Project Manual
For

City of Laredo
Fasken Community Center Pool & Amenities
15201 Cerralvo Drive
Laredo, Texas 78041

Honorable Pete Saenz, Mayor

Roberto Balli
Council Member

Alberto Torres, Jr.
Council Member

Rudy Gonzalez, Jr.
Council Member

Nelly Vielma
Council Member

Vidal Rodriguez
Council Member

Marte A. Martinez
Council Member

Mercurio Martinez, III
Council Member

George J. Altgelt
Council Member

Ramon E. Chavez, P.E.
City Engineer
1110 Houston Street
Laredo, Texas 78040
(956) 791-7346

January 15, 2019
PROJECT MANUAL FOR

City of Laredo
Fasken Community Center Pool &
Amenities
15210 Carralvo Drive
Laredo, Texas 78045

OWNER
CITY OF LAREDO
Laredo, Texas 78040
956.791.7346
Contact: Ramon Chavez, P.E., City Engineer

MECHANICAL ELECTRICAL &
PLUMBING
TRINITY MEP ENGINEERING
3533 Morehead Dr
Weslaco, Texas 78596
956-973-0500
Contact: Leo Muñoz, P.E.

CIVIL
SLAY ENGINEERING CO.
9901 McPherson Drive, suite 104
Laredo, Texas 78045
956.791.0405
Contact: Ramiro Ibarra, P.E.

LANDSCAPE ARCHITECTURE
C2 Landgroup Inc.
317 Lexington, Suite #1
San Antonio, Texas 78215
210-269-5454
Contact: Chad Stranahan, Principal

ARCHITECT
SLAY ARCHITECTURE
9901 McPherson Drive, suite 104
Laredo, Texas 78045
956.791.0405
Contact: Monica Guajardo, AIA
mguajardo@slayarchitecture.com

TREEHOUSE PROJECT
STUDIO CORTES
1101 South St Mary’s
San Antonio, Texas, 78210
Contact: Carlos Cortes
210.274.4625
studiocortes@studiocortes.com

STRUCTURAL
LUNDY & FRANKE ENGINEERING
549 Heimer
San Antonio, Texas 78232
210.979-7900 - #8
Contact: Shawn Franke, P.E.
## CITY OF LAREDO

### ENGINEERING DEPARTMENT

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**DATE: 01/15/20**

[Signature]

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Fasken Community Center Pool & Amenities
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NOTICE TO BIDDERS

Sealed bids will be received at City Secretary’s Office, 1110 Houston Street, 3rd floor, City Hall Building, Laredo, Texas, until 4:00 P.M., on Thursday, February 13th, and publicly opened, read, and taken under advisement on Friday, February 14th, at 10 A.M., for the furnishing of all necessary materials, machinery, equipment, labor, superintendence, and all other services and appurtenances required for certain improvements for the City of Laredo, and shall include acknowledgement of any addenda submitted, and all other documents included in said bid call. Said bid shall be marked,

“Fasken Community Center Pool & Amenities”

The project consists of:

- A kids treehouse constructed of reinforced concrete by Studio Cortes;
- A “natural creek” like water feature; and
- A Swimming pool for 40 people that can function for recreational and instructional activities. It includes a mechanical room and all necessary equipment and other related accessories. The pool area includes the following:
  - Two Single occupant Toilet Rooms
  - Changing Rooms
  - Exterior shower
  - Perimeter fencing
- A “natural creek” like water feature; and
- Connecting paths with Lighting for the above mentioned areas.

Construction contract time for the project is two hundred seventy (270) calendar days.

Each bid and a bid guaranty in the form of a bidder’s bond having a minimum Best’s Rating A according to Best’s Key Rating Guide Latest Edition from a surety duly authorized and licensed in the State of Texas, certified check, or cashier’s check must be originals and must be submitted in a sealed envelope plainly marked with the name of the project as shown above, and the name and address of the Bidder. When submitted by mail, this envelope shall be placed in another envelope addressed as indicated in this Notice to Bidders and shall be marked as a bid for the project above referred.

Further, on federally funded projects only, contractor must comply with the Federal Labor Standards Provision, Davis Bacon Act, Equal Opportunity Clause, Wage Determination and HUD and Urban Development Federal Requirements especially as it regards payrolls and basic records.

Only the bids and bid guaranties actually in the hands of the designated official at the time set in this Notice to Bidders shall be considered. Bids submitted by telephone, telegraph, or fax, will not be considered.
Bidders are expressly advised to review Section C-3.10 of the General Conditions of the proposed Contract as to the causes which may lead to the disqualification of a bidder and/or the rejection of a bid proposal. Unless all bids are rejected, the Owner agrees to give Notice of Award of Contract to the successful bidder within ninety (90) days of the bid opening.

Bidders are expected to inspect the site of the work and inform themselves regarding all local conditions.

Bidders are advised to review the Key Points of Public Right-of-Way Ordinance on Legal Relations and Responsibilities to the Public Division C-7.15. The entire ordinance may be viewed at the following website under Building Services Department.
http://www.ci.laredo.tx.us/Building/

A pre-bid conference with prospective bidders will be held on Monday, January 27th, at 10:00 A.M. at the City of Laredo Engineering Department Conference Room, located at 1110 Houston Street, 2nd Floor, Laredo, Texas 78040.

The Construction Documents and Specification may be reviewed or obtained free of charge at the office of the City Engineer, 1110 Houston Street, Laredo, Texas, or from the City of Laredo website www.cityofLaredo.com/bids.html.

Jose A. Valdez, Jr., City Secretary

Publication Dates:
Sunday, January 19, 2020
Sunday, January 26, 2020
INFORMATION TO BIDDERS

Sealed bids will be received at City Secretary’s Office, 1110 Houston Street, 3rd floor, City Hall Building, Laredo, Texas, for the furnishing of all necessary materials, machinery, equipment, labor, superintendence, and all other services and appurtenances required for certain improvements in the City of Laredo and shall include acknowledgment of addenda submitted, and all other documents included in said bid call. Said bids shall be marked,

“Fasken Community Center Swimming Pool & Amenities”

Bids shall be based on a per unit of work basis and shall include dollar amounts for each specific unit in improvements listed including those items listed as alternatives as per the proposal sheet included in the specifications of this project.

Each proposal and a proposal guaranty must be originals and must be sealed in an envelope plainly marked with the name of the project as shown above, and the name and address of the Bidder. When submitted by mail, this envelope shall be placed in another envelope addressed as indicated in this Notice to Bidders and shall be marked as a bid for the project above referred.

Further, on federally funded projects, contractor must comply with the Federal Labor Standards Provision, Davis Bacon Act, Equal Opportunity Clause, Wage Determination and HUD and Urban Development Federal Requirements especially as it regards payrolls and basic records.

Only the bids and bid guaranties actually in the hands of the designated official at the time set in this Notice to Bidders shall be considered. Bids submitted by telephone, telegraph, or fax, will not be considered.

The City reserves the right to award the contract on the basis of the alternative which appears most advantageous to the City, to reject any or all bids, to waive objections based on failure to comply with formalities, and to allow the correction of obvious or patent errors. Bidders are expressly advised to review Section C-3 of the General Conditions of the proposed contract as to the causes which may lead to the disqualification of a bidder and/or the rejection of a bid proposal. Unless all bids are rejected, Owner agrees to give Notice of Award of contract to the successful bidder within ninety (90) days from the date of the bid opening.

Bidders for the construction work must submit a satisfactory cashier’s or certified check, or bidder’s bond having a minimum Best’s Rating A according to Best’s Key Rating Guide Latest Edition from a surety duly authorized and licensed in the State of Texas, payable without recourse to the order of the City of Laredo, Texas, in an amount not less than five percent (5%) of the total bid based on the bid which check or bond shall be submitted as a guarantee that the bidder will enter into a contract, and execute
performance and payment bonds within ten (10) days after Notice of Award of contract is given to him for contracts in excess of $50,000.00. Bids without the required check or bond will NOT be considered.

The successful bidder for the construction of the improvements must furnish a Certificate of Insurance, and a satisfactory Performance Bond in the amount of 100% of the total contract price, and a satisfactory Payment Bond in such amount, duly executed by such bidder as principal and by a corporate surety duly authorized so to act under the laws of the State of Texas. The successful bidder will be required to provide Performance and Payment Bonds issued by an insurance company which meets the minimum State requirements and is licensed in the State of Texas, and has a Best’s Key according to Best’s Key Rating Guide Latest Edition as follows:

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<td>50,001 - 250,000</td>
<td>A</td>
</tr>
<tr>
<td>250,000 - 1,000,000</td>
<td>A</td>
</tr>
<tr>
<td>Over 1,000,000</td>
<td>A</td>
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All lump sum and unit prices must be stated in both script and figures.

Bidders are expected to inspect the site of the work and to inform themselves regarding all local conditions.

The Instructions to Bidders, Forms of Bid, Form of Contract, Plans, Specifications, Form of Bid Bond, Performance and Payment Bonds and other contractual documents may be examined free of charge at the City of Laredo Engineering Department, 1110 Houston Street, Laredo, Texas 78040.

The Construction Documents and Specification may be reviewed or obtained free of charge at the office of the City Engineer, 1110 Houston Street, Laredo, Texas, or from the City of Laredo website www.cityofLaredo.com/bids.html.

Bid proposals over $50,000.00 shall comply with all conditions of the bid documents.

In the event the base bid amount is $50,000.00 or LESS than $50,000.00, a Payment Bond and Performance Bond will NOT BE REQUIRED. A Bid Guarantee in the form of a Cashier’s or Certified Check or Bid Bond and the Certificate of Insurance however, WILL BE REQUIRED. Under the above conditions, the successful bidder for the______________________________ project is hereby advised that the total contract price will be paid in ONE PAYMENT upon completion and acceptance of the project by the City of Laredo. Cashier’s checks are not to be released until a contract for the project has been approved by City Council and signed by the City Manager.
Any other division or section of this project’s specifications having reference to Bid Guarantee, Cashier’s or Certified Check, Bid Bond, Payment Bond, or Performance Bond, or having mention at all, to the requirements of bonds, is hereby amended to concur with the above conditions ONLY when the base bid is LESS THAN $50,000.00.

Bidders are advised to contact the City Engineering Department at 1110 Houston Street, Laredo, Texas, 78040, telephone number (956) 791-7346, for visits to project site, and for any additional information required on the project.

Contractor’s attention is directed to Special Provision 000-6233, “Important Notice to Contractors” and “Statement of Materials and Other Charges” which will be included in all projects, beginning with the September 1991 letting. These establish the procedures whereby the Contractor will be permitted to obtain an exemption from the sales tax on certain materials. See Comptroller’s Rule 2.291 and Texas Tax Code Chapter 151, as mended by House Bill Number 11, Acts 1991, 72nd Legislature, First called Session. The Contractor will be required to separate the charges for materials from all other charges and will be furnished an Exemption Certificate of each contract the Department. Also, the Contractor must issue resale certificates to suppliers. Sales tax permit applications and information regarding resale certificates may also be obtained by calling the State Comptroller’s toll free number 1-800-252-5555.
ADVISE TO BIDDERS

Project: Fasken Community Center Swimming Pool & Amenities

The Contractor’s attention is directed to the State of Texas Comptroller of Public Accounts Limited Sales Excise and Use Tax Rules and Regulations, Paragraph 3 of Ruling No. 9. Repairmen and Contractors (amended April 3, 1972). Reference Article 20.01 (T). Upon compliance with certain conditions, this ruling provides for exemption from this tax of materials incorporated into work done for an exempt agency under a Contract. The City is an exempt agency.

Any Bidder may elect to exclude this sales tax from his bid. If the Bidder submitting the lowest acceptable bid for performing the work on this project elects to comply with the above ruling on any bid item included in this Contract by obtaining any necessary permit or permits from the State Comptroller allowing the purchase of material for incorporation into this project without having to pay the Limited Sales, Excise and Use Tax at the time of purchase, he shall upon Award of Contract submit a statement in satisfactory form in which his bid prices to the City for materials are listed separately from all other charges, either by bid item or by total as required by the comptroller. This statement shall be included in and made part of the Contract.

The City will make no further allowance for and will make no price adjustment above or below the originally bid unit price on account of this tax. It shall be the Contractor’s sole responsibility, if he elects to exclude the sales tax from his bid, to comply with the aforementioned Ruling No. 9 and with any other applicable rules, regulation, or laws pertaining to the Texas Limited Sales, Excise and Use Tax which may now or at any time during the performance of this Contract be in effect, and the City shall have no responsibility for any sales or use tax which the Contractor may be required to pass as a result of his failure or the City’s failure to comply with said rules, regulations or laws, or as the result of the performance of the Contract or any part thereof by the Contractor.

Bidders are cautioned that materials which are not permanently incorporated into the work are not eligible for exemption and are not to be included in the statements as “Materials” (example: fuel, lubricants, tools, forming materials, etc.).
BID PROPOSAL

To: The City of Laredo, Texas

Honorable Pete Saenz, Mayor

From: ________________________________
Contractor

Address: ________________________________
Phone: ________________________________
Fax: ________________________________

Project: Fasken Community Center Swimming Pool & Amenities

Pursuant to Notice to Bidders, the undersigned bidder hereby proposes to furnish the labor, materials, and equipment in accordance with the plans and specifications, general conditions of the agreement, special provisions of the Agreement, and Addenda, if any. The bidder binds himself upon acceptance of his proposal to execute a contract and bonds accompanying form of performing and completing the said work within the time stated as required by the detailed specifications at the following unit prices. The quantities shown below are based on the Engineer’s estimate of quantities and it is agreed that the quantities may be increased or diminished, and may be considered necessary in the opinion of the City of Laredo, Texas to complete the work fully as planned and contemplated, and that all quantities of work, either increased or decreased, are to be performed at the unit prices set forth below (except as provided in the General Conditions of the Agreement or the specifications, the contract documents).

Acknowledgment of Addenda: (Please initial and date):

Addendum No. 1: __________________________________________
Addendum No. 2: __________________________________________
Addendum No. 3: __________________________________________
Addendum No. 4: __________________________________________
Addendum No. 5: __________________________________________

Acknowledgment of other documents: (Please initial and date):

Wage Determination:

Labor Provisions:

Affirmative Action Program:
Project: Fasken Community Center Swimming Pool & Amenities

Form of Non-Collusive Affidavit

AFFIDAVIT

STATE OF TEXAS {}
COUNTY OF WEBB {}

being first duly sworn, deposes and says

That he is (a Partner of Officer of the firm of, etc.)

the party making the foregoing proposal or bid, that such proposal or bid is genuine and not collusive or sham; that said Bidder has not colluded, conspired, connived or agreed, directly or indirectly, with any Bidder or Person, to put in a sham bid or to refrain from bidding, and has not in any manner, directly or indirectly, sought by agreement or collusion, or communication or conference, with any person, to fix the bid price or affiant or of any other Bidder or to fix any overhead, profit or cost element of said bid price, or of that of any other Bidder, or to secure any advantage against the City of Laredo or any person interested in the proposed Contract; and that all statements in said proposal or bid are true.

_____________________________________
Signature of (Print and Sign)

Bidder, if the Bidder is an individual
Partner, if the Bidder is a Partnership
Officer, if the Bidder is a Corporation

Subscribed and sworn before me this _____ day of ____________, 20__.

_____________________________________
Notary Public

My Commission expires

_____________________________________

Fasken Community Center Swimming Pool & Amenities
INFORMATION TO CONTRACTORS

PROJECT:  Fasken Community Center Swimming Pool & Amenities

The Contractor’s attention is directed to Special Provision 000-6233, “Important Notice to Contractors”, and “Statement of Materials and Other Charges” which will be included in all projects, beginning with the September, 1991 letting. These establish the procedures whereby the Contractor will be permitted to obtain an exemption from the sales tax on certain materials. See Comptroller’s Rule 3.291 and Texas Tax Code, Chapter 151, as amended by House Bill Number 11, Acts 1991, 72nd Legislature, First Called Session. The Contractor will be required to separate the charges for materials from all other charges and will be furnished an Exemption Certificate for each contract by the Department. Also the Contractor must issue resale certificates to suppliers. Sales tax permit applications and information regarding resale certificates may be obtained by calling the State Comptrollers’ toll fee number 1-800-252-5555.

Issued 10/29/91
IMPORTANT NOTICE TO CONTRACTORS

The Contractor’s attention is directed to Rule 3.291, paragraphs (a) (1), defining separated contracts, subsection (b) (3) discussing separated contracts, and subsection (c) discussing exempt contracts. Reference: Texas Tax Code, Chapter 151.

Contractors should note those organizations in subsection (c) that the rule shows as being exempt no longer qualify for the exemption. The rule states that contractors improving realty for organizations listed in Texas Tax Code 151.309 and 151.310 are exempt from tax. THIS IS NO LONGER TRUE EFFECTIVE WITH CONTRACTS SIGNED ON OR AFTER AUGUST 15, 1991.

Only those contracts with school districts and nonprofit hospitals qualify for the exemption discussed in subsection (c) of Rule 3.291.

The Comptroller is amending the rule to reflect this change.

If the low bidder elects to operate under a separated contract as defined by Rule 3.291, by obtaining the necessary permits from the State Comptroller’s office allowing the purchase of materials for incorporation in this project without having to pay the Limited Sales and Use Tax at the time of purchase, the low bidder shall identify separately from all other charges the total agreed contract price for materials incorporated into the project. This form shall be filled out by the low bidder in each of the two bound copies of the contract. Total materials shall only include materials physically incorporated into the realty.

If the Contractor operates under a “separated contract”, the Department will furnish the Contractor with an exemption certificate for the applicable materials.

In order to comply with the requirements of Rule 3.291, as mentioned above, it will be necessary for the Contractor to obtain a sales tax permit.

It will also be necessary that the contractor issue resale certificates to his suppliers.
Sales tax application for a sales tax permit and information regarding resale certificates may be obtained by writing to:

Comptroller of Public Accounts  
Capital Station  
Austin, Texas 78774

The Contractor may also receive information or request sales tax permit applications by calling the State Comptrollers’ toll free number 1-800-252-5555.

Subcontractors are eligible for sales tax exemption if the subcontract is made in such manner that the charges for materials is separated from all other charges. The procedure described above will effect a satisfactory separation. When subcontractors are handled in this manner, the Contractor must issue a resale certificate to the subcontractor and the subcontractor, in turn, must issue a resale certificate to his supplier.
STATEMENT OF MATERIALS AND OTHER CHARGES

PROJECT: Fasken Community Center Swimming Pool & Amenities

MATERIALS INCORPORATED INTO THE PROJECT: $__________

ALL OTHER CHARGES: $__________

*TOTAL: $__________

*This total must agree with the total figure shown in the Item and Quantity Sheets in the bound contract.

For purposes of complying with the Texas Tax Code, the Contractor agrees that the charges for any material incorporated into the project in excess of the estimated quantity provided for herein will be no less than the invoice price for such material to the Contractor.

NOTE: ONLY THE COPY OF THIS FORM IN THE BOUND CONTRACTS IS TO BE FILLED OUT.
INFORMATION FROM BIDDERS  
MUST BE COMPLETED AND SUBMITTED WITH BID PROPOSAL

Project: Fasken Community Center Swimming Pool & Amenities

Statement of Qualifications: (Similar Projects Completed by Bidder)

1. Name of Project: ____________________________________________  
   Value of Contract: ____________________________________________  
   Date Completed: ____________________________________________  

2. Name of Project: ____________________________________________  
   Value of Contract: ____________________________________________  
   Date Completed: ____________________________________________  

3. Name of Project: ____________________________________________  
   Value of Contract: ____________________________________________  
   Date Completed: ____________________________________________  

Experience Data: (Include name and experience record of the Superintendent)

Financial Status: A confidential financial statement will be submitted by the apparent successful low Bidder only if the Owner deems it necessary.

**NOTE:** TO BE SUBMITTED UPON REQUEST  
IS NOT AN ACCEPTABLE ANSWER.
Project:  Fasken Community Center Swimming Pool & Amenities

Proposed Progress Schedules:

Data on Equipment to be used on the Work: (Include the number of machines, the type, capacity, age and conditions and location)

Subcontractors: (Submit a list of proposed Subcontractors. List sources, types and manufacturers of proposed materials)

NOTE: TO BE SUBMITTED UPON REQUEST

IS NOT AN ACCEPTABLE ANSWER.
PROJECT: FASKEN COMMUNITY CENTER POOL & AMENITIES

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Estimated Qty.</th>
<th>Unit</th>
<th>Description of item with Unit Price Written in Words</th>
<th>Unit Price (in numbers &amp; words)</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>L.S.</td>
<td>Furnish all labor, equipment, materials, and all other terms necessary to construct the improvements per the Construction Documents (specs and drawings) dated 01/15/2020</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>EA</td>
<td>Allowance No. 1 - Construction Contingency Allowance</td>
<td>$15,000.00</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>EA</td>
<td>Allowance No. 2 – Tree House construction by Studio Cortes</td>
<td>$160,000.00</td>
<td></td>
</tr>
</tbody>
</table>

DEDUCT ALTERNATE NO. 1 AMOUNT ______________________
Water feature & associated site work

DEDUCT ALTERNATE NO. 2 AMOUNT ______________________
Swimming Pool including Toilet Rms./Mech, sitework, fencing, approach, etc.

