (4) years following final payment; and

.8 Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Agreement or the Contract Documents. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

§ 11.1.3 Unless otherwise provided, copies of the insurance policies, in form acceptable to the Owner, shall provided to Owner within 30 days of Owner's request. Except as otherwise provided, all of the policies provided shall name Owner as an additional insured, and such policies shall immediately deliver to Owner copies of all such insurance policies, together with certificates by the insurer evidencing Owner's coverage there under. Each policy of insurance obtained by Contractor pursuant to the Contract Documents shall provide, by endorsement or otherwise (i) that such policy shall not be canceled, endorsed, altered or reissued to effect a change in coverage for any reason or to any extent whatsoever unless the insurer shall have first given Owner and Lender at least thirty (30) days prior written notice thereof, and (ii) that Owner may, but shall not be obligated to, make premium payments to prevent the cancellation, endorsement, alteration or reissuance of such policy and such payments shall be accepted by the insurer to prevent the same. Such policies shall provide, by endorsement or otherwise, that Contractor shall be solely responsible for the payment of all premiums under the policies, and that Owner shall have no obligation for the payment thereof, notwithstanding that Owner is named as additional insured under the policy. Any insured loss or claim of loss shall be adjusted to the Owner, and any settlement payments shall be made payable to the Owner as a trustee for the insureds, as their interests may appear. Upon the occurrence of an insured loss or claim of loss, monies received will be held by Owner who shall make distribution in accordance with an agreement to be reached in such event between Owner and Contractor. If the parties are unable to agree between themselves on the settlement of the loss, such dispute shall be resolved in accordance with section 15, below, but the Work of the Project shall nevertheless progress during any such period of dispute without prejudice to the rights of any party to the dispute. The Contractor shall be responsible for any loss within the deductible area of the policy. If Owner is damaged by the failure of Contractor to purchase or maintain such insurance, then Contractor shall bear all costs properly attributable thereto. The Contractor shall affect and maintain similar property insurance on portions of the Work stored off the site or in transit when such portions of the Work are to be included. 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 Completion of the Project.

§ 11.1.4 The Contractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Owner as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations.

§ 11.2 OWNER'S LIABILITY INSURANCE
The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance.

§ 11.3 PROPERTY INSURANCE
§ 11.3.1 Unless otherwise provided in the Contract Documents, the Contractor 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 Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section

11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

§ 11.3.1.1 Property insurance shall be on an “all-risk” or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect’s and Contractor’s services and expenses required as a result of such insured loss as well as coverage for building materials while in transit or building materials suitably stored at a temporary location. Property insurance provided by the Contractor shall not cover any tools, apparatus, machinery, scaffolding, hoists, forms, staging, shoring, and other similar items commonly referred to as construction equipment that may be on the site and the capital value of which is not included in the Work. The Contractor shall make its own arrangements for any insurance it may require on such construction equipment. Any such policy obtained by the Contractor under this Section 11.3.1 shall include a waiver of subrogation in accordance with the requirements of Section 11.3.4.

§ 11.3.1.2 If the Contractor does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Contractor shall so inform the Owner in writing prior to commencement of the Work. If the Owner is damaged by the failure or neglect of the Contractor to purchase or maintain insurance as described above, without so notifying the Owner in writing, then the Contractor shall bear all reasonable costs properly attributable thereto.

§ 11.3.1.3 Contractor shall be responsible for any deductibles to the extent that the loss arose out of or was cause by Contractor’s negligence or breach of the Agreement.

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

§ 11.3.1.5 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial 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.

§ 11.3.4 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 of actual recovery of any insurance proceeds under any property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance. However, this waiver shall not apply to property insurance purchased by Owner after completion of the Work or Final Payment, whichever comes first. 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.