TOTAL BASE BID AMOUNT________________________________________

TOTAL BASE BID WRITTEN IN WORDS: ____________________________

___________________________________________________________
Contractor

___________________________________________________________
Signature                  Title

___________________________________________________________
Address                  City/State                Zip Code

Phone Number:__________
Email:____________________

Date:____________________

NOTE: ALL BID ITEMS WILL BE PAID FOR WHEN COMPLETE IN PLACE, TESTED, AND ACCEPTED BY THE OWNER.
BID BOND

Project: Fasken Community Center Swimming Pool & Amenities

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned

__________________________________________

as Principal, and ____________________________ as

Surety, are hereby held and firmly bound unto

__________________________________________

as Owner in the penal sum of ____________________________

for payment of which, well and truly to be made, we hereby jointly and severally bid

ourselves, our heirs, executors, administrations, successors and assigns.

Signed, this ______ day of ____________________________, 20__.

The condition of the above obligation is such that whereas the Principal has submitted to

__________________________________________ a certain Bid,

attached hereto and hereby made a part hereof to enter into a Contract in writing for the


NOW, THEREFORE,

(a) If said Bid shall be rejected, or in the alternate,

(b) If said Bid shall be accepted and the Principal shall execute and deliver a

Contract in the Form of Contract attached hereto (properly completed in

accordance with said Bid) and shall furnish a bond for his faithful

performance of said Contract, and for the payment of all persons

performing labor or furnishing materials in connection therewith, and shall

in all other respects perform the Agreement created by the acceptance of

said Bid,

then this obligation shall be void, otherwise the same shall remain in force and

effect; it being expressly understood and agreed that the liability of the Surety for any and

all claims hereunder shall, in no event, exceed the penal amount of this obligation as

herein stated.
The Surety, for value received, hereby stipulates and agrees that he obligations of said Surety, and its bonds shall be in no way impaired or affected by any extension of the time within which the Owner may accept such Bid; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set fourth herein.

__________________________________________
Principal (Print and Sign)

__________________________________________
Surety

By: ______________________________________
PROJECT: Fasken Community Center Swimming Pool & Amenities

The Contractor’s attention is directed to Special Provision 000-6233, “Important Notice to Contractors”, and “Statement of Materials and Other Charges” which will be included in all projects, beginning with the September, 1991 letting. These establish the procedures whereby the Contractor will be permitted to obtain an exemption from the sales tax on certain materials. See Comptroller’s Rule 3.291 and Texas Tax Code, Chapter 151, as amended by House Bill Number 11, acts 1991, 72nd Legislature, First Called Session. The Contractor will be required to separate the charges for materials from all other charges and will be furnished an Exemption Certificate for each contract by the Department. Also the Contractor must issue resale certificates to suppliers. Sales tax permit applications and information regarding resale certificates may be obtained by calling the State Comptrollers’ toll fee number 1-800-252-5555.

Issued 10/29/91
SPECIAL PROVISION
No. 000-6233
IMPORTANT NOTICE TO CONTRACTORS

The Contractor’s attention is directed to Rule 3.291, paragraphs (a) (1), defining separated contracts, subsection (b) (3) discussing separated contracts, and subsection (c) discussing exempt contracts. Reference: Texas Tax Code, Chapter 151.

Contractors should note those organizations in subsection (c) that the rule shows as being exempt no longer qualify for the exemption. The rule states that contractors improving realty for organizations listed in Texas Tax Code 151.309 and 151.310 are exempt from tax. THIS IS NO LONGER TRUE EFFECTIVE WITH CONTRACTS SIGNED ON OR AFTER AUGUST 15, 1991.

Only those contracts with school districts and nonprofit hospitals qualify for the exemption discussed in subsection (c) of Rule 3.291.

The Comptroller is amending the rule to reflect this change.

If the low bidder elects to operate under a separated contract as defined by Rule 3.291, by obtaining the necessary permits from the State Comptroller’s office allowing the purchase of materials for incorporation in this project without having to pay the Limited Sales and Use Tax at the time of purchase, the low bidder shall identify separately from all other charges the total agreed contract price for materials incorporated into the project. This form shall be filled out by the low bidder in each of the two bound copies of the contract. Total materials shall only include materials physically incorporated into the realty.

If the Contractor operates under a “separated contract”, the Department will furnish the Contractor with an exemption certificate for the applicable materials.

In order to comply with the requirements of Rule 3.291, as mentioned above, it will be necessary for the Contractor to obtain a sales tax permit.

It will also be necessary that the contractor issue resale certificates to his suppliers.
Sales tax application for a sales tax permit and information regarding resale certificates may be obtained by writing to:

    Comptroller of Public Accounts
    Capital Station
    Austin, Texas 78774

The Contractor may also receive information or request sales tax permit applications by calling the State Comptrollers’ toll free number 1-800-252-5555.

Subcontractors are eligible for sales tax exemption if the subcontract is made in such manner that the charges for materials is separated from all other charges. The procedure described above will effect a satisfactory separation. When subcontractors are handled in this manner, the Contractor must issue a resale certificate to the subcontractor and the subcontractor, in turn, must issue a resale certificate to his supplier.
STATEMENT OF MATERIALS AND OTHER CHARGES

PROJECT:  Fasken Community Center Swimming Pool & Amenities

MATERIALS INCORPORATED INTO THE PROJECT:   $__________

ALL OTHER CHARGES:       $__________

*TOTAL:                     $__________

*This total must agree with the total figure shown in the Item and Quantity Sheets in the bound contract.

For purposes of complying with the Texas Tax Code, the Contractor agrees that the charges for any material incorporated into the project in excess of the estimated quantity provided for herein will be no less than the invoice price for such material to the Contractor.

NOTE: ONLY THE COPY OF THIS FORM IN THE BOUND CONTRACTS IS TO BE FILLED OUT.
CHECKLIST FOR BIDDERS

Project: Fasken Community Center Swimming Pool & Amenities

All information required by the terms of the Bid Documents must be furnished. **MISTAKES OR OMISSIONS CAN BE COSTLY AND CAN RESULT IN THE REJECTION OF YOUR BID.** Important items for you to check are included in but not limited to, those listed below. This checklist is furnished only to assist you in submitting a proper bid. Check as you read. **DO NOT INCLUDE THIS CHECKLIST WITH YOUR BID.**

[ ] Have you acknowledged receipt of all addenda to the plans and specifications?

[ ] Is your bid properly signed? (Refer to Bid Documents)

[ ] If a bid guarantee is required, is it included in your bid? (A late bid guarantee is treated the same as a late bid)

[ ] Is your bid guarantee in the proper amount? (Usually 5% of total bid price)

[ ] Your bid guarantee must be original in the form of a Bidder’s Bond, a Certified Check or Cashier’s Check.

[ ] If your bid guarantee is in the form of a Bidder’s Bond, is the bond properly signed by both the bidder and surety and are all required seals affixed?

[ ] Is the surety company qualified and licensed by the State of Texas as required by the provisions of the bid documents?

[ ] Is the name in which you submitted the bid the same on your bid proposal as on the Bidder’s Bond?

[ ] If required have you entered a unit price for each bid item?

[ ] If required have you entered the unit price or lump sum price in both words and figures? (Unit Price or Lump Sum price in words govern)

[ ] Are decimals in unit prices in the proper places? Are your figures legible?

[ ] Are the extensions of your unit prices, and your total bid price correct?

[ ] Is proposal being submitted complete together with Information from Bidders?
[ ] Are all erasures or corrections initialized by the person signing the bid or by an authorized representative of the person signing the bid.

[ ] Do not restrict your bid by altering any provisions of the Bid Document or by attaching any documents to the Proposal that takes exception to the Bid Documents.

[ ] Have you included all pages of the Proposal with your bid? Are all blanks in the Proposal properly completed (equipment brands, alternate materials, etc.)?

[ ] Is the envelope containing your bid properly identified that it is a sealed bid and does it contain the correct project name and bid opening date?

[ ] Will your bid arrive on time? Late bids will not be considered. Generally, bids must be received by the City Secretary, City Hall on the date and time specified in the Notice to Bidders. (Other times or dates will be clearly specified in the Notice).

[ ] On Federally Funded Projects, contractor must submit certified weekly payrolls with a copy to City Engineering Files.
CONSTRUCTION CONTRACT

STATE OF TEXAS
COUNTY OF WEBB

THIS AGREEMENT, made this _________ day of ____________ 2019, by and between the City of Laredo, Texas, acting by and through its duly authorized City Manager hereinafter termed the Owner, and ____________________, of the City of ________________, County of ________________, State of ________________, his/their executors, administrators, heirs, successors, or assigns, hereinafter termed the Contractor.

WHEREAS, the Owner desired to enter into Contract for the ___________________________________________________________________ in accordance with the provisions of the Invitation for Bids, the Specifications and Plans titled as above, and published by City of Laredo, Texas, 1110 Houston Street, (mailing address: P.O. Box 579), Laredo, Texas 78040 all of which are a part thereof; and,

WHEREAS, the Contractor has been engaged in and now does such work and represents that he is fully equipped, competent and capable to perform the above desired and outlined work, and is ready and willing to perform the work in accordance with the provisions of the Invitation for Bids, the Specifications and Plans, titled, "_________________________________________________________________

WITNESS: THAT for and in consideration of the payments and agreements hereinafter mentioned to be made and performed by the Owner, the Contractor hereby agrees at the unit price set forth in his Bid, made a part thereof totaling the sum of _______________________________ ($_________________) based on the Engineer's estimate of quantities, payable in the manner set out in Division C, Section 9, General Provisions of the contractual Documents to commence and complete the ____________________________________________________________________ in the City of Laredo, Tx, in accordance with Instructions to Bidders, Special Provisions, General Provisions, Technical Provisions, and all other requirements of the contractual Documents, and in accordance with the Specifications and Plans (including all maps, plats, blueprints, and other drawings and printed or written explanatory matter thereof) prepared by the Owner's Engineer, a part thereof and collectively, together with this Agreement constitute the entire Contract; and the Contractor agrees to furnish all the materials, supplies, machinery, equipment, tools, superintendence, labor, bonds, insurance and other accessories and services, and whatever else may be necessary to complete the said construction in accordance with said specifications, plans, and other contractual documents including such proposal.
Project: __Fasken Community Center Canopies________________________

Said Contractor further agrees to begin the work on or before the tenth day following the date set by the Owner in the written notice to proceed and to complete the work within ________________.

The Contractor further agrees to pay the sum of $________ for each consecutive day there-in-after as herein provided in Division B, Section 1.

And the Owner in consideration of the full and true performance of the said work by said Contractor hereby agrees to and binds itself to pay the said Contractor the unit price set forth in the attached Bid, and in the manner provided in the Specifications.

IN WITNESS WHEREOF, the OWNER AND THE CONTRACTOR have hereunto set their hand this____ day of ______________.

WITNESS:

_________________           ______________________
Signature                         Signature

_________________
(Print)

_________________
(Print)

_________________
Title: __________________

_________________
Address

_________________
City/State/Zip Code

_________________
Telephone Number:

_________________
Fax Number

ATTEST:                             CITY OF LAREDO, TEXAS

_________________
Jose A. Valdez, Jr., City Secretary

Robert A. Eads
Co-Interim City Manager

APPROVED AS TO FORM:

_________________
City Attorney

Rosario C. Cabello
Co-Interim City Manager
SECTION A-8
PERFORMANCE BOND
(As required by Chapter 2253, Texas Government Code)

THE STATE OF {}
COUNTY OF {}

KNOW ALL MEN BY THESE PRESENTS: That we (1) ____________________________ of hereafter called Principal and (3) ____________________________ of ______________, State of ______________, hereinafter called the Surety, are held and firmly bound unto (4) ____________________________ hereinafter called Owner, in the penal sum of ____________________________ ($________________________ ) Dollars in lawful money of the United Stated, to be paid in (5)

WEBB COUNTY, TEXAS

____________________ for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITIONS OF THIS OBLIGATION is such that Whereas, the Principal entered into a certain Contract with (6) ____________________________ the Owner, dated the ________________ day of ____________________________ a copy of which is hereto attached and made a part hereof for the Construction of:

____________________________________________________________________________

____________________________________________________________________________

(hereinafter called the “Work”)

These notes refer to the numbers in body of Contract above:

Date of Bond must not be prior to Date of Contract.

(1) Correct name of Contractor.
NOW THEREFORE, if the Principals shall well, truly and faithfully perform the work in accordance with the Plans, Specifications and Contract Documents during the original term thereof, and any extensions thereof which may be granted by the Owner with or without notice to the Surety, and if he shall satisfy all claims and demands incurred under such Contract, and shall fully indemnify and save harmless the Owner from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the owner all outlay and expense which the Owner may incur in making good any default, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED FURTHER, that if any legal action be filed upon this Bond, venue shall lie WEBB County, State of Texas, and that the said surety, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed thereunder or the Specifications accompanying the same shall in any wise affect its obligation on this Bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the work or to the Specifications.

IN WITNESS WHEREOF, this Instrument is executed in six counterparts, each one of which shall be deemed an original, this the ______ day of ________________.

ATTEST:

______________________________  ________________________________
(Principal) Secretary           PRINCIPAL (Print and Sign)
(Print and Sign)

By: ____________________________

______________________________
(SEAL)

______________________________
Address (State and Zip Code)

______________________________
Witness as to Principal (Print and Sign) Telephone Number

______________________________
Address (State and Zip Code)
ATTEST:

__________________________________________
Secretary (Print and Sign)

(SEAL)

(Surety) Secretary

__________________________________________
Address (State and Zip Code)

(SEAL)

Witness as to Surety (Print and Sign)

__________________________________________
Address (State and Zip Code)

SURETY: (Surety)

By: __________________________________________
(Print and Sign)

__________________________________________
Address (State and Zip Code)

__________________________________________
Telephone No. (Area Code)
PAYMENT BOND
(As required by Chapter 2253, Texas Government Code)

THE STATE OF {}
COUNTY OF {}

KNOW ALL MEN BY THESE PRESENTS: That we (1) ____________________________
(2) ______________________________________ of ____________________________, hereinafter called Principal and (3) ______
of ____________________________________________, State of ____________, hereinafter called
the Surety, are held and firmly bound unto (4) ____________________________________________ of
______________________________________ hereinafter called Owner, and unto all
Persons, Firms, and Corporations who may furnish materials for, or perform labor upon
the building or improvements hereinafter referred to in the penal sum of ____________________________
($ ________________________ ) Dollars in lawful money of the United Stated, to be paid in (5) WEBB COUNTY,
TEXAS for the payment of which sum well and truly to be made, we bind ourselves, our
heirs, executors, administrators and successors, jointly and severally, firmly by these
presents.

THE CONDITIONS OF THIS OBLIGATION is such that Whereas, the Principal entered
into a certain Contract with (6) ______
the Owner, dated the ______________ day of ______________________ a copy
of which is hereto attached and made a part hereof for the construction of:

______________________________

(herinafter called the “Work”)

These footnotes refer to the numbers in body of contract above:

Date of Bond must not be prior to Date of Contract.

(1) Correct name of Contractor.
(2) A Corporation, or Partnership or an Individual, as case may be.
(3) Correct name of Surety.
(4) Correct name of Owner.
(5) County and State.
(6) Owner.
NOW THEREFORE, if the Principals shall well, truly and faithfully perform the work in accordance with the Plans, Specifications and Contract Documents during the original term thereof, and any extensions thereof which may be granted by the Owner with or without notice to the Surety, and if he shall satisfy all claims and demands incurred under such Contract, then this obligation shall be null and void; otherwise to remain in full force and effect.

This Bond is made and entered into solely for the protection of all claimants supplying labor and material in the prosecution of the work provided for in said Contract, and all such claimants shall have a direct right of action under the Bond as provided in Section 2253.073, Texas Government Code.

PROVIDED FURTHER, that if any legal action be filed upon this Bond, venue shall lie WEBB County, State of Texas, and that no change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed thereunder or the Specifications accompanying the same shall in any wise affect its obligation on this Bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the work or to the Specifications.

PROVIDED FURTHER, that no final settlement between the Owner and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in six counterparts, each one of which shall be deemed an original, this the ______ day of ____________.

ATTEST:

(Principal) Secretary (Print and Sign) PRINCIPAL (Print and Sign)

By: __________________________

(SEAL)

Address (State and Zip Code)

Witness as to Principal (Print and Sign) Telephone Number

(SEAL)

Surety
ATTEST:

(Surety Secretary) (Print and Sign)  By: ____________________________ (Print and Sign)
(SEAL)  ____________________________

Address (State and Zip Code)

Telephone Number

NOTE: If Contractor is Partnership, all Partners should execute Bond.
PERFORMANCE - PAYMENT BOND FORM
M-24, 25, Attach. Sa

____________________________________
Business (Print) (SEAL) Individual Principal (Print and Sign)

____________________________________
Address (State and Zip Code) Business - Address

____________________________________
Telephone Number (Area Code) Telephone Number (Area Code)

ATTEST:

____________________________________
Corporate Principal

____________________________________
(Print and Sign) Business Address Name

____________________________________
(State and Zip Code) Telephone Number (Area Code)

____________________________________
Address (State and Zip Code) (Affix Corporate Seal)

By: ____________________________
(Sign and Print)

ATTEST:

____________________________________
Corporateg Surety

____________________________________
(State and Zip Code)

____________________________________
(Please Corporate Seal)

____________________________________
Business Address

____________________________________
(Telephone:
CERTIFICATE AS TO CORPORATE PRINCIPAL

I, ____________________________, certify that I am the ___________________.

Secretary of the Corporation named as Principal in the within Bond; that ___________________ __________________________, who signed the said Bond on behalf of the Principal was then __________________________, of said Corporation; that I know his signature thereof is genuine; and that said Bond was duly signed, sealed, an attested for and in behalf of said Corporation by authority of its governing body.

________________________________________
Title

________________________________________
Date: ____________________________ (Affix Corporate Seal)

________________________________________
Telephone No.

The rate of premium on this Bond is ____________ per thousand. Total of premium charge

$________________________________________

NOTE: The above must be filled in by Corporate Surety. Power-of-Attorney of person signed for Surety company must be attached.
CITY OF LAREDO
INSURANCE PROVISIONS AND LIMITS

Contractor shall provide and continuously maintain the minimum insurance coverages set forth below during the term of its agreement with the City of Laredo; and Contractor shall require its subcontractors to purchase the same types and amounts of insurance, at a minimum, as set forth below with respect to statutory workers’ compensation and liability insurance.

1. Commercial general liability standard ISO insurance at minimum combined single limits of $1,000,000 per-occurrence and $2,000,000 general aggregate for bodily injury and property damage, which coverage shall include: products/completed operations ($2,000,000 products/completed operations aggregate); XCU (explosion, collapse, underground) hazards; and contractual liability. Without limitation, the commercial general liability coverage must cover all operations required in the contract, as well as contractual liability for the indemnity obligations assumed by the Contractor in the contract. Coverage must be written on an occurrence form.

2. Workers’ compensation insurance at statutory limits, including employers’ liability coverage at minimum limits of $1,000,000 each-occurrence, each accident/$1,000,000 by disease each-occurrence/$1,000,000 by disease aggregate.

3. Commercial automobile liability insurance at a minimum combined single limit of $1,000,000 per-occurrence for bodily injury and property damage, including non-owned and hired car coverage and owned vehicles if any are owned.

4. Umbrella liability or following-form excess liability at minimum limits, reference page four for project costs over $1,000,000. Coverage must be at least as broad as the underlying commercial general liability, auto liability, and employer’s liability.

5. Pollution Legal Liability if applicable:
   a) Project costs of $1,000,000 to $10,000,000 and over $10,000,000; reference page four for limits.
   b) Contractors Pollution Liability:
      › Applies to operations that include the use, application, or consumption of pollutants.
      › Retro date shall not be later than the inception date of contract.
      › Contractual liability coverage to be included in contractor’s pollution liability coverage.
   c) Environmental Liability:
      a. Applies to asbestos and removal of other hazardous materials and/or repair, maintenance, installation, construction operations that are high hazard.
      › $5,000,000 per-claim/$10,000,000 aggregate minimum.
      › Retro date shall not be later than the inception date of contract.
      › Contractual liability coverage to be included in contractor’s pollution liability coverage.
      › At a minimum, coverage must apply to on-premises and transit operations.

6. Professional liability applies to professional services which include but are not limited to design build contractors, engineers, and architects at minimum limits of $1,000,000 per-claim/$2,000,000 annual aggregate. The retro date shall not be later than the inception date of the contract. Reference page four for limits based on project cost.
7. Builders Risk if applicable:
   
   a) "All-risk" including collapse, flood, and earthquake, to be written on completed value form.
   b) Coverage to include limits of at least $250,000 for off-premises storage and transit of construction materials. Soft costs to be included at a minimum limit of $500,000.
   c) Thirty (30)-day occupancy clause to apply.
   d) No testing exclusion should apply.

With reference to the foregoing insurance requirements, Contractor shall specifically endorse applicable insurance policies as follows:

1. City of Laredo shall be named as an additional insured on a primary and non-contributory basis, regardless of the application of other insurance, with respect to all liability coverages, except for the professional liability and workers’ compensation.

2. All liability policies shall contain no cross-liability exclusions or insured versus insured restrictions.

3. A waiver of subrogation in favor of City of Laredo shall be contained in all policies.

4. All insurance policies shall be endorsed to require the insurer to immediately notify City of Laredo of any material change in the insurance coverage.

5. All insurance policies shall be endorsed to the effect that City of Laredo will receive at least thirty (30) days’ notice prior to cancellation or non-renewal of the insurance.

6. The additional insured coverage in the CGL policy in favor of City of Laredo must apply to the ongoing operations of Contractor for contract costs or up to $1,000,000 and expanded to include product/s/completed operation for contract costs in excess of $1,000,000.

7. Required limits may be satisfied by any combination of primary and umbrella/excess liability insurances.

8. Contractor may maintain reasonable and customary deductibles, subject to approval by City of Laredo.

9. Insurance must be purchased from insurers that are financially acceptable to City of Laredo with a minimum A.M Best financial rating of A-:VII.

10. Coverage for commercial general liability, professional liability, and pollution legal liability must be maintained for at least one (1) to two (2) years after the project is completed.

11. For projects in excess of $10,000,000 in cost, a per-project aggregate limit must be included in the commercial general liability.
All insurance must be written on standard ISO or equivalent forms. Certificates of insurance shall be prepared and executed by the insurance company, or its authorized agent, shall be furnished to City of Laredo within five (5) business days of being notified of the award of the contract, and shall contain provisions representing and warranting the following:

Shall set forth all endorsements and insurance coverages according to requirements and instructions contained herein.

Shall specifically set forth the notice-of-cancellation or termination provisions to City of Laredo.

Copies of all required endorsements must be attached to the certificate of insurance. The certificates of insurance must be updated and resubmitted to the City of Laredo to show renewal coverages, as applicable, at least thirty (30) days prior to expiration of any one or more policies.

Upon request, Contractor shall furnish City of Laredo with certified copies of all insurance policies.

All of the above insurance provisions and limits are the minimum requirements, as referenced, and may be modified at the sole discretion of the City of Laredo.

**BONDS**

Bonds are required for public works contracts under the following circumstance:

1. A Bid or Proposal Bond is required in the amount of the bid submitted to the City of Laredo.
2. Performance Bond when the contract is in excess of $100,000, in a personal sum equal to 100% of the contract cost.
3. Payment or Labor and Material Bond when a contract is in excess of $50,000, each in a personal sum equal to 100% of the contract cost.
# CITY OF LAREDO
## INSURANCE PROVISIONS AND LIMITS

<table>
<thead>
<tr>
<th>CONTRACT COST</th>
<th>TYPE OF INSURANCE</th>
<th>LIMITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than $1,000,000</td>
<td>Umbrella Liability, Professional Liability</td>
<td>Not Required $1,000,000 Per-Claim/ $2,000,000 Aggregate</td>
</tr>
<tr>
<td>$1,000,000 to $5,000,000</td>
<td>Umbrella Liability, Professional Liability</td>
<td>$4,000,000 Per-Occ $1,500,000 Per-Claim/ $3,000,000 Aggregate</td>
</tr>
<tr>
<td>$5,000,000 to $10,000,000</td>
<td>Umbrella Liability, Professional Liability</td>
<td>$9,000,000 to $10,000,000 Per-Occ $1,500,000 Per-Claim/ $3,000,000 Aggregate to $2,000,000 Per-Claim/$4,000,000 Aggregate</td>
</tr>
<tr>
<td>Over $10,000,000</td>
<td>Umbrella Liability, Professional Liability</td>
<td>$10,000,000 or Higher $2,000,000 Per-Claim/ $4,000,000 Aggregate or Higher</td>
</tr>
<tr>
<td>$1,000,000 to $10,000,000</td>
<td>Contractor's Pollution Legal Liability</td>
<td>$1,000,000 Per-Claim/ $2,000,000 Aggregate</td>
</tr>
<tr>
<td>Over $10,000,000</td>
<td>Contractor's Pollution Legal Liability</td>
<td>$2,000,000 Per-Claim/ $4,000,000 Aggregate</td>
</tr>
</tbody>
</table>

## TAIL COVERAGE

<table>
<thead>
<tr>
<th>CONTRACT COST</th>
<th>TYPE OF INSURANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1,000,000 to $5,000,000</td>
<td>Commercial General Liability, Professional Liability, and Pollution Legal Liability</td>
</tr>
<tr>
<td>Over $5,000,000</td>
<td>Commercial General Liability, Professional Liability, and Pollution Legal Liability</td>
</tr>
<tr>
<td>Any Contract Size</td>
<td>Hazardous Environmental Work</td>
</tr>
</tbody>
</table>

### TAIL COVERAGE

- **$1,000,000 to $5,000,000**: One (1) Year
- **Over $5,000,000**: Two (2) Years
- **Any Contract Size**: Two (2) Years
NOTICE:

All persons providing services on this construction project shall abide by new rule 110.110 to the TEXAS LABOR CODE concerning workmen’s compensation insurance coverage.

This rule is applicable for building or construction contracts advertised for bid by a governmental entity on or after September 1, 1994.

(copy of rule 110.110 is attached)
NOTICE OF AWARD

Project: Fasken Community Center Swimming Pool & Amenities

The City of Laredo has considered the bids submitted for the above described project in response to its advertisement for bids dated ________________, 2019, and ________________, 2019, and related information to Bidders.

You are hereby notified that your bid in the net amount of $____________________ has been favorable considered for the project by the City Council at its regular council meeting on ________________, 2019. Pursuant to the information to Bidders you are asked to provide five (5) original signed contracts and to return the same, along with the required original Certificate of Insurance, and Payment Bond and Performance Bond within ten (10) days of your receipt of this Notice, for the approval and signature of the City Manager.

For the purpose of effective date of the required Certificate of Insurance, and the Performance Bond and the Payment Bond, the date of ________________, 2019, may be considered the date of the contract, if the Documents are approved by the City Manager.

If you fail to submit the signed Contract Performance and Payment Bonds, and the Certificate of Insurance within ten (10) working days from your receipt of this Notice, your bid will be considered as withdrawn and your bid bond will be forfeited, unless an extension for submittals has been requested in writing and approved by the City.

The Construction Contract time of ______________ (____) working/calendar days is to be strictly adhered to per Division B Section 1 and contractor agrees to pay liquidated damages for late completion an amount of $____________________ for each consecutive day exceeding the contract time allotted.

You are asked to acknowledge receipt of this Notice by signing in the appropriate place below.

Dated this the ___ day of ______________ of 2019.

CITY OF LAREDO ENGINEERING DEPT.

________________________________
Ramon E. Chavez, P.E.,
City Engineer

ACKNOWLEDGMENT:

Receipt of this Notice is hereby acknowledged

________________________________

Dated this ____________________

Authorized Signature
Title:__________________________

Div-A Notice of Award
CERTIFICATE OF OWNER’S ATTORNEY

Project: Fasken Community Center Swimming Pool & Amenities

Awarded by the City Council:

I, the undersigned,______________________, City Attorney the duly authorized and acting legal representative of THE CITY OF LAREDO, do hereby certify as follows:

I have examined the attached Contract(s) and Surety bonds and the manner of execution thereof, and I am of the opinion that each of the aforesaid Agreements has been duly executed by the proper parties thereto acting through their duly authorized representatives; that said representatives have full power and authority to execute said Agreements on behalf of the respective parties named thereon; and that the foregoing Agreements constitute valid and legally binding obligations upon the parties executing the same in accordance with terms, conditions, and provisions thereof.

_____________________________
City Attorney

Date: ___________________________
NOTICE TO PROCEED

Date: ________________________________

To: ____________________________________

Project: Fasken Community Center Swimming Pool & Amenities

In accordance with the construction contract dated ______________________ you are hereby authorized to proceed on ___________________________________________.

Contract time is ______________________. **Completion date for the project is approximately ____________, ________.**

CITY OF LAREDO ENGINEERING DEPT.

_____________________________________

Ramon E. Chavez, P.E.
City Engineer

The above NOTICE TO PROCEED is hereby acknowledged by

_____________________________________

on this the ____________ day of _________________.

_____________________________________

Authorized Signature

_____________________________________

Typed Name:

Title: ____________________________
DIVISION B
SECTION 1

CONTRACT TIME & LIQUIDATED DAMAGES

Project: Fasken Community Center Swimming Pool & Amenities

The Contract Performance for this project shall be ______________________ ( ) calendar days defined in the Specifications under General Provisions, Division C, Section 1.

The time set forth in the proposal for the completion of the work is an essential element of the Contract. For each day under the conditions described in the preceding Paragraph that any work shall remain uncompleted after the expiration of the days specified in the Contract, together with any additional days allowed, the amount per day given in the following schedule will be deducted from the money due or to become due the Contractor, as liquidated damages for late completion of the specified work.

<table>
<thead>
<tr>
<th>From More Than</th>
<th>To and Including</th>
<th>Amount of Penalty Per Day over Contract Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>$0</td>
<td>$100,000</td>
<td>$200</td>
</tr>
<tr>
<td>100,000</td>
<td>500,000</td>
<td>400</td>
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<tr>
<td>500,000</td>
<td>1,000,000</td>
<td>550</td>
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<td>1,000,000</td>
<td>2,000,000</td>
<td>700</td>
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<tr>
<td>2,000,000</td>
<td>5,000,000</td>
<td>850</td>
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<tr>
<td>5,000,000</td>
<td>10,000,000</td>
<td>1,200</td>
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<td>10,000,000</td>
<td>15,000,000</td>
<td>1,500</td>
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<tr>
<td>15,000,000</td>
<td>20,000,000</td>
<td>1,700</td>
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<tr>
<td>20,000,000</td>
<td>Over 20,000,000</td>
<td>2,500</td>
</tr>
</tbody>
</table>
DIVISION B
SECTION 2

EQUAL OPPORTUNITY CLAUSE

PROJECT: Fasken Community Center Swimming Pool & Amenities

1. The Contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex or natural origin. The Contractor will take Affirmative action to insure that applicants are employed, and that employees are treated during employment, without regard to their race, creed, color or national origin. Such action shall include, but not limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection of training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the contracting officer setting forth the provisions of the non-discrimination clause.

2. The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, religion, color, sex or natural origin.

3. The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the agency contracting officer, advising the labor union or worker’s representative of the Contractor’s commitments under Section 202 of Executive Order No. 11246, as amended (3CFR 169 (1974) and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

4. The Contractor will comply with all provisions of Executive Order No. 11246, as amended, and of the rules, regulations and relevant orders of the Secretary of Labor.

5. The Contractor will furnish all information and reports required by Executive Order No. 11246, as amended, and by the rules, regulations and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records and accounts by the contracting agency and the Secretary of Labor for purposes of investigation to ascertaint compliance with such rules, regulations and orders.

6. In the event of the Contractor’s noncompliance with the nondiscrimination clauses of this Contract or with any of such rules, regulations or orders, this Contract may be canceled, terminated, or suspended in whole or in part and the Contractor may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order No. 11246, as amended, and such other sanctions may
be imposed and remedies invoke as provided in Executive Order No. 11246, as amended or by rule, regulation or order of the Secretary of Labor, or as otherwise provided by law.

7. The Contractor will include the Provisions of Paragraph 1 through 7 in every Subcontract or purchase order unless exempted by rules, regulations or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order No. 11246, as amended, so that such provisions will be binding upon each Subcontractor or Vendor. The Contractor will take such action with respect to any Subcontract or Purchase Order, as the contracting may direct as a means of enforcing such provisions, including sanctions for noncompliance: Provided, however, that in the event the Contractor becomes involved in, or is threatened with, litigation with a Subcontractor or Vendor as a result of such direction by the contracting agency, the Contractor may request the United States to enter into such litigation to protect the interest of the United States.
DIVISION B

SECTION 4

INSPECTION BY CITY

Project: Fasken Community Center Swimming Pool & Amenities

The work covered by these Specifications shall at all times be subject to inspection by the City of Laredo (City) authorized inspectors.

The Contractor shall furnish the City Inspector with every reasonable facility for ascertaining whether the work performed is substandard and deviates from the requirements of the plans and specifications. The City Inspector shall have the authority to halt the construction of any portion of the work not meeting requirements until such time as said work has been corrected to the satisfaction of the Inspector and the Engineer.

City’s normal working hours are Monday through Friday, not including Saturdays, Sundays, or legal holidays observed by the City from 8:00 A.M. to 5:00 P.M. The contractor shall notify the City at least twenty-four (24) hours in advance for any work that is to be scheduled beyond the limits of the City’s working hours, and the Contractor shall not begin any such work scheduled unless proper inspection and/or testing has been pre-arranged with the City, with the cost for such inspection beyond the City’s working hours borne by the Contractor. However, should the City opt to expedite a project and chooses a calendar day contract for such endeavor, the City will bear the 8:00 A.M. to 5:00 P.M. inspection cost only, and the contractor pays for time beyond the city’s working hours limit.

Payment due for overtime inspection is expected to be processed timely, otherwise the City may elect to deduct said amount due from the contractor’s monthly estimate. See Section C-9.02 Scope of Payment.
DIVISION B

SECTION 5

PROJECT SIGN

The general contractor shall erect two (2) signs, unless otherwise noted by the City Engineers, at the project site identifying the project and indicating that the City of Laredo is participating in the development of the project.

The project signs shall be substantially in accordance with the drawing printed on the following page and shall be made from ¾ inch plywood, placed in a prominent location and maintained in good condition until completion of the project.

THE CONTRACTOR SHALL REMOVE AND DISPOSE OF THE PROJECT CONSTRUCTION SIGN WHEN THE WORK HAS BEEN COMPLETED
### CITY OF LAREDO, TEXAS

**Fasken Community Center Swimming Pool & Amenities**

<table>
<thead>
<tr>
<th>Honorable Pete Saenz, Mayor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roberto Balli</td>
</tr>
<tr>
<td>Rudy Gonzalez, Jr.</td>
</tr>
<tr>
<td>Vidal Rodriguez</td>
</tr>
<tr>
<td>Mercurio Martinez, III</td>
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<table>
<thead>
<tr>
<th>A/E’s Name</th>
<th>Contractor’s Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td>Address</td>
</tr>
<tr>
<td>City, State, Zip Code</td>
<td>City, State, Zip Code</td>
</tr>
<tr>
<td>Telephone Number</td>
<td>Telephone Number</td>
</tr>
<tr>
<td>Fax Number</td>
<td>Fax Number</td>
</tr>
</tbody>
</table>

**NOTE:** Signs are to be installed in ground on 4” x 4” posts
Blue borders
White background
Red letter
Two (2) project signs are required - 4’ x 8’

**CONTRACTOR TO REMOVE SIGNS UPON COMPLETION OF PROJECT**
DIVISION B

SECTION 7

ILLEGAL DUMPING

The general contractor shall not dispose of any material whatsoever taken from the project site, onto any areas not considered to be legal dump sites. Materials such as broken concrete, asphalt, rebar, trash, etc. are to be disposed of properly, i.e. at the city landfill or as directed by the city engineer. Unless otherwise noted, no material, including dirt, is to be dumped or placed into an existing creek or channel.

The general contractor is hereby instructed to contact the City of Laredo Environmental Dept. at 956-794-1650 for additional information on illegal dumping city ordinances.

*Building construction debris should be hauled to the Landfill only by a franchised hauler.
DEFINITION OF TERMS

C-1.01 DEFINITION OF TERMS:

Whenever the terms defined herein occur on the Plans, in any other documents or instrument herein contemplated or to which the Specifications apply, the intent and meaning shall be as follows:

C-1.02 OWNER: (Or Party of the First Party):

The individual, firm corporation or the political subdivision for whom the facilities covered by these Plans and Specifications are to be constructed.

C-1.03 CONTRACTOR: (Or Party of the Second Part):

The individual, firm or corporation with whom the Contract is made by the Owner.

C-1.04 ENGINEER:

City Engineer employed by the Owner, or such other Engineer, or Supervisor authorized by the City Engineer or the Owner to act on their behalf.

C-1.05 CONSULTANT:

Licensed Engineer or Architect employed by the Owner, and authorized by the City Engineer or the Owner to act on their behalf. The decisions by the City Engineer are final.

C-1.06 BIDDER:

An individual, firm or corporation submitting a proposal.

C-1.07 SUPERINTENDENT:

An authorized representative of the Contractor.

C-1.08 INSPECTOR:

An authorized representative of the Owner and Engineer

C-1.09 LABORATORY:

A testing laboratory approved by the Owner and Engineer.
C-1.10 CONTRACT:

The Agreement between the Owner and the Contractor covering the furnishing of all materials and labor necessary to complete the work and consisting of the Plans and Specifications, together with such supplemental agreements as may be made from time to time.

C-1.11 WORKING DAY:

A “Working Day” is defined as any day not including Saturdays, Sundays, or any legal holidays, observed by the City of Laredo, in which weather or other conditions, not under the control of the Contractor, will permit construction of the principal units of work for a continuous period of not less than seven (7) hours. If the contractor opts to work on Saturday, Sunday, or legal holiday requiring construction inspection, said days are considered working days and charged to the contract time, **and the cost for such inspection borne by the contractor.**

C-1.12 WORK:

All structures, services, machinery, equipment, or other facilities that are described in the Plans and Specifications together with such additions or modifications as may be ordered by the Owner from time to time.

C-1.13 WORK, ORDER, OR NOTICE TO PROCEED:

A document authorized by the Owner and issued by the Engineer directing the Contractor to proceed on all or part of the work and a specified date.

C-1.14 CHANGE ORDER:

A supplemental agreement adding to or modifying the Contract, including such additional Plans and Specifications as necessary to properly describe the required change.

C-1.15 SURETY:

The corporate body which is bound with the Contractor for the faithful performance of the work covered by the Contract.

C-1.16 PLANS:

The drawings published by the Engineer showing the locations, character, dimensions and details of the work which are part of the Contract.
C-1.17 SPECIFICATIONS:

The directions, provisions and requirements contained herein pertaining to the method and manner of performing the work, or to the quantities, or to the qualities of materials to be furnished under the Contract. The term “Specifications” shall be deemed to include the Contract Documents, the Special Provisions, the General Provision, and the Technical Provisions as contained herein, together with all supplemental agreements and change orders. Specifications are part of the Contract. Plans take precedence over Specifications if in conflict.

C-1.18 CALENDAR DAYS:

A “Calendar Day” is defined as any day of the week inclusive of Saturdays, Sundays, and legal holidays.

C-1.19 INSPECTION:

The periodic on site review of the progress of project construction, may be referred to as progress, pre-final, or final inspection, but in each case of inspection a “punch-list” of items requiring varying degrees of further work is prepared.

C-1.20 PROJECT ACCEPTANCE:

Condition resulting when all items of construction are complete, inspected for completion by inspector and engineering staff and approved by City Council.

Note: Items of construction may be approved by inspector and engineering staff as constructed in place for contractor progress payment purposes, but final acceptance of project is by City Council action.

C-1.21 RESPONSIBLE BIDDER:

Contractor which has adequate resources to perform a contract, comply with legal and regulatory requirements, and deliver per contract schedule.
DEFINITION OF ABBREVIATIONS

C-2.01 DEFINITION OF ABBREVIATIONS:

Whenever the abbreviations defined herein occur on the Plans, in the Specifications, Contract, Bond, advertisement, Proposal, or in any other Instrument herein contemplated or to which the Specifications apply or may apply, the intent and meaning shall be as follows:

A.S.H.O American Association of State Highways Official
HP Horsepower
K.W. Kilowatt
Am. or Amp. Ampere
KVA Kilovolt
A.S.T.M. American Society for Testing Materials
In. or " Inch or Inches
Lin. Linear
Asph. Asphalt
Lb. or # Pound
Ave. Avenue
A.W.W.A. American Waterworks Association
Max. Maximum
Min. Minimum
MH Manhole
I.P. Iron Pin
B & S. Bell and Spigot
Mono. Monolithic
Blvd. Boulevard
No. Number
B.T.U. British Thermal Unit
% Percent
B.M. Bench Mark
PL Property Line
C.I. Cast Iron
R. Radius
C.C.C. Center to Center
Rein. Reinforced or reinforcing
C/G Curb & Gutter
C.L. Center Line
V.G. Valley Gutter
Con. or Conc. Concrete
Rem. Remove
C.S.P. Concrete Sewer Pipe
Rep. Replace
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.M.</td>
<td>Circular Mil</td>
</tr>
<tr>
<td>R.C.S.D.P.</td>
<td>Reinforced Concrete Storm Drain Pipe</td>
</tr>
<tr>
<td>C.F.M.</td>
<td>Cubic Feet per Minute</td>
</tr>
<tr>
<td>C.O.</td>
<td>Cleanout</td>
</tr>
<tr>
<td>R.P.M.</td>
<td>Revolutions per minute</td>
</tr>
<tr>
<td>Cond.</td>
<td>Conduit Minute</td>
</tr>
<tr>
<td>Corr.</td>
<td>Corrugated</td>
</tr>
<tr>
<td>ROW or R of W</td>
<td>Right of Way</td>
</tr>
<tr>
<td>Cu.</td>
<td>Cubic</td>
</tr>
<tr>
<td>Vol.</td>
<td>Volume</td>
</tr>
<tr>
<td>Culv.</td>
<td>Culvert</td>
</tr>
<tr>
<td>S.S.</td>
<td>Sanitary Sewer</td>
</tr>
<tr>
<td>Dia.</td>
<td>Diameter</td>
</tr>
<tr>
<td>S.D.</td>
<td>Storm Drain</td>
</tr>
<tr>
<td>D.S.</td>
<td>Double Strength</td>
</tr>
<tr>
<td>Sq.</td>
<td>Square</td>
</tr>
<tr>
<td>Dr.</td>
<td>Driveway</td>
</tr>
<tr>
<td>Std.</td>
<td>Standard</td>
</tr>
<tr>
<td>Elev. or El.</td>
<td>Elevation</td>
</tr>
<tr>
<td>T.H.D.</td>
<td>Texas Highway Department</td>
</tr>
<tr>
<td>F.</td>
<td>Fahrenheit</td>
</tr>
<tr>
<td>V.C.P.</td>
<td>Vitrified Clay Pipe</td>
</tr>
<tr>
<td>Ft. or '</td>
<td>Foot or Feet</td>
</tr>
<tr>
<td>V</td>
<td>Volt</td>
</tr>
<tr>
<td>Gal.</td>
<td>Gallon</td>
</tr>
<tr>
<td>Yd.</td>
<td>Yard</td>
</tr>
<tr>
<td>S.O.P.</td>
<td>Secretaria de Obras Publicas (Mexican Secretaries of Public Works)</td>
</tr>
<tr>
<td>Tex. D.O.T., or TxDOT</td>
<td>Texas Department of Transportation</td>
</tr>
</tbody>
</table>
INSTRUCTION TO BIDDERS

C-3.01 EXAMINATION OF PLANS, SPECIFICATIONS, SPECIAL PROVISIONS, AND SITE OF WORK:

Submission of a Proposal shall constitute prima facie evidence that the Bidder has carefully examined the site of the proposed work, the Proposal, Contract Forms, Plans and Specifications, and has satisfied himself as to the character, quality, and quantity of work to be performed, materials to be furnished, and as to the requirements of these Specifications, Special Provisions, and Contract.