§ 11.3.5 A loss insured under the property insurance shall be adjusted in good faith and made payable to the Owner in good faith for the insureds, as their interests may appear. 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 BONDS
§ 11.4.1 The Contractor is required to tender to Owner, prior to commencing the Work, performance and payment bonds, as required by law. In the event Contractor fails to provide such bonds within the time provided by the Agreement, Owner may immediately, upon notice of such failure, or within a reasonable time thereafter, at its sole option and discretion: (1) void this Agreement in its entirety; or (2) procure such bonds on behalf of the Contractor, deducting such amounts from the Contract Price. In the event Owner voids the Agreement under this section, Contractor may forfeit its bid bond.

§ 11.4.2 A Performance Bond is required if the Contract Price is in excess of $50,000. The performance bond is solely for the protection of the Owner, in the full amount of the Contract Price and conditioned on the faithful performance of the Work in accordance with the Contract Documents. The form of the bond shall be approved by the Owner.

§ 11.4.3 A Payment Bond is required if the Contract Price is in excess of $25,000. A payment bond is payable to the Owner, in the full amount of the Contract Price and solely for the protection and use of payment bond beneficiaries who have a direct contractual relationship with the Contractor or a supplier of required materials or labor. The form of bond shall be approved by the Owner.

§ 11.4.4 Warranty Bond. Upon Substantial Completion and prior to final completion and final payment, Contractor shall provide Owner with a Warranty Bond in the sum of 10% of the Contact Price or 10% of the Guaranteed Maximum Price for Construction Manager-At-Risk Agreements for the entire warranty period set out in the Contract Documents. The form of bond shall be approved by the Owner.

§ 11.4.5 Corporate sureties authorized to issue bonds shall be qualified and comply with relevant provisions of the Texas Insurance Code.

§ 11.4.6 Each bond shall be executed by a corporate surety or sureties authorized to do business in the State of Texas and acceptable to the Owner. If any bond is for more than 10 percent of the surety's capital and surplus, the Owner may require certification that the company has reinsured the excess portion with one or more reinsurers authorized, accredited, or trusteed to do business in the State. A reinsurer may not reinsure for more than 10 percent of its capital and surplus. If a surety upon a bond loses its authority to do business in the State, the Contractor shall within thirty (30) days after such loss furnish a replacement bond at no added cost to the Owner.

§ 11.4.7 Each bond shall be accompanied by a valid Power-of-Attorney (issued by the surety company and attached, signed and sealed with the corporate embosses seal, to the bond) authorizing the attorney in fact who signs the bond to commit the company to the terms of the bond, and stating any limit in the amount for which the attorney can issue a single bond.

§ 11.4.8 The process of requiring and accepting bonds and making claims thereunder shall be conducted in compliance with Chapter 2253, Texas Government Code. If for any reason a statutory payment or performance bond is not honored by the surety, the Contractor shall fully indemnify and hold the Owner harmless of and from any costs, losses, obligations or liabilities it incurs as a result.

§ 11.4.9 Owner shall furnish certified copies of a payment bond and the related Agreement between Owner and Contractor to any qualified person seeking copies who complies with §2253.026, Texas Government Code.

§ 11.4.10 Claims on Payment Bonds. Claims on payment bonds must be sent directly to the Contractor and its surety in accordance with § 2253.041, Texas Government Code. All Payment Bond claimants are cautioned that no lien exists on the funds unpaid to the Contractor on such contract, and that reliance on notices sent to the Owner may result in loss of their rights against the Contractor and/or its surety. The

Owner is not responsible in any manner to a claimant for collection of unpaid bills, and accepts no such responsibility because of any representation by any agent or employee.

§ 11.4.11 Payment Claims when Payment Bond not Required. When the value of the Agreement between Owner and the Contractor is less than $25,000.00, claimants and their rights are governed by Texas Property Code, §§ 53.231 – 53.239. These provisions set out the requirements for filing a valid lien on funds unpaid to the Contractor as of the time of filing the claim, actions necessary to release the lien and satisfaction of such claims.