Any information on the Plans or in the Specifications as to the soil, or material borings, or tests of existing materials, or location of existing utilities is for the convenience of the Bidder. The accuracy of the information is not guaranteed, and no claims for extra work or damages will be considered if it is found during construction that the actual conditions or locations vary from those indicated on the Plans or in the Specifications.

C-3.02 INTERPRETATION OF ESTIMATES:

Any estimate of quantities of work to be done and materials to be furnished in the proposal or on the Plans is given only as a basis of comparison of Proposals and the Award of the Contract. Such estimate is the result of careful calculation and is believed to be correct, but the Owner does not expressly, or by implication, agree that the actual quantities involved will correspond exactly therewith, nor shall the Bidder plead misunderstanding or deception because of such estimate of quantities, or of the character, location or other conditions pertaining to the work. Payment to the Contractor under unit price contracts will be made only for the actual quantities of work performed or materials furnished in accordance with the Plans and Specifications, and it is understood that the quantities may be increased or diminished as hereinafter provided without in any way invalidating the unit bid prices.

C-3.03 PREPARATION OF PROPOSAL:

The Bidder shall submit his proposal on the forms furnished by the Owner. All blank space in the proposal form shall be filled in for each and every item for which quantity is given, and the Bidder shall state the price (typed, or written in ink, both in words and numerals for which he proposed to do each item of work. In case of conflict between words and numerals, the words will govern.

The Proposal shall be signed in ink by the person or persons making, or authorized to make the bid. If the Proposal is offered by an individual, his name and post office address shall be given. If the proposal is offered by a firm or partnership, the name and post office address of each member of the firm or
partnership shall be given. If the Proposal is offered by a corporation, the name and title of the person signing the Proposal, and the post office address of the corporation shall be given.

Any person signing a Proposal as agent must file with the Owner legal evidence that he has the authority to do so, and that the signature is binding upon the firm or corporation.

C-3.04 REJECTION OF PROPOSAL:
A Proposal showing any alterations or of words or figures, erasures, additions not called for, alternate bids not called for, incomplete bids, condition bids, or proposals not accompanied by proposal guaranty as required, will be considered as an irregular bid and may be rejected. The Owner reserves the right to waive technicalities as to changes, alterations, or reservations, and to make the award to the best interest of the Owner.

C-3.05 PROPOSAL GUARANTY:
Each Proposal shall be accompanied by an original certified check, cashier’s check or bid bond in the amount of five (5%) percent of the total amount bid. Checks shall be made payable unconditionally to the Owner.

C-3.06 DELIVERY OF PROPOSAL:
Each Proposal must be an original and must be sealed, together with the proposal guaranty, in an envelope plainly marked with the name of the project as shown on the Notice to Bidders, and the name and address of the Bidder. When submitted by mail, this envelope shall be placed in another envelope addressed as indicated in the Notice to Bidders.

Only those proposals actually in the hands of the designated official at the time set in the Notice to Bidders shall be considered. Proposals submitted by telephone, telegraph or fax, will NOT be considered.

C-3.07 WITHDRAWAL OF PROPOSAL:
A Bidder may withdraw his proposal provided he submits to the official designated to receive bids his request in writing to do so prior to the time set for opening of proposals.

C-3.08 PUBLIC OPENING OF PROPOSALS:
Proposals will be publicly opened and read aloud at the time and place set in the Notice to Bidders.
C-3.09 COMPETENCY OF BIDDERS:

Before any Contract is awarded, the Owner may require the Bidder to furnish a complete statement of his financial resources. His experience in similar work, his equipment available for the work proposed, or any other information necessary to establish his competency and reliability as a Contractor.

C-3.10 DISQUALIFICATION OF BIDDER:

Any of the following causes may be considered as sufficient for the disqualification of the Bidder and the rejection of his Proposal:

More than one proposal for the same work from an individual or corporation under the same or different name.
Evidence of collusion among Bidders.

An unbalanced Proposal.

Failure to submit a unit price for each item of work shown on the Proposal.

Lack of competency as revealed by the financial statement, experience record, or plant and equipment statement furnished.

Lack of responsibility as shown by past work judged from the standpoint of workmanship and progress.

Uncompleted work which, in the judgment of the Owner, might hinder or prevent the prompt completion of additional work if awarded.

Being in arrears on existing Contracts.

Having defaulted on a previous Contract.

C-3.11 MATERIALS GUARANTY:

Before any Contract is awarded, the Owner may require the Bidder to furnish a complete statement of the origin, composition or manufacturer of any and all materials proposed to be used in the work, together with samples, which may be subjected to tests to determined their quality and fitness for the work.
AWARD AND EXECUTION OF CONTRACT

C-4.01 CONSIDERATION OF PROPOSALS:

For the purpose of award, after the proposals are opened and read, the bids considered the most advantageous to the Owner will be carefully studied. The bids will then be compared and the results made public. Until the award of the Contract is made, the Owner reserves the right to reject any or all proposals, to waive technicalities, to advertise for new proposals, or to proceed to do the work otherwise when the best interests of the Owner will be thereby promoted.

C-4.02 AWARD TO CONTRACT:

Contract will not be awarded until the necessary investigations as to the competency of the low bidder are made. Award of Contract will be made by the Owner, upon recommendation by the Engineer, to the lowest responsible bidder meeting the requirements of the Owner. Award of Contract will be made within ninety (90) days after the opening of proposals, unless stated otherwise in the Notice to Bidders.

C-4.03 RETURN OF PROPOSAL GUARANTIES:

As soon as the proposal price has been compared the Engineer may, at his discretion, return the proposal guaranties accompanying in those proposals which, in his judgment, will not be considered in making the award. When award is made, the successful bidder’s proposal guaranty only will be retained until after Contract and Bond have been executed.

C-4.04 PERFORMANCE AND PAYMENT BOND:

Within ten (10) days after Notification of Award of Contract, the successful bidder shall execute and file with the Owner a separate surety and payment bond as required by Chapter 93 of the Acts of the Regular Session of the 56th Legislature of Texas, in the full amount of the contract price as a guarantee of the faithful performance of the Contract and payment of all obligations which may be incurred for material and labor used in the work. Bonds shall be executed by a surety company authorized to do business in the State of Texas on the bond forms provided in these Documents. Any surety shall be subject to the approval of the Owner.
C-4.05 EXECUTION OF CONTRACT:

Within ten (10) days after Notification of Award of contract, the successful bidder shall sign and place in the hands of the Owner the necessary agreement entering into a Contract with the Owner.

C-4.06 NOTICE TO PROCEED:

The Notice to Proceed shall be issued within ten (10) days of the execution of the Agreement by the City provided that the Contractor has properly executed and submitted all Documents required by the City of Laredo within the same period of time. Should there be reasons why the Notice to Proceed cannot be issued within such period, the time may be extended by mutual agreement between the City and Contractor. If the Contractor has submitted all Documents required and the Notice to Proceed has not been issued within the ten (10) day period or within the time extension, the Contractor may terminate the Agreement without further liability on the part of either party. Furthermore, should the Contractor fail to execute all the requirements within this same ten (10) days period or within the time extension, the City may terminate the Agreement.

C-4.07

The City of Laredo may make such investigations as he deems necessary to determine the ability of the Bidder to perform the work, and the Bidder shall furnish to the City all such information and data for this purpose as the City may request.

C-4.08 APPROVAL OF CONTRACT:

No Contract shall be binding upon the Owner until it has been signed by the Owner and returned to the Contractor.

C-4.09 FAILURE TO EXECUTE CONTRACT:

Failure to comply with any of the requirements of these Specifications, to execute Contract within ten (10) days after notification of work, or to furnish surety as required, shall be just cause for the annulment of the award. In case of annulment of award, the proposal guaranty shall become the property of the Owner, not as penalty, but as a liquidated damage.
C-4.10

After the Notice to Proceed is issued, the Owner shall provide the Contractor with three (3) complete sets of Plans and Specifications for Contractor’s use during construction. In the case that additional sets are required, the Contractor shall make arrangements to obtain the extra sets at his own expense.

C-4.11 RESPONSE TIME DURING THE PROSECUTION OF THE PROJECT:
The contractor shall furnish the owner with three (3) local telephone numbers where contractor or a responsible representative of contractor can be reached at any and all time during the prosecution of this project, and especially during weekends or holidays. Failure of contractor to respond to any such emergency which causes city personnel, equipment and materials to be used in such emergency will result in the contractor being charged an amount which shall be twice the cost incurred by the City in using personnel, equipment and materials to handle such emergency due to failure of the contractor to do so, and, in addition, the contractor will be charged a penalty of $500.00 for each emergency to which it does not respond. In this connection, “failure to respond” means the failure of the contractor to respond to telephone calls from the relevant staff or owner.

C4-12 – MOBILIZATION AND DEMOBILIZATION

Mobilization shall include all activities and associated costs for transportation of contractor’s personnel, equipment, and operating supplies to the site; establishment of offices, buildings, and other necessary general facilities for the contractor’s operations at the site and premiums paid for insurance, performance and payment bonds, as applicable; and demobilization for site cleanup of offices, buildings, and other facilities assembled on the site specifically for this contract.

This work includes mobilization and demobilization required by the contract at the time of award and which lump sum amount shall not be more than 5% of the adjusted contract amount of the project.

Payment will be made as the work proceeds up to 90% of the lump sum amount after presentation of paid invoices or documentation of direct costs by the contractor showing specific mobilization and demobilization costs and supporting evidence of the charges. The balance will be included in the final contract payment.
SCOPE OF WORK

C-5.01 INTENT OF PLANS AND SPECIFICATIONS:

It is the intent of the Plans and Specifications to describe the complete work to be performed under the Contract. Except as provided on the Plans or in the Specifications, it is also the intent that the Contractor shall furnish all materials, supplies, tools, equipment, labor and incidentals necessary to complete the work.

C-5.02 CHANGES AND INCREASED OR DECREASED QUANTITIES OF WORK:

The Owner has the right to make such changes and alterations in the Plans or in the quantities of work as he may consider necessary or desirable, and such changes and alterations shall not be considered as a waiver of any condition of the Contract, nor shall they invalidate any provision thereof. The Contractor shall perform the work as increased or decreased, and no allowance will be made for anticipated profits.

Payment to the contractor will be made for the actual quantities of work done and materials furnished at the unit prices as set forth in the Contract, except as follows:

When the total cost of work to be done, or of materials to be furnished, is more than one hundred and twenty-five 125 percent of the total contract price for the items stated in the Proposal, then either party to the Contract, upon demand, shall be entitled to a revised consideration on that portion of the work above one hundred and twenty-five (125%) percent of the total contract price stated in the Proposal.

When the total cost of work to be done, or of materials to be furnished, is less than seventy-five (75%) percent on the total contract price for the items stated in the Proposal, then either party to the Contract, upon demand, shall be entitled to a revised consideration on the work actually done.

Revised consideration shall be determined by supplemental agreement between the parties, which supplemental agreement shall be included with, and shall become a party of, the Contract.

C-5.03 OMITTED ITEMS:

The Owner may, in writing, order the omission from the work of any item found unnecessary to the project. Such omission shall be subject to all provisions of Par. C-5.02.
C-5.04 EXTRA WORK:

When the proper completion of the project requires work for which no quantities or prices were shown in the Proposal, such work shall be called “EXTRA WORK” and shall be performed by the Contractor when so directed in writing by the Owner. “EXTRA WORK” shall be performed in accordance with these Specifications and as may be directed by the Engineer.

Prices for extra work shall be itemized and covered by a supplement agreement submitted by the Contractor and approved by the Owner prior to the starting of such work.

Claims for extra work not authorized in writing by the Owner prior to the performance thereof will be rejected.

C-5.05 MAINTENANCE OF TRAFFIC:

When the work requires partial or complete closing of any driveway, alley, street, or roadway, the Contractor shall so schedule and prosecute his work that traffic will be hindered to a minimum.

C-5.06 REMOVAL AND DISPOSAL OF STRUCTURES AND OBSTRUCTIONS:

All structures and/or obstructions on the site of the work, which are not to remain in place or which are not to be used in the new construction shall be removed as directed by the Engineer. Such items of removal are not listed in the Proposal will not be paid for as separate items; the cost of doing such work shall be included in the unit price bid for other items.

C-5.07 TOOLS AND ACCESSORIES:

When special wrenches, gauges, or other special tools or accessories are required to properly maintain and operate any machine or equipment furnished under this Contract, the furnishing of such tools and accessories shall be deemed to have been included in the Contract and they shall be furnished by the Contractor without extra cost to the Owner.

C-5.08 GUARANTEES:

All structural, mechanical and electrical equipment or instrument shall be guaranteed against mechanical and physical defects, leakage, breakage, or other damage occurring during normal operation for a period of one (1) year after such equipment or instruments have been accepted by the Owner. The Contractor shall
promptly repair or make good, at his own expense, any defect in such equipment or instruments.

C-5.09 GENERAL GUARANTEE:

All work included in the Contract shall be guaranteed against faulty material or workmanship for a period of one (1) year after the work has been accepted by the Owner.

Neither final acceptance of the work, nor final payment thereof, nor occupancy and use of the work by the Owner shall constitute a waiver of the Owner’s right to require the Contractor to repair or make good any such faulty materials or workmanship.

C-5.10 FINAL CLEANING UP:

Upon completion of the work and before acceptance and final payment will be made, the Contractor shall remove from the site all machinery, equipment, tools, and materials and shall dispose of all rubbish, temporary structures, and surplus backfill. The site shall be left in a neat and presentable condition throughout. Any land area, driveway, sidewalk, alley, street or road (concrete or asphalt) which has been cut or disturbed during the prosecution of the work shall be repaired at the Contractor’s expense to a condition at least as good or better as originally existed.

C-5.11 EXISTING STRUCTURES:

The Plans show the locations of all known surfaces and subsurface structures. However, the exact location of gas mains, water mains, conduits, sewer etc., is unknown and the Owner assumes no responsibility for failure to show any of these structures on the Plans or to show them in their exact location. It is mutually agreed such failure will not be considered sufficient basis for claims for additional compensation for extra work or for increasing the pay quantities in any manner whatsoever, unless the obstruction encountered is such as necessitates, or requires the building of special work, provision for which is not made in the Plans and Proposal, in which case the provisions in these Specifications for extra work shall apply.
CONTROL OF WORK AND MATERIALS

C-6.01 AUTHORITY OF ENGINEER:

The work will be observed, tested and inspected by the Engineer, and performed to his satisfaction, in accordance with the Contract, Plans and Specifications. The Engineer will decide all questions which may arise as to the quality and acceptability of materials furnished and work performed, as to the manner of performance and rate of progress of said work, as to the interpretation of the Plans or Specifications relating to the work, as to the fulfillment of the Contract on the part of the Contractor and to the rights of different Contractors on the project.

The decisions of the City Engineer will be final.

C-6.02 CITY ENGINEER AS REFEREE:

The City Engineer will act as referee in all questions, arising under the terms of the Contract between the parties thereto, and his decisions shall be final and binding.

C-6.03 ADEQUACY OF DESIGN:

It is understood that the Owner selected the Engineer named herein to prepare the Plans and Specifications, and all supplements thereto, and it is agreed that the Owner will be responsible for the adequacy of the design, sufficiency of the Plans and Specifications, and safety of structures, provided the Contractor has complied with said Plans and Specifications, all modifications thereof, and additions and alterations thereto approved by the Engineer. The burden of proof shall be upon the contractor to show that he has fully complied with the Plans and Specifications, all modifications thereof, and all additions and alterations thereof.

C-6.04 PLANS:

Plans will show the lines, grades, cross sections, details and general features of the work. Where shop drawings or working drawings are required, they shall be furnished by the Contractor and approved by the Engineer. Authorized alterations to the Plans will be endorsed on approved copies of the Plans or shown on supplementary sheets.

The approval by the Engineer of the Contractor’s shop drawings or working drawings will not relieve the Contractor of any responsibility under the Contract.

The Contractor shall furnish the Engineer with such blue print copies of shop drawings or working drawings as may be required for approval and for the purposes of supervision.
The contract price shall include the cost of furnishing all such prints.

C-6.05 CONFORMITY WITH PLANS:

The finished work shall conform with the lines, grades, cross sections, details and dimensions shown on the Plans. Such deviations from the Plans as may be required will, in all cases, be determined by the Engineer and authorized in writing.

C-6.06 COORDINATION OF PLANS AND SPECIFICATIONS AND SUPPLEMENTAL AGREEMENTS:

The Plans, Specifications, and supplemental agreements are essential parts of the Contract, and a requirement occurring in one is as binding as though occurring in all. In case of disagreement, Plans shall govern over “Technical Provisions,” and “Special Provisions” shall govern over “Technical Provisions.” The Contractor shall not take advantage of any apparent error or omission on the Plans or Specifications. In the event the Contractor discovers any apparent error or discrepancy, he shall immediately call upon the Engineer for his interpretation and decision, and such decision shall be final.

C-6.07 COOPERATION OF CONTRACTOR:

The Contractor shall give the work the constant attention necessary to facilitate the progress thereof and shall cooperate with the Engineer and with other Contractors in every way possible.

The Contractor shall have on the work at all times, a satisfactory and competent English-speaking Superintendent, authorized to receive order, and act for him as his agent. The Contractor shall designate to the Engineer in writing the name of such Superintendent, and the designated Superintendent may not be removed from the work without the written permission of the Engineer.

C-6.08 CONSTRUCTION STAKES:

The Contractor shall furnish and set at his own expense any and all construction stakes and blue tops as seems necessary for the satisfactory prosecution of the work.

Any missing construction stakes which have been destroyed by the different utility companies, vandals and/or the contractor at the time of construction will be replaced by the contractor at this own expense.
The Engineer may, at his option, make spot or complete checks on all construction alignment and grades to determine the accuracy of the contractor's survey work. These checks, however, will not relieve the Contractor of his responsibility of constructing the work to the lines and grades as shown on the plans or approved change orders. Computations, sketches, and other drawings used in the design and layout of this project will be made available to the Contractor, however these items will not relieve the contractor of his responsibility.

C-6.09 QUANTITIES OF MATERIALS:

It shall be the responsibility of the Contractor to verify all quantities of materials shown on the Plans before ordering such materials. Payment is provided for acceptable materials, and materials rejected due to improper fabrication or excess quantity or other reasons within the control of the Contractor will not be paid for regardless of the quantities or dimension shown on the Plans.

C-6.10 APPROVAL OF MATERIALS:

The sources of supply of materials shall be subject to the approval of the Engineer. Representative samples of materials proposed for use shall be submitted, if required, for examination and testing by an independent testing laboratory selected by the City.

Results obtained from testing such samples may be used for preliminary approval, but will not be used as final acceptance of materials. All materials proposed for use may be inspected or tested at any time during their preparation or use.

If at any time, it is found that sources of supply which have been approved do not furnish a product of uniform quality, or if the product becomes unacceptable at any time, the Contractor shall furnish approved material from another source.

Any material, which after approval has for any reason become unfit for use, shall not be incorporated into the work.

C-6.11 SAMPLES AND TESTS:

Samples and testing procedures shall conform to the requirements of appropriate designations of the American Association of State Highway Officials or the American Society for Testing Materials.

Test for determining the fitness of materials; tests for the purpose of obtaining preliminary approval of materials; tests for determining concrete mixes will be at the expense of the Contractor. Tests for the actual control of the work, such as soil compacting tests and concrete compressive strength test, will be at the expense of the Owner. Any and all retesting because of failure in soil compaction
or concrete compressive strength tests shall be done at the expense of the Contractor. Tested and accepted subgrade shall be covered and protected with the flexible base within a maximum of seven (7) days. Tested and accepted flexible base shall be primed and cured a minimum of seventy two (72) hours and shall be cured with asphalt within seven (7) days. Failure to comply with the seven (7) days limitations may result in the need for re-testing at the Contractors expense depending on weather conditions and at the discretion of the Engineer. The Contractor shall provide such facilities as the Engineer may require for conducting field tests and collecting and forwarding samples. All sampling and testing shall be under the control of the Engineer and shall be done in laboratories approved by him.

C-6.12 STORAGE:

Materials shall be stored as to insure the preservation of the quality and fitness for the work. Material which is not, in the opinion of the Engineer, properly stored and protected will not be included as material in hand in the estimates.

C-6.13 AUTHORITY AND DUTIES OF INSPECTORS:

Inspectors employed by the Owner shall be authorized to inspect all work done in any part of the project and all preparation, fabrication, or manufacturer of the materials to be used.

The Inspector shall be authorized to call to the attention of the Contractor any failure of the work or materials to conform to the Specifications or the Plans. He will in no case act as foreman or perform other duties for the Contractor, nor shall he interfere with the management of the work. In the event the Contractor does not comply with the requirements of the Owner and the Engineer, he may stop all work until the non-compliance is corrected.

If the progress of the work becomes unduly delayed because of negligence on the part of the Contractor, the Inspector shall notify the Owner and the Engineer, who may require the Contractor to give reasons for the delay. If it is found that the Contractor is at fault, then it is the prerogative of the Owner to demand correction.

Inspection as provided herein shall not relieve the Contractor from any obligation to perform the work in conformity with the requirements of the Plan and Specifications. No Inspector shall be authorized to revoke, alter, enlarge or release any requirements of the Plans and Specifications, or to issue instructions contrary to the Plans and Specifications, or to approve or accept any portion of the work.

The Contractor shall furnish every reasonable facility for ascertaining whether or not the work is performed in accordance with the Plans and Specifications.
No backfill shall be made unless inspected by the Engineer or the City’s representative designated in writing and verbal approval of field Engineer is given to such work; if the Contractor should backfill any work without such inspection and approval, the Contractor shall remove or uncover such portions of the finished work as may be directed. After examinations, the Contractor shall restore said portion of the work to the standard required by the Plans and Specifications. Should the work thus exposed and examined prove acceptable or unacceptable, the uncovering or removing and the replacing of the covering or making good of the parts removed shall be done at the Contractor’s expense.

C-6.14 SUSPENSION OF WORK:

In case of any dispute arising between the Contractor and the Inspector as to materials furnished or the manner of performing the work, the Inspector shall have authority to reject materials or suspend work until the question at issue can be referred to and decided by the Engineer.

If the Contractor refuses to suspend work on verbal order, the Inspector shall issue a written order to suspend work giving the reason for such suspension. After placing the order in the hands of the Contractor’s man in charge, the Inspector shall immediately leave the job. Work done during the absence of the Inspector shall not be paid for.

C-6.15 REMOVAL OF DEFECTIVE AND UNAUTHORIZED WORK:

All work which has been rejected or condemned shall be repaired or removed and replaced as the Engineer may direct, at the expense of the Contractor. Materials not conforming to the requirements of the Plans and Specifications shall be removed immediately from the site of the work and replaced with satisfactory material at the expense of the Contractor.

Work done without lines and grades, work done beyond the lines and grade shown on the Plans, work done without inspection, or any extra or unclassified work done without written authority and prior agreement in writing as to the prices will be done at the Contractor’s risk and will be considered unauthorized. At the option of the Engineer, such work may not be measured and paid for, or may be ordered removed and replaced at the expense of the Contractor.

Upon the failure of the Contractor to repair satisfactorily or to remove and replace rejected, unauthorized, or condemned work or materials immediately after receiving formal notice from the Engineer, the Owner may at his own option:

a. Recover for such defective work or materials on the Contractor’s bond, or;
b. Recover from such defective work or materials by action in a court having proper jurisdiction in such matter, or;

c. Employ labor and equipment and satisfactorily repair, or remove and replace, such defective work or materials and charge the cost of same to the Contractor, which cost will be deducted from any money due him.

C-6.16 DISPUTED CLAIMS FOR EXTRA WORK:

In case the Contractor deems extra compensation is due him for work or materials not clearly covered in the Contract, or not ordered by the Engineer as “EXTRA WORK”, the Contractor shall notify the Engineer in writing of his intention to make claim for such extra compensation before he begins the work on which he bases the claim and shall afford the Engineer every facility for keeping actual cost of the work.

Failure on the part of the Contractor to give such notice or to afford the Engineer every facility for keeping account of actual cost of the work shall constitute waiver of the claim for extra compensation. The filing of such notice by the Contractor and the keeping of cost by the Engineer shall not in any way be construed to prove the validity of the claim. Extra work of any kind should only be performed by Contractor upon receipt of an approved Change Order issued by Owner. When the work has been completed, the Contractor shall within ten (10) day file claim for extra compensation with the Engineer, who will present it to the Owner for consideration.

C-6.17 FINAL INSPECTION

Whenever the work provided for under the Contract has been satisfactorily completed and the final cleaning up performed, the Contractor shall notify the Engineer to make the “Final Inspection”. Such inspection will be made within ten (10) days of such notification. After such final inspection, if the work is found to be satisfactory, the Contractor will be notified in writing of the acceptance of same. No time charge will be made against the Contractor between the date of notification of the Engineer and the date of the final inspection.
LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC

C-7.01 LAWS TO BE OBSERVED:

The Contractor shall make himself familiar with and shall observe and comply with, all Federal, State, and local laws, ordinances and regulations which in any manner affect the conduct of the work, and shall indemnify and save harmless the Owner and the Owner’s representative against any claim arising from the violation of any such law, ordinance, or regulation, damages to public or private property whether by himself or by his employees and whether said work is in public property or right-of-way, temporary construction easements, dedicated easements, or staging/storage areas.

C-7.02 PERMITS AND LICENSES:

The Contractor shall procure all permits and licenses, pay all charges and fees, and give all notices necessary to the due and lawful prosecution of the work.

C-7.03 PATENTED DEVICES, MATERIALS AND PROCESSES:

If the Contractor is required or desires, to use any design, device, material or process covered by letters, patent, or copyright, he shall provide for such use by suitable legal agreement with the patentee or Owner of such patent. The Contractor and his surety shall indemnify and save harmless the Owner from any and all claims for infringement by reason of the use of any such patented design, device, material, or process, or any trademark or copyright in connection with the work agreed to be performed under this Contract, and shall indemnify the Owner for any costs, expenses, and damages which it may be obliged to pay for reasons of any such infringement at any time during the prosecution, or after the completion of the work.

C-7.04 PUBLIC, SAFETY AND CONVENIENCE:

The safety of the public and the convenience of traffic shall be regarded as of prime importance during construction and provisions thereof, made necessary by the work, shall be the direct responsibility of the Contractor, and shall be performed at his own expense.

Where the Contractor is required to construct temporary crossings for streams, culverts, ditches or trenches, his responsibility for accidents shall include the approaches as well as the structures of such crossing.

C-7.05 SANITARY PROVISIONS:
The Contractor shall, at his own expense, provide and maintain in a neat, sanitary condition such accommodations for the use of his employees as may be necessary to comply with the requirements or the State Department of Health and of other authorities having jurisdiction.

C-7.06 BARRICADES AND WARNING SIGNS:

The Contractor shall furnish and maintain adequate barricades, warning and directing signs, red flags, lights and other traffic control devices as are necessary to comply with the latest edition of the TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREET AND HIGHWAYS.

All provisions of barricades and warning signs shall be considered an incidental and necessary part of the work and no direct payment will be made therefore. All costs of providing such safe guards shall be included in the prices bid for other parts of the work.

C-7.07 USE OF EXPLOSIVES:

When the use of explosives is necessary in the prosecution of the work, the Contractor shall use the utmost care not to endanger life or property. All explosives shall be stored in a secured manner and all storage places shall be marked clearly with the words “DANGEROUS EXPLOSIVES”. The method of storing and handling explosives and highly inflammable materials shall conform to the requirements of Federal and State laws and regulations. The Contractor shall not use explosives until he has taken the legal precautions necessary to save harmless the Owner from any claims arising from such use of explosives.

C-7.08 PROTECTION AND RESTORATION OF PROPERTY:

The Contractor shall take all measures necessary to protect public or private property which might be injured by any process of construction, and in case of any injury or damage to said property, he shall restore at his own expense the damaged property to a condition similar or equal to the existing before such injury damage was done, or he shall make good such injury or damage in an acceptable manner.

Where the work involves excavation any public or private driveway, alley street or roadway, the Contractor shall do any work necessary to restore such driveway, alley, street or roadway to a condition similar or equal to that existing before such work was done. The Contractor shall be responsible for any subsidence of backfill or pavement failure due to such excavation, and shall promptly repair any such subsidence or failure.
C-7.09 PROTECTION OF EXISTING UTILITIES:
The Contractor shall contact the utility company for exact location prior to doing any work that might interfere with or damage present utilities.

The Contractor shall take all measures necessary to protect existing surface drains, seers, underdrains, conduits, utilities, or similar underground structures, and to provide temporary service when service in any of these is interrupted.

When such facilities are encountered, the Contractor shall notify the Engineer who will arrange for their removal, if necessary. Any utility lines cut or damaged shall be repaired and restored to working conditions as determined by the Engineer.

C-7.10 RESPONSIBILITY FOR DAMAGE CLAIMS:
The Contractor shall save harmless the Owner from all suits, action in or claims brought on account of any injuries or damages sustained by any person or property in consequence of any neglect in safeguarding the work by the Contractor; or on account of any claim or amount recovered for any infringement of patent or reward under the “Workmen’s Compensation Laws” or any other laws. He shall be held responsible for all damage or injury to property of any character occurring during the prosecution of the work resulting from any omission, neglect, or misconduct on his part in the manner or method executing the work, or from defective work or materials.

C-7.11 RESPONSIBILITY FOR THE WORK:
Until acceptance of the work by the Engineer, in writing, it shall be under the charges and care of the Contractor. The Contractor shall rebuild and make good at his own expense all injuries and damage to the work occurring before its completion and acceptance. In case of suspension of work for any cause, the Contractor shall be responsible for all the preservation of all materials.

C-7.12 USE OF COMPLETED WORK:
Whenever, in the opinion of the Engineer, any portion of the work is in acceptable conditions, it may be entered upon and used by the Owner upon the written order of the Engineer. Such use shall be held as an acceptance of that portion of the work, but not be considered as a waiver of any of the provisions of these Specifications. Pending final completion and acceptance of the entire work, all necessary repairs and renewal of any part of the work so used, due to defective material or work, to natural causes other than wear and tear, or to the operations of the Contractor, shall be performed by the Contractor at his own expense.
C-7.13 NO WAIVER OF LEGAL RIGHT:
Inspection by the Engineer or by any of his duly representatives, any order, measurement, or certificate by the Engineer; any order by the Owner for the payment of money, any payment for or acceptance of any of work, or extension of time; or any possession taken by the Owner shall not operate as a waiver of any provision of the Contract, or any power therein preserved to the Owner, or of any right to damages therein provided. A waiver of any breach of the Contract shall not be held to be a waiver of any other or subsequent breach.

The Owner reserves the right to correct any error that may be discovered in any estimate that may have been paid, and to adjust that or any subsequent estimate to meet the requirements of the Contract. The Owner reserves the right to claim and recover sums as may be sufficient to correct any error or make good any deficit in the work resulting from error, dishonesty, or collusion in the work after the final payment has been made.

C-7.14 RESPONSIBILITIES OF PARTIES AS TO UTILITY WORK:

It shall be the responsibility of the Contractor to check and coordinate his work with the public and private utility companies which have authority from the City of Laredo to own and operate lines, pipes, conduits, or other means of conveyance within the streets Right-of-Way. The Contractor shall contact the Engineer concerning any and all utility relocation work needed, and it shall be the responsibility of the Contractor to advise the Engineer of any lines or utility poles to be relocated. The Engineer shall assist in coordinating the various utility relocation activities but shall not be responsible for any delays occasioned by this work, although appropriate allowance for additional contract time will be made by the Engineer if warranted. The Owner shall not be responsible for any acts of the Contractor or any damages resulting from work done by the Contractor relating to the removal, alteration, or other activity concerning utilities.

C-7.15 KEY POINTS OF PUBLIC RIGHT-OF-WAY ORDINANCE:

1.) All projects in public R.O.W. must go through Utility Coordination Committee.
2.) All Contractors must be registered at The Building Development Service Department at 794-1625 to be able to work in public R.O.W.
3.) All work in Public R.O.W. requires a permit from The Building Development Services Department and subject to inspections by same. Any additional inspections requested after normal working hours of 8 am to 5 pm Monday to Friday and Saturday and Sunday and holidays are charged at premium rates. Permits must be secured prior to pre-construction meeting.
4.) All work done in Public R.O.W. that impedes the flow of traffic or pedestrian path requires a traffic control plan or pedestrian accessibility.
5.) Contractor must provide certificate of insurance. Insurance must be liability, workman compensation and performance bond.
C-8.01 RIGHT-OF-WAY:

The Owner will furnish all and or right-of-way necessary for the performance of the contract and will use due diligence in acquiring land or right-of-way. Should all necessary land or right-of-way not be acquired prior to the beginning of construction, the Contractor shall begin with work upon such land or right-of-way as the Owner may have acquired.

C-8.02 DELAYS DUE TO OWNER:

Should the Owner be prevented or enjoined from proceeding with the work or authorizing its prosecution, either before or after its commencement, by reason of any litigation or by reason of the Owner’s inability to acquire necessary land or right-of-way, the Contractor shall not entitled to make or assert any claim for damage by reason of such delay, or to withdraw from the contract except by consent of Owner.

The time for completion of the work will be extended by such time as determined by the Engineer as will compensate for the time lost by reason of said delay.

C-8.03 SUBLETTING OR ASSIGNING OF CONTRACT:

The “City” does not allow, permit, negotiate, authorize nor approve any assignment of contract proceeds between the “City”, the “Contractor”, and/or with a bank, lending institution or any type of financial institution either before, during or after a contract award.

The “City” agrees to pay the “Contractor” for specified services as stated in the agreed contract. The “City” does not agree to pay any additional party either jointly or separately for the contract under discussion.

C-8.04 SUBCONTRACTING:

The Owner will not recognize any subcontractor on the work. The Contractor shall be fully responsible to the Owner for the acts and omissions of his subcontractors, and of persons either directly or indirectly employed by them.

C-8.05 PROSECUTION OF WORK:

Prior to beginning of the work, the Contractor shall submit to the Engineer such schedules, charts, or briefs as may be required, outlining the manner of prosecution of the work. The contractor shall begin the work within ten (10) calendar days after the date set in the “Work Order” or notice to proceed and shall continuously prosecute same with such diligence as will enable him to complete the work within the time specified. Upon completion of work submit forms of

The contractor shall notify the Engineer at least twenty-four (24) hours prior to the beginning at any point. He shall not begin new portions of the work to the detriment of portions already begun.

Owner’s normal working hours are Monday through Friday from 8:00 AM to 5:00 PM. The contractor shall notify the owner at least twenty-four (24) hours in advance for any work that is to be scheduled beyond the limits of the owner’s working hours, and he shall not begin any such work schedule unless proper inspection by the Contractor has been pre-arranged with the Owner, with the cost for such work beyond the owner’s working hours borne by the Contractor. For Clarification, See Division B - Section 4 “Inspection by City”.

If at any time the methods, equipment, or sequence of operations sued by the Contractor are found to be inadequate to secure the quality of the work or rate of progress required by the contract, the Engineer may in writing order such modifications in the Contractor’s methods, equipment, or sequence of operations as he may deem necessary and the contractor shall comply with such order.

C-8.06 WORKMEN AND EQUIPMENT:

All workmen employed by the Contractor shall be skilled and competent. Any person employed by the Contractor who in the opinion of the Engineer does not perform his work in a proper and skillful manner or who is disrespectful, intemperate, disorderly, or otherwise objectionable shall at the written order of the Engineer be immediately removed from the work and shall not be employed again on any part of the work without written consent from the Engineer.

The Contractor shall furnish and use such suitable machinery and equipment as may be required in the opinion of the Engineer to properly prosecute the work. The Contractor shall at the written order of the Engineer remove from the work any equipment found unsuited to properly perform the work.

Upon failure of the Contractor remove the work any person or equipment as ordered by the Engineer, the Engineer may withhold all estimates which have or may become due, or may suspend the work until such orders are complied with.

C-8.07 TEMPORARY SUSPENSION OF WORK:

The Engineer shall have the authority to suspend the work wholly or in part for such period or periods as he may deem necessary due to unsuitable weather, or such other conditions as are considered unfavorable for the prosecution of the work or for such time as is necessary due to failure on the part of the Contractor to comply with orders given or to perform any or all provisions of the contract.
If work is stopped for an indefinite period, the Contractor shall store all materials in such manner that they will not become an obstruction nor become damaged in any way, and he shall take every precaution to prevent damage or deterioration of the work performed.

The Contractor shall not suspend the work without written authority from the Engineer and shall proceed with the work promptly when notified by the Engineer to resume operations.

C-8.08 COMPUTATION OF CONTRACT TIME:

The Contractor shall complete the work within the number of days stated in the contract. The number of days used shall be the number of days from the first day of actual commencement of operations or the 10th day after the date set in the Work Order or Notice to Proceed whichever comes first, and counting that day as the first elapsed day of contract time.

If the completion of the contract requires unforeseen work, or work and materials in greater quantities than those set forth in the proposal, then additional days or suspension of time charge will be allowed the Contractor equal to the time which in the opinion of the Engineers the work as a whole is delayed.

C-8.09 FAILURE TO COMPLETE THE WORK ON TIME:

The time set forth in the proposal for the completion of the work is an essential element of the contract. If the contractor fails to complete the work in the number of contract days specified, a time charge will be made for each day thereafter until the work has been satisfactorily completed.

An amount per day is set forth in the Division B Section 1, and said amount is to be deducted from the amount due the Contractor for each day charged in excess of the number specified, the time charge shall be based on the total days of such delay. Such deductions shall be considered liquidated damages and may be used as compensation to the Owner for the added expenses for engineering supervision, testing, inspection, and other costs.

C-8.10 ABANDONMENT OF WORK OR DEFAULT OF CONTRACT:

The Engineer may give notice in writing to the Contractor and his surety of delay, neglect, or default stating which if the Contractor:

- Fails to begin work within the time specified, or fails to perform the work with sufficient workmen and equipment;

- Fails to provide materials of sufficient quantity to insure the completion of the work within the contract time; or

- Performs the work unsuitable; or
- Neglects or refuses to remove materials or perform new work such as may have been rejected; or

- Discontinues the work without authority; or

- Refuses to suspend or resume operations when so directed by the Engineer; or

- Becomes insolvent or is declared bankrupt; or

- Commits any act of bankruptcy insolvency; or

- Makes an authorized assignment for the benefit of any creditor; or

- Fails from any other cause whatsoever to carry out the work in an acceptable manner.

The ten (10) days after such notice if given, if a satisfactory effort has not been made by the Contractor or his surety to correct such delay, neglect, or default, the Owner may declare the work abandoned and so notify the Contractor and his surety.

After receiving such notification of abandonment, the Contractor shall not remove from the work any machinery, equipment, tools, materials or supplies then on the site. The Owner shall have the power and authority without violating the contract to take prosecution of the work out of the hands of the contractor and to appropriate or use any or all materials and equipment on the site as may be suitable and acceptable and enter into an agreement for the completion of the contract according to the terms and provisions thereof, or use such other methods as he may elect for the completion of the contract in an acceptable manner.

All costs and charges incurred by the Owner, together with the cost of completing the work under the contract shall be deducted from any money due or which may become due to the contractor. In the case the cost to the Owner is less than the amount which would have been payable under the contract if it had been completed by the Contractor, then the Contractor shall be entitled to receive the difference. In case the cost to the Owner exceeds the amount which would have been payable under the contract, if it had been completed by the Contractor, the Contractor and his surety shall be liable and shall pay the Owner the amount of such excess.
MEASUREMENT AND PAYMENT

C-9.01 MEASUREMENT OF QUANTITIES:

All work completed under the Contract will be measured in United States standard measures. Linear and surface measurements will be taken horizontally unless otherwise shown on the Plans. Structures will be measured to the neat lines shown on the Plans.

When any material is cubic yards in the vehicle, such measurement will be made at the point of delivery. The capacity of each vehicle shall be plainly marked on said vehicle and the capacity of marking shall not be changed without written permission of the Engineer. The Engineer shall have authority to require all vehicles to have uniform capacity.