§11.4.12 Sureties shall be listed on the Department of the Treasury's Listing of Approved Sureties stating companies holding Certificates of Authority as acceptable sureties on Federal Bonds and acceptable reinsuring companies (Department Circular 570).

§ 11.5 GENERAL REQUIREMENTS
§ 11.5.1 Unless otherwise provided in the Contract Documents, all insurance coverage procured by the Contractor shall be provided by insurance companies having policy holder ratings no lower than "A" and financial ratings not lower than "XII" in the Best's Insurance Guide, the latest edition in effect as of the date of the Contract, and subsequently in effect at the time of renewal of any policies required by the Contract Documents.

§ 11.5.2 If the Owner is damaged by failure of the Contractor to purchase or maintain insurance required under Article 11, then the Contractor shall bear all reasonable costs (including attorneys' fees and court and settlement expenses) properly attributable thereto.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK
§ 12.1 UNCOVERING OF WORK
§ 12.1.1 If a portion of the Work is covered contrary to the Owner or Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Owner or Architect, be uncovered for examination and be replaced at the Contractor's expense without change in the Contract Time. If prior to the date of Substantial Completion the Contractor, a Subcontractor, or anyone for whom either is responsible uses or damages any portion of the Work (other than start-up), including, without limitation, mechanical, electrical, plumbing, and other building systems, machinery, equipment, or other mechanical device, the Contractor shall cause such item to be restored to "like new" condition at no expense to the Owner.

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

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

§ 12.2.2 AFTER SUBSTANTIAL COMPLETION
§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner

to do so. The Owner shall give such notice promptly after discovery of the condition. 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, without prejudice to any other remedies, correct it in accordance with Section 2.4 or file a claim with the surety of any applicable warranty bond.

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

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

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

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

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

ARTICLE 13 MISCELLANEOUS PROVISIONS
§ 13.1 GOVERNING LAW
The Contract shall be governed by the law of Williamson County, Texas.

§ 13.2 SUCCESSORS AND ASSIGNS
§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to covenants, agreements and obligations contained in the Contract Documents. Except as provided in the Contract Documents or by law, 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.

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

§ 13.4 RIGHTS AND REMEDIES
§ 13.4.1 Except as expressly provided in the Contract Documents, 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 there under, 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 shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. 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. The Contractor shall give the Owner and Architect timely notice of when and where tests and inspections are to be made so that the Owner and Architect may be present for such procedures. The Owner shall bear costs of tests, inspections, or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

§ 13.5.2 If the Architect, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the 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 Owner and Architect of when and where tests and inspections are to be made so that the Owner and Architect may be present for such procedures.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Architect's services and expenses shall be at the Contractor's expense. The Contractor also agrees the cost of testing services related to remedial operations performed to correct deficiencies in the Work, shall be borne by the Contractor.

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

§ 13.5.5 If the 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

The rate of interest that accrues on an overdue payment is the rate in effect on September 1 of the fiscal year in which the payment becomes overdue. The rate in effect on September 1 is equal to the sum of:
(1) one percent; and
(2) the prime rate as published in the Wall Street Journal on the first day of July of the preceding fiscal year that does not fall on a Saturday or Sunday pursuant to §2251.025 of the Texas Government Code.

§ 13.7 TIME LIMITS ON CLAIMS

The Owner and Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the time limits provided by law. Nothing herein shall be construed as shortening the period of time Owner has for commencing claims to less than what is required by law.

§ 13.8 Application To Subcontracts

Any specific requirement in this Contract that the responsibilities or obligations of Contractor also apply to a Subcontractor is added for emphasis and are also hereby deemed to include a Subcontractor of any tier. The omission of a reference to a Subcontractor in connection with any of Contractor's responsibilities or obligations shall not be construed to diminish, abrogate or limit any responsibilities or obligations of a Subcontractor of any tier under the Contract Documents or the applicable subcontract.

§ 13.10 GENERAL PROVISIONS

§ 13.10.1 All personal pronouns used in this Contract, whether used in the masculine, feminine, or neuter gender, shall include all other genders; and the singular shall included the plural and vice versa. Titles of articles, sections, and subsections are for convenience only and neither limit nor amplify the provisions of this Contract. The use herein of the word "including," when following any general statement, term, or matter, shall not be construed to limit such statement, term, or matter to the specific items or matters set forth immediately following such word or to similar items or matters, whether or not non-limiting language (such words as "without limitation," or "but not limited to," or words of similar import) is used with reference thereto, but rather shall be deemed to refer to all other items or matters that could reasonably fall within the broadest possible scope of such general statement, term, or matter.

§ 13.10.2 Wherever possible, each provision of this Agreement shall be interpreted in a manner as to be effective and valid under applicable law. If, however, any provision of this Agreement, or portion thereof, is prohibited by law or found invalid under any law, only such provision or portion thereof shall be ineffective, without in any manner invalidating or affecting the remaining provisions of this Agreement or valid portions of such provision, which are hereby deemed servable.

§ 13.11 NO ORAL WAIVER

The Provisions of the Contract Documents shall not be changed, amended, waived, or otherwise modified in any respect except by a writing signed by Owner. No person is authorized on behalf of Owner to orally change, amend, waive, or otherwise modify the terms of the Contract Documents or any of the Contractor's duties or obligations under or arising out of the Contract Documents. Any change, waiver, approval, or consent granted to the Contractor shall be limited to the specific matters stated in the writing signed by Owner, and shall not relieve Contractor of any other of the duties and obligations under the Contract Documents. No "constructive" changes shall be allowed.

§ 13.12 Texas Public Information Act. To the extent, if any, that any provision in the Contract Documents is in conflict with Tex. Gov't Code 552.001 et seq., as amended (the "Public Information Act"), the same shall be of no force or effect. Furthermore, it is expressly understood and agreed that Owner, its officers and employees may request advice, decisions and opinions of the Attorney General of the State of Texas in regard to the application of the Public Information Act to any information or data furnished to Owner whether or not the same are available to the public. It is further understood that Owner, its officers and employees shall have the right to rely on the advice, decisions and opinions of the Attorney General, and that Owner, its officers and employees shall have no liability or obligation to Contractor for the disclosure to the public, or to any person or persons, of any software or a part thereof, or other items or data furnished to Owner by Contractor in reliance of any advice, decision or opinion of the Attorney General of the State of Texas.

§ 13.13 Equal Opportunity in Employment. The Contractor agrees that during the performance of the Agreement it will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Parties will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; termination; rates of pay or other forms of compensation, and selection for training, including apprenticeship.

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 90 consecutive days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

.1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;

.2 An act of government, such as a declaration of national emergency that requires all Work to be stopped; or

.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 Section 9.4.1, or because the Owner has not made payment on an undisputed Certificate for Payment within the time stated in the Contract Documents.

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

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon 30 days' written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, including reasonable overhead and profit, costs incurred by reason of such termination, and damages.

§ 14.2 TERMINATION BY THE OWNER FOR CAUSE

§ 14.2.1 The Owner may terminate the Contract if the Contractor

.1 fails to commence the Work in accordance with the provisions of this Contract,

.2 fails to prosecute the Work to completion thereof in a diligent, efficient, timely, workmanlike, skillful and careful manner and in strict accordance with the provisions of the Contract,

.3 fails to use an adequate amount or quality of personnel or equipment to complete the Work without undue delay,

.4 fails to perform any of its obligations under the Contract,

.5 fails to make prompt payments when due to its Subcontractors and Suppliers, or as required by Texas Government Code 2251,

.6 files any petition or other pleading seeking any relief under any provisions of the Federal Bankruptcy Act, as amended, or any other federal or state statute or law providing for reorganization of debts or other relief from creditors, permits a receiver or other person to be appointed on account of its insolvency or financial condition, or becomes insolvent,

.7 creates any situation or state of facts which would authorize or permit an involuntary petition in bankruptcy to be filed against Contractor, or

.8 has not met or in Owner's opinion will not meet the dates of Substantial Completion set forth in the Contract Documents.