C-9.02 SCOPE OF PAYMENT:

The Contractor shall accept the payment as provided in this Contract as full compensation for furnishing all materials, equipment, tools, labor and incidentals necessary to complete the work and for performing all work contemplated and embraced under this contract, as full compensation for loss or damage arising from the nature of the work, or from action of the elements, or from any unforeseen difficulties which may be encountered during the prosecution of the work; as full compensation for all expenses incurred in consequence of the suspension or discontinuance of the work; as full compensation for all expenses incurred in consequence of the suspension or discontinuance of the work herein specified; as full compensation for expenses incurred in any infringement of patent, trade-mark, or copyright; and as full compensation for completing the work in conformity with the requirements of the Plans and Specifications. Payment will be made only on items which are complete, in place, tested and accepted by the owner. Materials on hand shall be considered for payment ONLY when proper PAID invoices are submitted with Contractor’s pay estimates. Materials on hand must be placed in a secured area designed for the project under this contract and be available for inspection by City Engineers at all times. The Contractor must provide an inventory of all materials on a form acceptable to the City Engineer and which must accompany each pay request. The payment of any partial or current estimate shall in no way affect the obligation of the Contractor at his own cost to repair or renew any defective parts of the construction or to replace any defective materials used in the construction and to be responsible for all damages due to such defects. Any items to complete the work indicated on plan shall be considered subsidiary to include positions of work and no further compensation will be made.
No monies payable under this contract, except the estimate for the first month or period, shall become due and payable until the Contractor shall satisfy the Owner that he has fully settled and paid for all materials and equipment used in or upon the work and labor done in connection therewith and the Owner may if he so elects pay any or all bills wholly or in part, and deduct the amount or amounts paid from any estimate(s) except the first estimate.

In event the surety on any bond given by the Contractor becomes insolvent or is placed in the hands of a receiver or has its right to do business in the State revoked by Law, the Owner may if he so elects withhold payment of any or all estimates until the Contractor shall give a good and sufficient bond in lieu of the bond so executed by said surety.

C-9.03 PAYMENT FOR ALTERED QUANTITIES:

When alterations in the Plans or quantities of work not requiring supplemental agreements are ordered and performed, the Contractor shall accept payment in full at the contract price for the actual quantities of work done. No allowance for anticipated profits will be made. Increased or decreased work involving supplemental agreements will be paid for as stipulated in such agreements.

C-9.04 PAYMENT FOR OMITTED ITEMS:

When any item ordered omitted from the Contract, the Contractor shall accept payment in full at the contract price for any work actually performed on such item prior to the date of issuance of such order. No allowance will be made for anticipated profits on work ordered omitted. Acceptable materials ordered by the Contractor, or delivered on the work prior to the date of issuance of such order will be paid for at the actual cost to the Contractor and shall thereupon become the property of the Owner. The Contractor shall submit immediately certified statements covering all money expended in the preparation for any item ordered omitted and shall be entitle to reimbursement for any money expended in preparation for any items when such preparation is of no value to the remaining items of the Contract.

C-9.05 PAYMENT FOR EXTRA WORK:

Extra work performed under a supplemental agreement will be paid for according to the terms of such supplemental agreement. Extra work if performed on a force account basis will be paid for as follows:
For all labor and foreman, the Contractor will receive the wage paid on the project for each hour that said labor and foremen are actually engaged on such work to which shall be added the actual cost of premiums for public liability and workmen’s compensation insurance and social security taxes for the actual amount of such payroll.

For all materials used on such work the Contractor will receive the actual cost of such materials including freight charges.

For machinery and equipment used on such work the Contractor will receive an agreed rental price for each hour that such machinery and equipment is actually used on such work. The agreed price shall include the cost of fuel, lubrication and repairs.

To the sum of the foregoing an amount equal to fifteen (15) percent thereof will be added, as compensation for the use of small tools, Superintendent’s services, timekeeper’s services.

Premium on bond and all other overhead expenses incurred in the prosecution of the extra work including Contractor’s profit.

The sum of such payments provided for shall be accepted by the Contractor’s as full compensation as provided in C-9.02.

C-9.06 PARTIAL PAYMENTS:

Once a month and within the thirty (30) days after submittal of a correct and complete estimate, the Owner shall make a progress payment to the basis of a duly certified and approved estimate of the work performed during the preceding calendar month under this Contract. To insure the proper performance of the Contract, the Owner shall retain ten (10) percent ** of the amount of each estimate until final completion and acceptance of all work covered by this Contract.

**NOTE Retainage for construction contracts over four hundred thousand ($400,000) shall be five (5) percent.

In the event that the base bid is less than fifty thousand ($50,000) the total contract price will be paid in one payment upon completion and acceptance of the project.

Should any defective material or work be discovered or should a reasonable doubt arise as to the integrity of any part of the work completed prior to final acceptance and payment, there will be deducted from the first estimate presented after the discovery of such work, an amount equal to the value of the defective or questionable work. Such defective work
will be made from all subsequent estimates until the defects have been remedied or the cause for doubt removed.

C-9.07 TERMINATION OF THE CONTRACT BY THE CONTRACTOR:

If the work is stopped for a period of thirty (30) days under an order of any court of other public authority having jurisdiction, or as a result of an act of government, such as declaration of a national emergency making materials unavailable, through no act or fault of the Contractor or subcontractor or their agents or employees or any other persons performing any of the work under a Contract with the Contractor, or if the work should be stopped for a period of thirty (30) days by the Contractor because the Engineer has not issued a Certificate for payment as provided in C-9.06 or because the Owner has not made payment within the ten (10) days after such stopping of work, then the Contractor may, upon seven (7) additional days written notice to the Owner and the Engineer, terminated the Contract and recover from the Owner payment for all work executed and for any proven loss sustained upon any materials, equipment, tools, construction equipment and machinery, including reasonable profit and damages.

C-9.08 TERMINATION OF THE CONTRACT BY THE OWNER:

If the Contractor is adjudged a bankrupt, or if he makes a general assignment for the benefit of his creditors, or if a receiver is appointed on account of his insolvency, or if he persistently or repeatedly refused or fails, except in cases for which extension of time is provided, to supply enough properly skilled workmen, or proper materials, or if he fails to make prompt payment to Subcontractors or for materials or labor, or persistently disregards laws, ordinances, rules, regulations or orders of any public authority having jurisdiction, or otherwise is guilty of a substantial violation of a provision of the Contracts Documents, then the Owner, upon certification by the Engineer that sufficient cause exists to justify such action, may without prejudice to any right or remedy and after giving the Contractor and his surety, if any, seven (7) days written notice, terminate the employment of the Contractor and his surety, if any, seven (7) days written notice, terminate the employment of the Contractor and take possession of the site and of all materials, equipment, tools, construction equipment and machinery thereon owned by the Contractor and may finish the work by whatever method he may deem expedient. In such case the Contractor shall not be entitled to receive any further payment until the work is finished.

C-9.09

If the unpaid balance of the Contract Sum exceeds the costs of finishing the work, including compensation for the Engineer’s additional services made necessary thereby,
such excess shall be paid to the Contractor. If such costs exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or to the Owner, as the case may be, shall be certified by the Engineer, upon application, and this obligation for payment shall survive the termination of the Contract.

C-9.10 ACCEPTANCE OF FINAL PAYMENT:

When the work provided for in the contract has been completed and the final inspection has been made by the Engineer, and all parts of the work have been approved and accepted, the final estimate showing all sums due the Contractor shall be prepared. All prior partial estimates and payments shall be subject to correction in the final estimate and payment. No payment on the final estimate will be made until the Contractor furnishes satisfactory evidence that all claims growing out of lawful demands of laborers, work, men, mechanics, subcontractors, material, men, furnishers of machinery and parts thereof, and suppliers of all kinds have been satisfied. Upon final payment the Contractor shall execute a certificate and release upon the Owner on the form specified.

C-9.11 AFFIDAVIT OF PAYMENT OF DEBTS AND CLAIMS AND RELEASE OF LIENS and PROOF OF INSURANCE:

Each and every pay estimate must be accompanied by an “Affidavit of Payment of Debts and Claims and Release of Liens” form (sample of which follows this Section); and copies of proof of current insurances for the project.

C-9.12 MATERIALS ON HAND INVENTORY:

When materials on hand payment is requested, and “Inventory of Materials on Hand” is required and must be included with Contractor’s Pay Estimate. Proof of payment for materials on hand is also to be included with the Materials Inventory. A sample form follows this section.

C-9.13 PHOTOGRAPHS:

The Contractor shall submit with each monthly progress pay estimate four (4) each 3 ½” x 5” color photographs depicting generally the work done during that month, and each photograph properly identified and dated.
# Project Acceptance Requirements

Items required by The City of Laredo for Acceptance of the Project.

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Consultant</th>
<th>Contractor</th>
<th>Date</th>
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<tbody>
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<tr>
<th>REQUIRED ITEMS</th>
<th>SUBMITTED</th>
<th>RESUBMIT</th>
<th>COMMENTS</th>
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<tr>
<td>Completion of Punch List</td>
<td>YES</td>
<td>N/A</td>
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<tr>
<td>Engineers / Architects Completion Report</td>
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<tr>
<td>Affidavit of Payments of Debts &amp; Claims &amp; Release of Liens from the Contractor.</td>
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<tr>
<td>Warranty Letter from the Contractor to the City of Laredo</td>
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<tr>
<td>Warranty Statement Form</td>
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<tr>
<td>Certificate of Occupancy from Building Development Services</td>
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<tr>
<td>Legal Description &amp; Physical Address</td>
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<tr>
<td>Reproducible Record Drawings</td>
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<tr>
<td>Electronic Record Drawings (CD with PDF files /ACAD)</td>
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<tr>
<td>Final Payment Request</td>
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</table>
**CITY OF LAREDO**

**CONTRACTOR’S APPLICATION FOR PAYMENT**

**PROJECT:**

**ESTIMATE NO.:**

**DATE FROM:**

**TO:**

**ORIGINAL CONTRACT:**

**TOTAL WORK TO DATE:** $

**CHANGE ORDERS:**

**MATERIALS ON HAND:** $

**10% RETAINAGE:** $

**TOTAL TO DATE:**

**PREVIOUS PAYMENTS:** $

**% COMPLETE:**

**AMOUNT DUE:** $

**CERTIFICATE OF CONTRACTOR:**

I certify that all items and amounts shown on this request for partial payment are correct and that all work has been performed and/or materials supplied in full in accordance with the requirements on the contract documents.

(Contractor) By: ____________________________

Signature Date

__________________________

Print Name

**CERTIFICATE OF FIELD REPRESENTATIVE:**

I have checked this request for partial payment against the notes and reports of my inspections of the project and in my opinion the statement of work performed and/or material supplied is accurate and that the contractor is observing the requirements of the contract documents.

(Inspector) By: ____________________________

Signature Date

__________________________

Print Name

**CERTIFICATE OF ENGINEER:**

I certify that I have checked and verified the above and foregoing request for partial payment and that it is a true and correct statement of work performed and/or material supplied by the contractor and that same has been performed and/or supplied in full accordance with the requirements of the contract documents.

(Consultant) By: ____________________________

Signature Date

__________________________

Print Name

**RECOMMENDED FOR PAYMENT:**

Ramon E. Chavez, P.E., P.E, City Engineer

DATE: ____________________________

**VERIFIED FOR PAYMENT:**

Engineering Project Manager

DATE: ____________________________

**APPROVED FOR PAYMENT:**

DATE: ____________________________

Finance Department
AFFIDAVIT OF PAYMENT OF DEBTS AND CLAIMS
AND RELEASE OF LIENS

TO: CITY OF LAREDO
WEBB COUNTY, TEXAS

PROJECT: ____________________________________

By this instrument the undersigned contractor engaged in the construction of the above project
certifies that on this date, or anytime prior thereto, except listed below, contractor has paid in full
or has otherwise satisfied all obligations for all materials and for all known indebtedness and
claims against the project, its land, improvements and equipment of every kind.

The undersigned hereby certifies that he has received all payments currently due under his
contract for work on the project above referred. Therefore, the undersigned does hereby waive
and/or release any and all liens against the property, project and as of the __________ day of
__________, ___________

________________________________________
Company Name

STATE OF TEXAS:

COUNTY OF _____________:

Before me, the undersigned authority, on this day personally appeared ____________________,
known to me to be the person whose name is subscribed to the foregoing instrument, and being
first duly sworn, acknowledge to me that he executed the same for the purposes and
consideration therein expressed and declared to me that the statements therein are true.

SWORN AND SUBSCRIBED TO before me this _____________ day of ____________.
___________.

NOTARY PUBLIC

MY COMMISSION EXPIRES:
# MATERIALS ON HAND INVENTORY

Project: 
Contractor: 

Estimate No. Dates: From to

<table>
<thead>
<tr>
<th>No.</th>
<th>Invoice No.</th>
<th>Vendor</th>
<th>Balance Last Period</th>
<th>Received Current</th>
<th>Placed Current</th>
<th>Balance</th>
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*Div C-9 Measurement and Payment*

*Page 9 of 11*
DATE:

Mr. Ramon E. Chavez, P.E., City Engineer
City Engineer
City of Laredo
1110 Houston St.
Laredo, Texas 78040

Re:

Dear Mr. Chavez:

__________________________ guarantees all materials and workmanship on the above referred project to be free of defects for a period of one (1) year from the date of acceptance by the owner. Upon notice, any defective materials or faulty workmanship developing within this period, will be replace at no cost to the owner.

Sincerely,

___________________________
Company Name

ACKNOWLEDGEMENT

STATE OF TEXAS

COUNTY OF _____________

Before me, Notary Public for and in ______________ County, State of ______________ on this personally appeared ________________________ known to me to be person(s) whose name(s) subscribed to the foregoing affidavit and acknowledge to me that he executed the same for the purpose and consideration expressed therein.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, THIS _______ DAY OF ______________, _____________.

___________________________
Notary Public in and for
____________ County, State of ____________ My Commission Expires:

________________________________
FORM LETTER FOR ENGINEERING COMPLETION REPORT

DATE:

Mr. Ramon E. Chavez, P.E.,
City Engineer
1110 Houston Street
Laredo, Texas 78040

Re:

Dear Mr. Chavez:

In accordance with the contracts between____________________________________ and The City of Laredo, Webb County, Texas, and pursuant to the specifications in the contract documents, I take this opportunity to file this Completion Report with reference to the above mentioned project as follows:

STATE OF _____________________
COUNTY OF ___________________

This is to Certify that I, _______________________________Registered Professional Engineer, have inspected the work accomplished by ___________________________ and, under contract with The City of Laredo, Webb County, Texas, found that workmanship and materials supplied are in accordance with plans and specifications for said project, and as amended by the “AS-BUILT” drawings.

SIGNED THIS THE ____________ DAY OF ___________, 2019.

____________________________
_________________, P.E.

__________________________
P.E. SEAL
City of Laredo  
Warranty Statement Form

Project Information
Name: ______________________________  Location: ______________________________
Cost: _______________________________  State Date: _____________________________
Contract/P.O. #: ________________________  Council Acceptance: ______________________
Completion Date: ________________________

Contractor/Sub-Contractor/Vendor Information
Name: ________________________________  Address: _______________________________
Contact Number: ________________________  Email Address: __________________________

Warranty Information
Coverage Type (Detail):
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
Required Maintenance (Detail):
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
Manuals Received (if applicable): ______________________________  Expiration Date: __________
Copies Provided To: _____________________________________

Warranty Statement
We are the ___________________________________________ contractor for the above indicated project. We guarantee out workmanship, equipment and materials to be free from defects for a period of ______________________________ from the completion date.

Signature: ______________________________  Date: ______________________________

For Warranty Management Office Use Only:
Entered into Warranty Management Tracker? ________________ Entered By ________________
Date Entered: ________________ Warranty Management Acct # Assigned: __________
SECTION C-11

ETHICS COMMISSION RULES

Certificate of Interested Parties (Form 1295):

In 2015, the Texas Legislature adopted House Bill 1295, which added section 2252.908 of the Government Code. The law states that a governmental entity or state agency may not enter into certain contracts with a business entity unless the business entity submits a disclosure of interested parties to the governmental entity or state agency at the time the business entity submits the signed contract to the governmental entity or state agency.

The law applies (with a few exceptions) only to a contract between a business entity and a governmental entity or state agency that either (1) requires an action or vote by the governing body of the entity or agency before the contract may be signed or (2) has a value of at least $1 million. The disclosure requirement applies to a contract entered into on or after January 1, 2016.

Changed or Amended Contracts:

Form 1295 is only required for a change made to an existing contract in certain circumstances: (1) if a Form 1295 was not filed for the existing contract, then a filing is only required if the changed contract either requires an action or vote by the governing body or the value of the changed contract is at least $1 million; or (2) if a Form 1295 was filed for the existing contract, then another filing is only required for the changed contract if there is a change to the information disclosed in the Form 1295, the changed contract requires an action or vote by the governing body, or the value of the changed contract increases by at least $1 million.

As required by law, the Commission adopted the Certificate of Interested Parties form (Form 1295) on October 5, 2015. The Commission also adopted rules (Chapter 46) to implement the law. The Commission does not have any additional authority to enforce or interpret section 2252.908 of the Government Code.

Filing Process:

A business entity must use the Form 1295 filing application the Commission created to enter the required information on Form 1295 and print a copy of the completed form. Once entered into the filing application, the completed form will include a unique certification number, called a “certification of filing.”

An authorized agent of the business entity must sign the printed copy of the form affirming under the penalty of perjury that the completed form is true and correct.

The completed, printed, and signed Form 1295 bearing the unique certification of filing number must be filed with the governmental body or state agency with which the business entity is entering into the contract.

https://www.ethics.state.tx.us/tec/1295-Info.htm
Acknowledgement by State Agency or Governmental Entity:

The governmental entity or state agency must acknowledge receipt of the filed Form 1295 with the certification of filing, using the Commission’s filing application, not later than the 30th day after the date the governing body or state agency receives the Form 1295. The Commission will post the completed Form 1295 to its website within seven business days after the governmental entity or state agency acknowledges receipt of the form.

Additional Information:

Section 2252.908, Government Code.

Certificate of Interested Parties (Form 1295)**

**This is a sample form for illustration purposes only. DO NOT FILL OUT THIS SAMPLE FORM. Form 1295 MUST BE FILED ELECTRONICALLY! Paper copies and PDF copies of this sample form are not accepted!

Chapter 46, Ethics Commission Rules (includes new rule 46.4, regarding changes to contracts, which went into effect on January 1, 2017)

Last Revision: December 21, 2017

https://www.ethics.state.tx.us/tec/1295-Info.htm
(a) In this section:
   (1) “Business entity” means any entity recognized by law through which business is conducted, including a sole proprietorship, partnership, or corporation.
   (2) “Governmental entity” means a municipality, county, public school district, or special-purpose district or authority.
   (3) “Interested party” means a person who has a controlling interest in a business entity with whom a governmental entity or state agency contracts or who actively participates in facilitating the contract or negotiating the terms of the contract, including a broker, intermediary, adviser, or attorney for the business entity.
   (4) “State agency” means a board, commission, office, department, or other agency in the executive, judicial, or legislative branch of state government. The term includes an institution of higher education as defined by Section 61.003, Education Code.

(b) This section applies only to a contract of a governmental entity or state agency that:
   (1) requires an action or vote by the governing body of the entity or agency before the contract may be signed; or
   (2) has a value of at least $1 million.

(c) Notwithstanding Subsection (b), this section does not apply to:
   (1) a sponsored research contract of an institution of higher education;
   (2) an interagency contract of a state agency or an institution of higher education; or
   (3) a contract related to health and human services if:
       (A) the value of the contract cannot be determined at the time the contract is executed; and
       (B) any qualified vendor is eligible for the contract.

Text of subsection as amended by Acts 2017, 85th R.S., Ch. 526 (SB 255) (Changes identified by italicized text apply only to a contract entered into or amended on or after January 1, 2018).

(c) Notwithstanding Subsection (b), this section does not apply to:
   (1) a sponsored research contract of an institution of higher education;
   (2) an interagency contract of a state agency or an institution of higher education;
   (3) a contract related to health and human services if:
       (A) the value of the contract cannot be determined at the time the contract is executed; and
       (B) any qualified vendor is eligible for the contract;
   (4) a contract with a publicly traded business entity, including a wholly owned subsidiary of the business entity;
   (5) a contract with an electric utility, as that term is defined by Section 31.002, Utilities Code; or

https://www.ethics.state.tx.us/statutes/Gov-Code-2252.908-12-19-17.htm#2252.908
(6) a contract with a gas utility, as that term is defined by Section 121.001, Utilities Code.

(d) A governmental entity or state agency may not enter into a contract described by Subsection (b) with a business entity unless the business entity, in accordance with this section and rules adopted under this section, submits a disclosure of interested parties to the governmental entity or state agency at the time the business entity submits the signed contract to the governmental entity or state agency.

(e) The disclosure of interested parties must be submitted on a form prescribed by the Texas Ethics Commission that includes:

1. a list of each interested party for the contract of which the contracting business entity is aware; and
2. the signature of the authorized agent of the contracting business entity, acknowledging that the disclosure is made under oath and under penalty of perjury.

Text of subsection as amended by Acts 2017, 85th R.S., Ch. 526 (SB 255) (Changes identified by italicized text apply only to a contract entered into or amended on or after January 1, 2018).

(e) The disclosure of interested parties must be submitted on a form prescribed by the Texas Ethics Commission that includes:

1. a list of each interested party for the contract of which the contracting business entity is aware; and
2. a written, unsworn declaration subscribed by the authorized agent of the contracting business entity as true under penalty of perjury that is in substantially the following form:
   “My name is _______________________, my date of birth is ________________, and my address is ________________, ________________, ________________, ________________, ________________, (Street) (State) (City) (Zip Code) (Country)

I declare under penalty of perjury that the foregoing is true and correct.

Executed in _______ County, State of ________, on the ________ day of ________, ________.

(Month) (Year) ________________

Declarant”.