§ 14.2.2 When any of the above reasons exist, the Owner, in its sole and absolute discretion, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, 30 days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

.1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;

.2 Accept assignment of subcontracts pursuant to Section 5.4; and

.3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished. In the event that a final decision under section 15, below, is rendered that sufficient cause did not exist for termination under this section 14.2, then the termination shall be considered a termination for convenience, under section 14.4, below.

§ 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 and costs incurred by the Owner in finishing the Work 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.

§ 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

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

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

.1 that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or

.2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

§ 14.4.1 The Owner may, at any time, 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 Upon such termination, the Contractor shall recover the amounts provided in Section 10.1.3 of the Agreement.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 CLAIMS

§ 15.1.1 DEFINITION

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

§ 15.1.2 NOTICE OF CLAIMS

Claims for events arising during the performance of the Work by Contractor must be initiated by written notice to the other party with a copy sent to the Architect; provided, however, that the claimant shall use its best efforts to furnish the other party, as expeditiously as possible, with notice of any Claim including, without limitation, those in connection with concealed or unknown conditions, once such claim is recognized, and shall take steps to mitigate the alleged or potential damages, delay, or other adverse consequences arising out of the condition that is the cause of such a Claim. Claims by Contractor must be initiated within 10 business days after occurrence of the event giving rise to such Claim or within 10 business days after the claimant first recognizes the condition giving rise to the Claim, whichever is later. Claims may also be reserved in writing within the time limits set forth in this Section 15.1.2. Any notice of Claim or reservation of Claim must clearly identify the alleged cause and the nature of the Claim and include data and information available to the claimant that will facilitate prompt verification and evaluation of the Claim.

§ 15.1.3 CONTINUING CONTRACT PERFORMANCE
Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. The Architect will prepare Change Orders and issue Certificates for Payment in accordance with the Contract Documents.

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

§ 15.1.5 CLAIMS FOR ADDITIONAL TIME
§ 15.1.5.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

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

§ 15.3 MEDIATION
§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract except those waived shall be subject to mediation as a condition precedent to seeking redress in a court of competent jurisdiction.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation, which shall consist of a single mediator who is knowledgeable about the subject matter of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract.

§ 15.3.3 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in Williamson County, Texas. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§15.3.4 All disputes not resolved through mediation shall be decided in litigation in Williamson County, Texas.

§ 15.3.5 No waiver of Immunity. Nothing in the Contract Documents shall be deemed to waive, modify or amend any legal defense available at law or in equity to Owner, its past or present officers, employees, or agents, nor to create any legal rights or claim on behalf of any third party. Owner does not waive, modify, or alter to any extent whatsoever the availability of the defense of governmental immunity under the laws of the State of Texas and of the United States.

# PROPOSAL AFFIDAVIT

**This form must be completed, signed, notarized and returned with Proposal package**

The undersigned attests that the company named below, under the provisions of Subtitle F, Title 10, Texas Government Code Chapter 2270:

1. Does not boycott Israel currently; and
2. Will not boycott Israel during the term of the contract.

Pursuant to Section 2270.001, Texas Government Code:

1. "Boycott Israel" means refusing to deal with, terminating business activities with, or otherwise taking any action that is intended to penalize, inflict economic harm on, or limit commercial relations specifically with Israel, or with a person or entity doing business in Israel or in an Israeli-controlled territory, but does not include an action made for ordinary business purposes; and
2. "Company" means a for-profit sole proprietorship, organization, association, corporation, partnership, joint venture, limited partnership, or any limited liability company, including a wholly owned subsidiary, majority-owned subsidiary, parent company or affiliate of those entities or business associations that exist to make a profit

The undersigned certifies that the RFSCP and the Respondent's Proposal have been carefully reviewed and are submitted as correct and final. Respondent further certifies and agrees to furnish any and/or all goods and/or services upon which prices are extended at the price Proposal, and upon the conditions contained in the RFSCP.