(f) Not later than the 30th day after the date the governmental entity or state agency receives a disclosure of interested parties required under this section, the governmental entity or state agency shall submit a copy of the disclosure to the Texas Ethics Commission.

(g) The Texas Ethics Commission shall adopt rules necessary to implement this section, prescribe the disclosure of interested parties form, and post a copy of the form on the commission's Internet website.

Added by Acts 2015, 84th Leg., R.S., Ch. 1024 (H.B. 1295), Sec. 3, eff. September 1, 2015. Amended by Acts 2017, 85th Leg., R.S., Ch. 526 (SB 255, Sec. 5, eff. September 1, 2017).

https://www.ethics.state.tx.us/statutes/Gov-Code-2252.908-12-19-17.htm#2252.908
§ 46.1. Application
(a) This chapter applies to section 2252.908 of the Government Code
(b) Section 2252.908 of the Government Code applies only to a contract of a governmental entity or state agency entered into after December 31, 2015, that meets either of the following conditions:
   (1) the contract requires an action or vote by the governing body of the entity or agency; or
   (2) The value of the contract is at least $1 million.
(c) A contract does not require an action or vote by the governing body of a governmental entity or state agency if:
   (1) the governing body has legal authority to delegate to its staff the authority to execute the contract
   (2) The governing body has delegated to its staff the authority to execute the contract; and
   (3) The governing body does not participate in the selection of the business entity with which the contract is entered into.

§ 46.3. Definitions
(a) “Contract” means a contract between a governmental entity or state agency and a business entity at the time it is voted on by the governing body or at the time it binds the governmental entity or state agency, whichever is earlier, and includes an amended, extended, or renewed contract.
(b) “Business entity” includes an entity through which business is conducted with a governmental entity or state agency, regardless of whether the entity is a for-profit or nonprofit entity. The term does not include a governmental entity or state agency.
(c) “Controlling interest” means: (1) an ownership interest or participating interest in a business entity by virtue of units, percentage, shares, stock, or otherwise that exceeds 10 percent; (2) membership on the board of directors or other governing body of a business entity of which the board or other governing body is composed of not more than 10 members; or (3) service as an officer of a business entity that has four or fewer officers, or service as one of the four officers most highly compensated by a business entity that has more than four officers. Subsection (3) of this section does not apply to an officer of a publicly held business entity or its wholly owned subsidiaries.
(d) “Interested party” means: (1) a person who has a controlling interest in a business entity with whom a governmental entity or state agency contracts; or (2) an intermediary.
(e) “Intermediary,” for purposes of this rule, means, a person who actively participates in the facilitation of the contract or negotiating the contract, including a broker, adviser, attorney, or representative of or agent for the business entity who:
   (1) receives compensation from the business entity for the person’s participation;
   (2) communicates directly with the governmental entity or state agency on behalf of the business entity regarding the contract; and
   (3) is not an employee of the business entity or of an entity with a controlling interest in the business entity.
(f) “Signed” includes any symbol executed or adopted by a person with present intention to authenticate a writing, including an electronic signature.
(g) “Value” of a contract is based on the amount of consideration received or to be received by the business entity from the governmental entity or state agency under the contract.

https://www.ethics.state.tx.us/legal/ch46.html
§ 46.4. Changes to Contracts (new rule effective January 1, 2017)
(a) Section 2252.908 of the Government Code does not apply to a change made to an existing contract, including an amendment, change order, or extension of a contract, except as provided by subsections (b) or (c) of this section.
(b) Section 2252.908 of the Government Code applies to a change made to an existing contract, including an amendment, change order, or extension of a contract, if a disclosure of interested parties form was not filed for the existing contract; and either:
(1) the changed contract requires an action or vote by the governing body of the entity or agency; or
(2) the value of the changed contract is at least $1 million.
(c) Section 2252.908 of the Government Code applies to a change made to an existing contract, including an amendment, change order, or extension of a contract, if the business entity submitted a disclosure of interested parties form to the governmental entity or state agency that is a party to the existing contract; and either:
(1) there is a change to the disclosure of interested parties; or
(2) the changed contract requires an action or vote by the governing body of the entity or agency; or
(3) the value of the changed contract is at least $1 million greater than the value of the existing contract.

§ 46.5. Disclosure of Interested Parties Form
(a) A disclosure of interested parties form required by section 2252.908 of the Government Code must be filed on an electronic form prescribed by the commission that contains the following:
(1) The name of the business entity filing the form and the city, state, and country of the business entity’s place of business;
(2) The name of the governmental entity or state agency that is a party to the contract for which the form is being filed;
(3) The name of each interested party and the city, state, and country of the place of business of each interested party;
(4) The identification number used by the governmental entity or state agency to track or identify the contract for which the form is being filed and a short description of the services, goods, or other property used by the governmental entity or state agency provided under the contract; and
(5) An indication of whether each interested party has a controlling interest in the business entity, is an intermediary in the contract for which the disclosure is being filed, or both.
(b) The certification of filing and the completed disclosure of interested parties form generated by the commission’s electronic filing application must be printed, signed by an authorized agent of the contracting business entity, and submitted to the governmental entity or state agency that is the party to the contract for which the form is being filed.
(c) A governmental entity or state agency that receives a completed disclosure of interested parties form and certification of filing shall notify the commission, in an electronic format prescribed by the commission, of the receipt of those documents not later than the 30th day after the date the governmental entity or state agency receives the disclosure.
(d) The commission shall make each disclosure of interested parties form filed with the commission under section 2252.908(f) of the Government Code available to the public on the commission’s Internet website not later than the seventh business day after the date the commission receives the notice required under subsection (c) of this section.

https://www.ethics.state.tx.us/legal/ch46.html
H.B. No. 1295
AN ACT
relating to the disclosure of research, research sponsors, and
interested parties by persons contracting with governmental
entities and state agencies.
BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF TEXAS:

SECTION 1. Subchapter Z, Chapter 51, Education Code, is amended
by adding Section 51.954 to read as follows:
Sec. 51.954. DISCLOSURE OF SPONSORS OF RESEARCH IN PUBLIC
COMMUNICATIONS. (a) In any public communication the content of
which is based on the results of sponsored research, a faculty
member or other employee or appointee of an institution of higher
education who conducted or participated in conducting the
research shall conspicuously disclose the identity of each
sponsor of the research.
(b) In this section:
(1) "Institution of higher education" has the meaning
assigned by Section 61.003.
(2) "Public communication" means oral or written
communication intended for public consumption or
distribution, including:
(A) testimony in a public administrative, legislative,
regulatory, or judicial proceeding;
(B) printed matter including a magazine, journal,
newsletter, newspaper, pamphlet, or report; or
(C) posting of information on a website or similar
Internet host for information.
(3) "Sponsor" means an entity that contracts for or
provides money or materials for research.
(4) "Sponsored research" means research:
(A) that is conducted under a contract with or a grant
from an individual or entity, other than the institution
conducting the research, for the purpose of the
research; and
(B) in which payments received or the value of
materials received under that contract or grant, or
under a combination of more than one such contract or
grant, constitutes at least 50 percent of the cost of
conducting the research.

SECTION 2. Subchapter Z, Chapter 51, Education Code, is amended
by adding Section 51.955 to read as follows:
Sec. 51.955. PROHIBITED STATE AGENCY ACTIONS RELATED TO DISCLOSURE OF
PUBLICLY FUNDED RESEARCH. (a) In this section, "institution of higher
education" has the meaning assigned by Section 61.003.
(b) A state agency that expends appropriated funds may not:


(1) enter into a research contract with an institution of higher
education if that contract contains a provision
precluding public disclosure of any final data generated or
produced in the course of executing the contract unless the
agency reasonably determines that the premature disclosure of such data would adversely affect public safety, the protection of intellectual property rights of the institution of higher education, publication rights in professional scientific publications, or valuable confidential information of the institution of higher education or a third party; or
(2) adopt a rule that is based on research conducted under a contract entered into with an institution of higher education unless the agency:

(A) has made the results of the research and all data supporting the research publicly available; or
(B) reasonably determines that the premature disclosure of such data would adversely affect public safety, the protection of intellectual property rights of the institution of higher education, publication rights in professional scientific publications, or valuable confidential information of the institution of higher education or a third party.

c) Subsection (b)(1) does not apply to a research contract between an institution of higher education and the Cancer Prevention and Research Institute of Texas.

d) A response to a request for information regarding research described by Subsection (b) must be made in accordance with Chapter 552, Government Code.

e) This section does not require the public disclosure of personal identifying information or any other information the disclosure of which is otherwise prohibited by law.

SECTION 3. Subchapter Z, Chapter 2252, Government Code, is amended by adding Section 2252.908 to read as follows:
Sec. 2252.908. DISCLOSURE OF INTERESTED PARTIES.
(a) In this section:
(1) "Business entity" means any entity recognized by law through which business is conducted, including a sole proprietorship, partnership, or corporation.
(2) "Governmental entity" means a municipality, county, public school district, or special-purpose district or authority.
(3) "Interested party" means a person who has a controlling interest in a business entity with whom a governmental entity or state agency contracts or who actively participates in facilitating the contract or negotiating the terms of the contract, including a broker, intermediary, adviser, or attorney for the business entity.
(4) "State agency" means a board, commission, office, department, or other agency in the executive, judicial, or legislative branch of state government. The term includes an institution of higher education as defined by Section 61.003, Education Code.
(b) This section applies only to a contract of a governmental entity or state agency that:
(1) requires an action or vote by the governing body of the entity or agency before the contract may be signed; or
(2) has a value of at least $1 million.
(c) Notwithstanding Subsection (b), this section does not apply to:
   (1) a sponsored research contract of an institution of higher education;
   (2) an interagency contract of a state agency or an institution of higher education; or
   (3) a contract related to health and human services if:
      (A) the value of the contract cannot be determined at the time the contract is executed; and
      (B) any qualified vendor is eligible for the contract.
   (d) A governmental entity or state agency may not enter into a contract described by Subsection (b) with a business entity unless the business entity, in accordance with this section and rules adopted under this section, submits a disclosure of interested parties to the governmental entity or state agency at the time the business entity submits the signed contract to the governmental entity or state agency.
   (e) The disclosure of interested parties must be submitted on a form prescribed by the Texas Ethics Commission that includes:
      (1) a list of each interested party for the contract of which the contracting business entity is aware; and
      (2) the signature of the authorized agent of the contracting business entity, acknowledging that the disclosure is made under oath and under penalty of perjury.
   (f) Not later than the 30th day after the date the governmental entity or state agency receives a disclosure of interested parties required under this section, the governmental entity or state agency shall submit a copy of the disclosure to the Texas Ethics Commission.
   (g) The Texas Ethics Commission shall adopt rules necessary to implement this section, prescribe the disclosure of interested parties form, and post a copy of the form on the commission's Internet website.

SECTION 4. (a) Not later than December 1, 2015, the Texas Ethics Commission shall adopt the rules, prescribe the disclosure of interested parties form, and post the form on the commission's Internet website as required by Section 2252.908, Government Code, as added by this Act.

(b) Section 2252.908, Government Code, as added by this Act, applies only to a contract entered into on or after January 1, 2016.


SECTION 5. This Act takes effect September 1, 2015.

President of the Senate  Speaker of the House

I certify that H.B. No. 1295 was passed by the House on May 11, 2015, by the following vote: Yeas 135, Nays 0, 1 present, not voting; that the House refused to concur in Senate amendments to H.B. No. 1295 on May 28, 2015, and requested the appointment of a conference committee to consider the differences between the two houses; and that the House adopted the conference committee report on H.B. No. 1295 on May 31, 2015, by the following
vote:  Yeas 144, Nays 0, 2 present, not voting.

__________________________
Chief Clerk of the House

I certify that H.B. No. 1295 was passed by the Senate, with amendments, on May 25, 2015, by the following vote: Yeas 30, Nays 1; at the request of the House, the Senate appointed a conference committee to consider the differences between the two houses; and that the Senate adopted the conference committee report on H.B. No. 1295 on May 31, 2015, by the following vote: Yeas 30, Nays 1.

__________________________
Secretary of the Senate

APPROVED: _____________
Date

__________________________
Governor

# Certificate of Interested Parties

**FORM 1295**

Complete Nos. 1 - 4 and 6 if there are interested parties. Complete Nos. 1, 2, 3, 5, and 6 if there are no interested parties.

1. Name of business entity filing form, and the city, state and country of the business entity's place of business.

2. Name of governmental entity or state agency that is a party to the contract for which the form is being filed.

3. Provide the identification number used by the governmental entity or state agency to track or identify the contract, and provide a description of the services, goods, or other property to be provided under the contract.

4. Name of Interested Party | City, State, Country (place of business) | Nature of Interest (check applicable)
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Controlling</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Intermediary</td>
</tr>
</tbody>
</table>

5. Check only if there is no Interested Party.

6. UNSWORN DECLARATION

   My name is ___________________________ and my date of birth is ___________________________.

   My address is ___________________________ (street), ___________________________ (city), ___________________________ (state) ___________________________ (zip code), ___________________________ (country) ___________________________.

   I swear under penalty of perjury that the foregoing is true and correct.

   Executed in ___________________________ County, State of ___________________________, on the ______ day of ___________________________, 20________.

   ___________________________.

   Signature of authorized agent of contracting business entity.

   (Declara[nt])

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Form provided by Texas Ethics Commission

www.ethics.state.tx.us

Revised 12/22/2017

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https://www.ethics.state.tx.us/forms/1295.pdf
City of Laredo Standard Technical Specifications

The City of Laredo Standard Technical Specifications shall apply to this project. A copy of the document can be viewed at the City’s website at:

http://www.ci.laredo.tx.us/

Then, click on “City Departments”,
Then, on “Building Development Services”,
Then, on “Standard Specifications Manual”
SECTION 01 1000
SUMMARY

PART 1 GENERAL

1.01 PROJECT
A. Project Name: Fasken Community Center Pool & Amenities
B. Owner's Name: City of Laredo.
C. Architect's Name: Slay Architecture, Contact: Monica Guajardo
D. The Project consists of the construction of a Swimming Pool (w/ restrooms, dressing rooms, a shaded canopy area, & an equipment room), a Treehouse, a water feature, and sitework.

1.02 CONTRACT DESCRIPTION

1.03 FUTURE WORK
A. Project is designed for future Deduct Alternates #1 & 2.

1.04 OWNER OCCUPANCY
A. Owner intends to continue to occupy adjacent portions of the existing building during the entire construction period.
B. Owner intends to occupy the Project upon Substantial Completion.
C. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.
D. Schedule the Work to accommodate Owner occupancy.

1.05 CONTRACTOR USE OF SITE AND PREMISES
A. Provide access to and from site as required by law and by Owner:
   1. Do not obstruct roadways, sidewalks, or other public ways without permit.
B. Utility Outages and Shutdown:
   1. Limit disruption of utility services to hours the building is unoccupied.
   2. Prevent accidental disruption of utility services to other facilities.

1.06 SPECIFICATION SECTIONS APPLICABLE TO ALL CONTRACTS
A. Section 01 2100 - Allowances.
B. Section 01 4000 - Quality Requirements.
C. Section 01 5000 - Temporary Facilities and Controls.
D. Section 01 6000 - Product Requirements.
E. Section 01 7000 - Execution and Closeout Requirements.
F. Section 01 7800 - CONTRACT CLOSEOUT.

END OF SECTION
SECTION 01 2100
ALLOWANCES

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Contingency allowance.

1.02 RELATED REQUIREMENTS
   A. General Conditions for City of Laredo Construction Contracts.
   B. Section 01 3000 - Submittals.

1.03 CONTINGENCY ALLOWANCE
   A. Costs Included in Allowances:
      1. Cost of product to Contractor or subcontractor, less applicable trade discounts.
      2. Delivery to site.
      3. Labor required under allowance, only when labor is specified to be included.
   B. Contractor Costs Included in Contract Sum
      1. Products handling at site, including unloading, uncrating, and storage.
      2. Protection of products from elements and from damage.
      3. Labor for installation and finishing, except when installation is specified as part of
         allowance.
      4. Other expenses required to complete installation.
      5. Contractor overhead, insurance, bonds, profit and other expenses directly attributable to
         the project.
      6. Contractor's overage or allowance for breakage and cutting wastes.
   C. Use the contingency allowance only as directed for the Owner's purposes and only by Change
      Orders that indicate amounts to be charge to the allowance.
   D. The Contractor's related costs for products and equipment ordered by the Owner under the
      contingency allowance are not part of the Contract Sum. These costs include delivery,
      installation, taxes, insurance, equipment rental, and similar costs.
   E. Construction Change Authorizations authorizing use of funds from the contingency allowance
      will include Contractor's related costs and reasonable overhead and profit margins.
   F. Contractor's costs for products, delivery, installation, labor, insurance, payroll, taxes, bonding,
      equipment rental, overhead and profit will be included in Change Orders authorizing expenditure
      of funds from this Contingency Allowance.
   G. Funds will be drawn from the Contingency Allowance only by Change Order.
   H. At closeout of Contract, funds remaining in Contingency Allowance will be credited to Owner by
      Change Order.
   I. A "Schedule of Allowances", showing amounts included in Contract Sum, is included at the end
      of this Section. Coordinate allowance work with related work, to ensure that each selection is
      completely integrated and interfaced with related work. Requirements for the work of
      allowances are shown and specified, to extent established by date of contract documents;
      additional requirements are established by change order. At earliest possible date, advise
      Architect/Engineer of date each final allowance selection must be completed. Submit proposals
      for allowance work as directed, and in the manner specified for change orders. The Contractor
      shall include in the Base Proposal the Allowances indicated in the Schedule of Allowances.
      Also to be included in the Base Proposal are all costs in connection with the Allowance Sum
      stated in the Schedule, including supervision, overhead, profit, bonds and insurance, delivery
      and installation, thus leaving the entire Allowance amount for the purchase of the particular
      item. Any unused portion of the Allowance will be deducted from the final payment. Where
requested, furnish detailed breakdown of quantity survey. Deliver excess materials of allowance work to Owner's storage space, or dispose of by other means as directed.

1.04 ARCHITECT/ENGINEER RESPONSIBILITIES
   A. Prepare Change Orders to authorize use of funds in allowances.

1.05 CONTRACTOR RESPONSIBILITIES
   A. Assist Architect/Engineer and Owner in determining qualified suppliers and installers; obtain proposals when requested.
   B. Make recommendations for Architect/Engineer consideration.
   C. Promptly notify Architect/Engineer of:
      1. Any reasonable objections against supplier or installer.
      2. Any effect on the construction schedule anticipated by selections under consideration.
   D. On notification of selecting execute purchase agreement with designated supplier and installer.
   E. Supply cost to Architect for inclusion in Change Order.
   F. Inform Architect of anticipated additional costs at the site, or other expenses caused by the selection under the allowance, prior to acceptance of the Change Order and subsequent execution of the work.
   G. Arrange for and process shop drawings, product data, and samples.
   H. Arrange for delivery. Promptly inspect products upon delivery for completeness, damage, and defects. Submit claims for transportation damage.
   I. Install, adjust, and finish products in compliance with requirements of referenced specifications sections.
   J. Provide warranties for products and installations.

1.06 CORRELATION WITH CONTRACTOR SUBMITTALS
   A. Schedule shop drawings, product data, samples, and delivery dates, in Progress Schedule for products selected under allowances.

1.07 ADJUSTMENT OF COSTS
   A. Should the net cost be more or less than the specified amount of the allowance, the Contract Sum will be adjusted accordingly by Change Order.
   B. Submit documentation for actual additional costs at the site, or other expenses caused by the selection under allowance.
   C. Failure to submit claims prior to acceptance of the Change Order will constitute a waiver of claims for additional costs.
   D. At contract closeout, reflect all approved changes in contract amounts in the final statement of accounting.

1.08 ALLOWANCES SCHEDULE
   A. Owners Contingency: Include the stipulated sum of $15,000 for purchase and delivery of owner requested materials or requested work.
   B. Cortes Studio Tree House: Include the stipulated sum of $160,000.00 for purchase and delivery of at tree house to be constructed on site out of reinforced concrete by Carlos Cortes.

PART 2 PRODUCTS - NOT USED
PART 3 EXECUTION - NOT USED

END OF SECTION
SECTION 01 2300
ALTERNATES

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Description of Alternates.

1.02 ACCEPTANCE OF ALTERNATES
   A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted Alternates will be identified in the Owner-Contractor Agreement.
   B. Coordinate related work and modify surrounding work to integrate the Work of each Alternate.

1.03 SCHEDULE OF DEDUCT ALTERNATES
   A. Alternate No. 1 - Water Feature and associated sitework:
      1. Alternate Item: Section 01-1000 and Drawing number 1/A1.2 including Water Feature and associated sitework.
   B. Alternate No. 2 - Swimming Pool, Restrooms, Dressing Rooms, Mechanical Room, Equipment Room, Sitework within the pool perimeter fence, and the perimeter fence:
      1. Alternate Item: Section 01-1000 and Drawing number 1/A.3 including ________.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION
SECTION 01 2500
SUBSTITUTION PROCEDURES

PART 1  GENERAL

1.01  SECTION INCLUDES
   A. Procedural requirements for proposed substitutions.

1.02  RELATED REQUIREMENTS
   A. Section 01 6000 - Product Requirements: Fundamental product requirements, product options, delivery, storage, and handling.