I hereby certify that the foregoing Proposal has not been prepared in collusion with any other Respondent or other person or persons engaged in the same line of business prior to the official opening of this Proposal. Further, I certify that the Respondent is not now, nor has been for the past six (6) months, directly or indirectly concerned in any pool or agreement or combination, to control the price of services/commodities Proposal on, or to influence any person or persons to submit a Proposal or not to submit a Proposal thereon."

| | |
|---|---|
| **Name of Respondent:** | |
| **Address of Respondent:** | |
| **Email:** | |
| **Telephone:** | |
| **Printed Name of Person Submitting Affidavit:** | |
| **Signature of Person Submitting Affidavit:** | |

**Cooperative Purchasing Program**

**Check one of the following options below**. A non-affirmative Proposal will in no way have a negative impact on the County's evaluation of the Proposal.

| | |
|---|---|
| ☐ | I will offer the quoted prices to all authorized entities during the term of the County's Contract. |
| ☐ | I will not offer the quoted prices to all authorized entities. |

***If no box is checked, the Respondent agrees to make best efforts in good faith to offer the quoted prices to all authorized entities. ***

BEFORE ME, the undersigned authority, a Notary Public, personally appeared _____ (*Name of Signer*), who after being by me duly sworn, did depose and say: "I, _____, (*Name of Signer*) am a duly authorized officer of/agent for _____ (*Name of Respondent*) and have been duly authorized to execute the foregoing on behalf of the said _____ (*Name of Respondent*).

SUBSCRIBED AND SWORN to before me by the above-named _____

on this the _____ day of _____, 20_____.

_____

Notary Public in and for

The State of _____

The County of _____

SIGNATURE AND NOTARY NOT REQUIRED IF COMPLETING IN BIDSYNC ELECTRONICALLY.

# CONFLICT OF INTEREST QUESTIONNAIRE FORM CIQ

## For vendor doing business with local governmental entity

**This questionnaire reflects changes made to the law by H.B. 23, 84th Leg., Regular Session.**

This questionnaire is being filed in accordance with Chapter 176, Local Government Code, by a vendor who has a business relationship as defined by Section 176.001(1-a) with a local governmental entity and the vendor meets requirements under Section 176.006(a).

By law this questionnaire must be filed with the records administrator of the local governmental entity not later than the 7th business day after the date the vendor becomes aware of facts that require the statement to be filed. *See* Section 176.006(a-1), Local Government Code.

A vendor commits an offense if the vendor knowingly violates Section 176.006, Local Government Code. An offense under this section is a misdemeanor.

**OFFICE USE ONLY**

Date Received

**1** **Name of vendor who has a business relationship with local governmental entity.**

**2** ☐ **Check this box if you are filing an update to a previously filed questionnaire.** (The law requires that you file an updated completed questionnaire with the appropriate filing authority not later than the 7th business day after the date on which you became aware that the originally filed questionnaire was incomplete or inaccurate.)

**3** **Name of local government officer about whom the information is being disclosed.**

Name of Officer

**4** Describe each employment or other business relationship with the local government officer, or a family member of the officer, as described by Section 176.003(a)(2)(A). Also describe any family relationship with the local government officer. Complete subparts A and B for each employment or business relationship described. Attach additional pages to this Form CIQ as necessary.

A. Is the local government officer or a family member of the officer receiving or likely to receive taxable income,other than investment income, from the vendor?

☐ Yes ☐ No

B.Is the vendor receiving or likely to receive taxable income, other than investment income, from or at the directionof the local government officer or a family member of the officer AND the taxable income is not received from the local governmental entity?

☐ Yes ☐ No

**5** **Describe each employment or business relationship that the vendor named in Section 1 maintains with a corporation or other business entity with respect to which the local government officer serves as an officer or director, or holds an ownership interest of one percent or more.**

**6** ☐ Check this box if the vendor has given the local government officer or a family member of the officer one or more gifts as described in Section 176.003(a)(2)(B), excluding gifts described in Section 176.003(a-1).

**7** Signature is not required if completing in BIDSYNC electronically;

Signature of vendor doing business with the governmental entity Date

# CONFLICT OF INTEREST QUESTIONNAIRE

## For vendor doing business with local governmental entity

A complete copy of Chapter 176 of the Local Government Code may be found at http://www.statutes.legis.state.tx.us/ Docs/LG/htm/LG.176.htm. For easy reference, below are some of the sections cited on this form.

**Local Government Code § 176.001(1-a)**: "Business relationship" means a connection between two or more parties based on commercial activity of one of the parties. The term does not include a connection based on:

(A) a transaction that is subject to rate or fee regulation by a federal, state, or local governmental entity or anagency of a federal, state, or local governmental entity;

(B) a transaction conducted at a price and subject to terms available to the public; or

(C) a purchase or lease of goods or services from a person that is chartered by a state or federal agency andthat is subject to regular examination by, and reporting to, that agency.

**Local Government Code § 176.003(a)(2)(A) and (B):**

(a) A local government officer shall file a conflicts disclosure statement with respect to a vendor if:

***

(2) the vendor:

(A) has an employment or other business relationship with the local government officer or afamily member of the officer that results in the officer or family member receiving taxable income, other than investment income, that exceeds $2,500 during the 12-month period preceding the date that the officer becomes aware that

(i) a contract between the local governmental entity and vendor has been executed;or

(ii) the local governmental entity is considering entering into a contract with thevendor;

(B) has given to the local government officer or a family member of the officer one or more giftsthat have an aggregate value of more than $100 in the 12-month period preceding the date the officer becomes aware that:

(i) a contract between the local governmental entity and vendor has been executed;

or (ii) the local governmental entity is considering entering into a contract with the vendor.

**Local Government Code § 176.006(a) and (a-1)**

(a) A vendor shall file a completed conflict of interest questionnaire if the vendor has a business relationship with a local governmental entity and:

(1) has an employment or other business relationship with a local government officer of that localgovernmental entity, or a family member of the officer, described by Section 176.003(a)(2)(A);

(2) has given a local government officer of that local governmental entity, or a family member of the officer, one or more gifts with the aggregate value specified by Section 176.003(a)(2)(B), excluding any gift described by Section 176.003(a-1); or

(3) has a family relationship with a local government officer of that local governmental entity. (a-1) The completed conflict of interest questionnaire must be filed with the appropriate records administrator not later than the seventh business day after the later of:

(2) the date that the vendor:

(A) begins discussions or negotiations to enter into a contract with the local governmentalentity; or

(B) submits to the local governmental entity an application, response to a request for proposalsor bids, correspondence, or another writing related to a potential contract with the local governmental entity; or

(3) the date the vendor becomes aware:

(A) of an employment or other business relationship with a local government officer, or a family member of the officer, described by Subsection (a);

(B) that the vendor has given one or more gifts described by Subsection (a); or(C) of a family relationship with a local government officer.

# Proposal References

List the last three (3) companies or governmental agencies, where the same or similar goods and/or services as contained in this RFP package, were recently provided by Respondent.

## Reference 1

Client Name: Location:

Contact Name: Title:

Phone: E-mail

Contract Date To: Contract Date From: Contract Value: $

Scope of Work:

## Reference 2

Client Name: Location:

Contact Name: Title:

Phone: E-mail

Contract Date To: Contract Date From: Contract Value: $

Scope of Work:

## Reference 3

Client Name:

Location:

Contact Name:

Title:

Phone:

E-mail

Contract Date To:

Contract Date From:

Contract Value: $

Scope of Work:

# Question and Answers for Bid #1906-327 - River Ranch County Park - Interpretive Center

| Overall Bid Questions |
| --- |
| There are no questions associated with this bid. |