1.03  DEFINITIONS
   A. Substitutions: Changes from Contract Documents requirements proposed by Contractor to materials, products, assemblies, and equipment.

PART 2  PRODUCTS - NOT USED

PART 3  EXECUTION

3.01  GENERAL REQUIREMENTS
   A. A Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:
      1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.
      2. Agrees to provide the same warranty for the substitution as for the specified product.
      3. Agrees to provide same or equivalent maintenance service and source of replacement parts, as applicable.
      4. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Owner.
      5. Waives claims for additional costs or time extension that may subsequently become apparent.
      6. Agrees to reimburse Owner and Architect for review or redesign services associated with re-approval by authorities.
   B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.
   C. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.
   D. Limit each request to a single proposed substitution item.

3.02  RESOLUTION
   A. Architect will notify Contractor in writing of decision to accept or reject request.

3.03  ACCEPTANCE
   A. Accepted substitutions change the work of the Project. They will be documented and incorporated into work of the project by Change Order, Construction Change Directive, Architectural Supplementary Instructions, or similar instruments provided for in the Conditions of the Contract.

END OF SECTION
SECTION 01 3000
ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Preconstruction meeting.
   B. Construction progress schedule.
   C. Submittals for review, information, and project closeout.
   D. Number of copies of submittals.
   E. Submittal procedures.

1.02 RELATED REQUIREMENTS
   A. General Conditions for City of Laredo Construction Contracts
   B. Section 01 7000 - Execution and Closeout Requirements: Additional coordination requirements.
   C. Section 01 7800 - CONTRACT CLOSEOUT: Project record documents; operation and maintenance data; warranties and bonds.

1.03 GENERAL ADMINISTRATIVE REQUIREMENTS
   A. Comply with requirements of Section 01 7000 - Execution and Closeout Requirements for coordination of execution of administrative tasks with timing of construction activities.
   B. Make the following types of submittals to Architect:
      1. Requests for Interpretation (RFI).
      2. Requests for substitution.
      3. Shop drawings, product data, and samples.
      4. Test and inspection reports.
      5. Design data.
      6. Manufacturer's instructions and field reports.
      7. Applications for payment and change order requests.
      8. Progress schedules.
      9. Coordination drawings.
      10. Correction Punch List and Final Correction Punch List for Substantial Completion.
      11. Closeout submittals.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRECONSTRUCTION MEETING
   A. Architect will schedule a meeting after Notice to Proceed.
   B. Attendance Required:
      1. Owner.
      3. Contractor.
   C. Agenda:
      1. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.
      2. Designation of personnel representing the parties to Contract, Owner and Architect.
      3. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
      4. Scheduling.
   D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.
3.02 SITE MOBILIZATION MEETING

A. Architect will schedule meeting at the Project site prior to Contractor occupancy.

B. Attendance Required:
   1. Contractor.
   2. Owner.
   3. Architect.
   4. Contractor’s superintendent.
   5. Major subcontractors.

C. Agenda:
   1. Use of premises by Owner and Contractor.
   2. Owner’s requirements.
   3. Construction facilities and controls provided by Owner.
   4. Temporary utilities provided by Owner.
   5. Survey and building layout.
   7. Schedules.
   8. Application for payment procedures.
   9. Procedures for testing.
   11. Requirements for start-up of equipment.
   12. Inspection and acceptance of equipment put into service during construction period.

D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.03 PROGRESS MEETINGS

A. Architect will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.

B. Attendance Required:
   1. Contractor.
   2. Owner.
   3. Architect.
   4. Contractor’s superintendent.

C. Agenda:
   1. Review minutes of previous meetings.
   2. Review of work progress.
   3. Field observations, problems, and decisions.
   4. Identification of problems that impede, or will impede, planned progress.
   5. Review of submittals schedule and status of submittals.
   7. Review of off-site fabrication and delivery schedules.
   8. Maintenance of progress schedule.
   9. Corrective measures to regain projected schedules.
   10. Planned progress during succeeding work period.
   11. Coordination of projected progress.
   12. Maintenance of quality and work standards.
   13. Effect of proposed changes on progress schedule and coordination.
   14. Other business relating to work.

D. The Contractor shall schedule additional meetings with Subcontractors and Material Suppliers as required for the proper prosecution of the Work and pre-installation conferences. For these meetings, the Contractor shall assume the above enumerated responsibilities of the Architect.
### 3.04 CONSTRUCTION PROGRESS SCHEDULE

A. If preliminary schedule requires revision after review, submit revised schedule within 10 days.

B. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
   1. Include written certification that major contractors have reviewed and accepted proposed schedule.

C. Within 10 days after joint review, submit complete schedule.

D. Submit updated schedule with each Application for Payment.

### 3.05 SUBMITTAL SCHEDULE

A. SPECIFICATION SUBMITTAL CHECKLIST:

#### STRUCTURAL

<table>
<thead>
<tr>
<th>SPEC SECTION</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>03 1000</td>
<td>CONCRETE FORMING AND ACCESSORIES SHOP DWGS-LAYOUT OF PREFAB FORMS, BEAMS, DROPS AND POUR BREAKS SHOP DWGS- DIMENSIONS, MATERIALS, BRACING, JOINTS &amp; TIES</td>
</tr>
<tr>
<td>03 2000</td>
<td>CONCRETE REINFORCING (DETAILED SHOP DRAWINGS)</td>
</tr>
<tr>
<td>03 3000</td>
<td>CAST-IN-PLACE CONCRETE PRODUCT DATA DESIGN MIXTURES STEEL REINFORCEMENT DWGS</td>
</tr>
<tr>
<td>04 2900</td>
<td>ENGINEERED UNIT MASONRY (PRODUCT DATA REF 04 2600)</td>
</tr>
<tr>
<td>05 1200</td>
<td>STRUCTURAL STEEL FRAMING SHOP DRAWINGS: PROFILES, SIZES, SPACING, FASTENERS, ETC. MILL CERTIFICATES, FABRICATOR TEST REPORT, WELDER’S CERTIFICATES FABRICATOR’S QUALIFICATION STATEMENT</td>
</tr>
<tr>
<td>05 1250</td>
<td>ARCHITECTURALLY EXPOSED STRUCTURAL STEEL (PRODUCT DATA &amp; SHOP DWGS)</td>
</tr>
<tr>
<td>06 1000</td>
<td>ROUGH CARPENTRY (PRODUCT DATA AND CERTIFICATES)</td>
</tr>
<tr>
<td>06 1323</td>
<td>HEAVY TIMBER FRAMING (PRODUCT DATA AND CERTIFICATES)</td>
</tr>
<tr>
<td>31 2316.16</td>
<td>STRUCTURAL EXCAVATION</td>
</tr>
<tr>
<td>31 2323.16</td>
<td>STRUCTURAL FILL (SOURCE, TEST REPORTS- COMPOSITION &amp; COMPATION DENS.)</td>
</tr>
</tbody>
</table>

#### ARCHITECTURAL

<table>
<thead>
<tr>
<th>SPEC SECTION</th>
<th>DESCRIPTION</th>
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Fasken Community Center Pool & Amenities
City of Laredo
Slay Architecture, 01-15-2020

 ADMINISTRATIVE REQUIREMENTS
<table>
<thead>
<tr>
<th>SPEC SECTION</th>
<th>DESCRIPTION</th>
<th>REQ/D</th>
<th>AFTER NTP</th>
</tr>
</thead>
<tbody>
<tr>
<td>03 3533</td>
<td>STAMPED CONCRETE FINISHING (PRODUCT DATA)</td>
<td>YES</td>
<td>2 WEEKS</td>
</tr>
<tr>
<td>04 0511</td>
<td>MORTAR AND MASONRY GROUT (PRODUCT DATA)</td>
<td>YES</td>
<td>2 WEEKS</td>
</tr>
<tr>
<td>04 2600</td>
<td>SINGLE WYTH UNIT MASONRY -GROUND FACE (PRODUCT DATA AND SAMPLES)</td>
<td>YES</td>
<td>2 WEEKS</td>
</tr>
<tr>
<td>04 4313</td>
<td>STONE MASONRY VENEER (PRODUCT DATA, SAMPLES, MORTAR COLORS)</td>
<td>YES</td>
<td>2 WEEKS</td>
</tr>
<tr>
<td>05 5213</td>
<td>PIPE AND TUBE RAILING (SHOP DRAWINGS)</td>
<td>YES</td>
<td>3 WEEKS</td>
</tr>
<tr>
<td>06 1000</td>
<td>ROUGH CARPENTRY</td>
<td>YES</td>
<td>2 WEEKS</td>
</tr>
<tr>
<td>07 4113</td>
<td>METAL ROOF PANELS (PRODUCT DATA, SHOP DWGS, SAMPLES, WARRANTY)</td>
<td>YES</td>
<td>2 WEEKS</td>
</tr>
<tr>
<td>07 4646</td>
<td>SHEET METAL FLASHING AND TRIM</td>
<td>YES</td>
<td>2 WEEKS</td>
</tr>
<tr>
<td>08 1113</td>
<td>HOLLOW METAL DOORS AND FRAMES</td>
<td>YES</td>
<td>2 WEEKS</td>
</tr>
<tr>
<td>08 1613</td>
<td>FIBERGLASS DOORS</td>
<td>YES</td>
<td>2 WEEKS</td>
</tr>
<tr>
<td>08 7100</td>
<td>DOOR HARDWARE</td>
<td>YES</td>
<td>2 WEEKS</td>
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<tr>
<td>08 9100</td>
<td>LOUVERS (PRODUCT DATA AND SHOP DRAWINGS)</td>
<td>YES</td>
<td>2 WEEKS</td>
</tr>
<tr>
<td>09 3000</td>
<td>TILING (PRODUCT DATA &amp; SAMPLES, GROUT COLOR SAMPLES)</td>
<td>YES</td>
<td>2 WEEKS</td>
</tr>
<tr>
<td>09 9113</td>
<td>EXTERIOR PAINTING (PRODUCT DATA &amp; CHIP SAMPLES)</td>
<td>YES</td>
<td>3 WEEKS</td>
</tr>
<tr>
<td>10 1400</td>
<td>SIGNAGE</td>
<td>YES</td>
<td>2 WEEKS</td>
</tr>
<tr>
<td>10 2800</td>
<td>TOILET BATH AND LAUNDRY ACCESSORIES</td>
<td>YES</td>
<td>2 WEEKS</td>
</tr>
<tr>
<td>12 3600</td>
<td>COUNTERTOPS - CONCRETE (SHOP DRAWINGS)</td>
<td>YES</td>
<td>2 WEEKS</td>
</tr>
<tr>
<td>32 3119</td>
<td>DECORATIVE METAL FENCES AND GATES</td>
<td>YES</td>
<td>2 WEEKS</td>
</tr>
<tr>
<td>32 3132</td>
<td>WOOD COMPOSITE FENCES</td>
<td>YES</td>
<td>2 WEEKS</td>
</tr>
</tbody>
</table>

### 3.06 PLUMBING / MECHANICAL / ELECTRICAL

<table>
<thead>
<tr>
<th>SPEC SECTION</th>
<th>DESCRIPTION</th>
<th>REQ/D</th>
<th>AFTER NTP</th>
</tr>
</thead>
<tbody>
<tr>
<td>22 03 00</td>
<td>SUMMARY OF PLUMBING WORK</td>
<td>YES</td>
<td>2 WEEKS</td>
</tr>
<tr>
<td>22 05 00</td>
<td>COMMON WORK RESULTS FOR PLUMBING</td>
<td>YES</td>
<td>2 WEEKS</td>
</tr>
<tr>
<td>22 05 29</td>
<td>HANGARS AND SUPPORTS FOR PLUMBING &amp; EQUIPMENT</td>
<td>YES</td>
<td>2 WEEKS</td>
</tr>
<tr>
<td>22 07 19</td>
<td>PLUMBING PIPING INSULATION</td>
<td>YES</td>
<td>2 WEEKS</td>
</tr>
<tr>
<td>22 11 16</td>
<td>DOMESTIC WATER PIPING (PRODUCT DATA AND SHOP DRAWINGS)</td>
<td>YES</td>
<td>2 WEEKS</td>
</tr>
<tr>
<td>22 11 19</td>
<td>DOMESTIC WATER PIPING SPECIALTIES</td>
<td>YES</td>
<td>2 WEEKS</td>
</tr>
<tr>
<td>22 13 13</td>
<td>FACILITY SANITARY SEwers</td>
<td>YES</td>
<td>2 WEEKS</td>
</tr>
<tr>
<td>22 13 19</td>
<td>SANITARY WASTE PIPING SPECIALTIES</td>
<td>YES</td>
<td>2 WEEKS</td>
</tr>
<tr>
<td>22 33 00</td>
<td>ELECTRIC DOMESTIC WATER HEATERS</td>
<td>YES</td>
<td>2 WEEKS</td>
</tr>
<tr>
<td>22 42 00</td>
<td>COMMERCIAL PLUMBING FIXTURES</td>
<td>YES</td>
<td>2 WEEKS</td>
</tr>
<tr>
<td>26 00 00</td>
<td>ELECTRICAL</td>
<td>YES</td>
<td>2 WEEKS</td>
</tr>
<tr>
<td>26 01 20</td>
<td>OPERATION AND MAINTENANCE OF LOW VOLTAGE ELECTRICAL DISTRIBUTION</td>
<td>YES</td>
<td>2 WEEKS</td>
</tr>
</tbody>
</table>
### 3.07 GENERAL SUBMITTAL REQUIREMENTS

**A. DEFINITIONS**

1. **Shop Drawings:** See General Conditions
2. **Product Data:** See General Conditions
3. **Samples:** See General Conditions
4. **Governmental Review Comments:** Written comments and process stamps by authorized governmental representatives on or accompanying returned documents previously submitted for building permits, operating licenses, code or ordinance approvals or variances, or other similar or related governmental reviews or approvals.
5. "**A ACTION**": Fabrication, manufacture and/or construction may proceed, providing the Work is in accordance with all requirements of the Contract Documents. The Architect's final acceptance of the Work will be contingent upon such compliance.
6. "**B ACTION**": Fabrication, manufacture and/or construction may proceed. The Architect's final acceptance of the Work will be contingent upon compliance with all notations and all requirements of the Contract Documents.
7. "**C ACTION**": No work shall be fabricated, manufactured and/or constructed. The Contractor shall redraw and resubmit the Shop Drawings or other submittals to conform with all requirements of the Contract Documents. Resubmit to the Architect, until resubmission is not required. Submittals marked "C ACTION" are not permitted on the construction site.

**B. CONTRACTOR’S DUTIES**

1. Before submission of first submittals and prior to submission of first Application for Payment, submit Schedule of Submittals. List:
   a. Specification Section Number,
   b. Projected Date of Delivery to Architect,
   c. Date fabrication of items must begin to prevent delay in work schedule, and

<table>
<thead>
<tr>
<th>Description</th>
<th>Required</th>
<th>Timeframe</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMMON WORK RESULTS FOR ELECTRICAL</td>
<td>YES</td>
<td>2 WEEKS</td>
</tr>
<tr>
<td>LOW VOLTAGE ELECTRICAL POWER CONDUCTOR AND CABLES</td>
<td>YES</td>
<td>2 WEEKS</td>
</tr>
<tr>
<td>GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS</td>
<td>YES</td>
<td>2 WEEKS</td>
</tr>
<tr>
<td>HANGARS AND SUPPORTS FOR ELECTRICAL SYSTEMS</td>
<td>YES</td>
<td>2 WEEKS</td>
</tr>
<tr>
<td>RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS</td>
<td>YES</td>
<td>2 WEEKS</td>
</tr>
<tr>
<td>UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS</td>
<td>YES</td>
<td>1 WEEK</td>
</tr>
<tr>
<td>IDENTIFICATION FOR ELECTRICAL SYSTEMS</td>
<td>YES</td>
<td>2 WEEKS</td>
</tr>
<tr>
<td>POWER SYSTEM STUDIES</td>
<td>YES</td>
<td>2 WEEKS</td>
</tr>
<tr>
<td>LIGHTING CONTROL DEVICES</td>
<td>YES</td>
<td>2 WEEKS</td>
</tr>
<tr>
<td>PANELBOARDS</td>
<td>YES</td>
<td>2 WEEKS</td>
</tr>
<tr>
<td>WIRING DEVICES</td>
<td>YES</td>
<td>2 WEEKS</td>
</tr>
<tr>
<td>FUSES</td>
<td>YES</td>
<td>2 WEEKS</td>
</tr>
<tr>
<td>ENCLOSED SWITCHES</td>
<td>YES</td>
<td>2 WEEKS</td>
</tr>
<tr>
<td>SURGE PROTECTIVE DEVICES</td>
<td>YES</td>
<td>2 WEEKS</td>
</tr>
<tr>
<td>INTERIOR LIGHTING</td>
<td>YES</td>
<td>2 WEEKS</td>
</tr>
<tr>
<td>EXTERIOR LIGHTING</td>
<td>YES</td>
<td>2 WEEKS</td>
</tr>
<tr>
<td>CONDUITS AND BACKBOXES FOR COMMUNICATION SYSTEMS</td>
<td>YES</td>
<td>2 WEEKS</td>
</tr>
</tbody>
</table>
d. Subcontractor name and telephone number.

2. Submit shop drawings, product data, samples, and manufacturer's instruction within 45 days of the Contract Date.

3. Review and approve all material developed for submittal in compliance with Contract Documents. Determine and verify conformance of materials and submittals to requirements of Contract Documents.
   a. Where work is noted as "by others", indicate contractor or subcontractor providing that construction.
   b. Where dimensions are noted "field dimension", indicate whether dimension has been field verified and if not, Contractor or subcontractor responsible for the field verifications.
   c. By submitting Shop Drawings, Product Data and Samples to Architect/Engineer the Contractor represents that he has determined and verified all materials, field measurements, and field construction criteria related thereto, or will do so, and that he has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

4. Unless otherwise noted in the individual specification section, submittals shall contain:
   a. Date of Submission and previous submission dates if applicable.
   b. Project Title and Number.
   c. Name of Contractor.
   d. Name of product Supplier and Manufacturer.
   e. Specification section number.
   f. Field dimensions clearly indicated as such.
   g. Relationship of adjacent or critical features of the Work.
   i. Applicable standards such as ASTM, ANSI, etc.
   j. Contractor's stamp, initialed or signed, certifying review of submittal, coordination and compliance with the requirements of the Work.

5. Deliver submittal material developed to Architect/Engineer for proper distribution and review.

6. Submit with reasonable promptness and in such sequence as to cause no delay in the Work or in the work of the Owner or any Separate Contractor, all Shop Drawings, Product Data and Samples required by the Contract Documents.

7. Transmit each item under Architect/Engineer accepted form.

8. Submit construction schedule and schedule of values within 15 days after date of Owner-Contractor Agreement. After review by Architect/Engineer, revise and resubmit as required. Schedule of Values shall be used as a basis for the Contractor's Application for Payment.


11. Sign or initial cover sheet of each shop drawing or product data submittal, and each sample label to certify contractor's review of submittals and compliance with requirements of Contract Documents.

12. After Architect/Engineer review of submittal, revise and resubmit as required, identifying changes made since previous submittal.

13. Reproduce and distribute copies of reviewed submittals to concerned parties. Instruct recipients to promptly report or conditions which prevent compliance.

14. Do not fabricate products or begin work which requires submittals until return of submittal with Architect/Engineer acceptance, then complete work in accordance with accepted submittals.
15. The Contractor shall not be relieved from responsibility for errors or omissions in the Shop Drawings, Product Data or Samples by the Architect/Engineer's acceptance thereof. Architect/Engineer's review of Contractor's shop drawings is an aid to the Contractor to ensure Contractor correctly interpreted the Contract Documents and understands what is required by them.

C. ARCHITECT’S DUTIES
   1. Receive and log submittals from Contractor.
      a. Transmit appropriate submittals to Engineer for review.
      b. Receive and log reviewed submittals from Engineer.
      c. Review Architectural submittals after receipt from Contractor for conformance with submission requirements. Return non-conforming submittals to Contractor without review for resubmission in conformance with requirements.
      d. Review Architectural submittals with reasonable promptness. Indicate modifications required, if any.
      e. Affix stamp and initial or sign, and indicated requirement for resubmittal or acceptance of submittal and return to Contractor.
      f. Notify Contractor that submittals are ready for pick-up, for distribution, or revision and resubmission.

D. ENGINEER’S DUTIES
   1. Review Engineering submittals after receipt from Architect for conformance with submission requirements. Return non-conforming submittals to Architect without review for resubmission in conformance with requirements.
      a. Review Engineering submittals with reasonable promptness. Indicate modifications required, if any.
      b. Affix stamp and initial or sign, and indicate requirements for resubmittal or acceptance of submittal and return to Architect.

E. RESUBMITTALS
   1. Make resubmittals under procedures for initial submittals; identify changes made since previous submittals.

3.08 SHOP DRAWINGS
   A. Electronic Shop Drawings: Shop Drawings submitted through electronic medium will be accepted under the following conditions:
      1. PDF Format only.
      2. 8-1/2 x 11 and/or 11 x17 format size to scale when printed. Larger format shall be submitted as hard copies.
      3. Number of sheets shall not exceed twenty (20).
      4. All other submittal requirements apply.
   B. Present in a clear and thorough manner. Title each drawing with Project name; identify each element of drawings by reference to sheet number and detail, schedule, or room number of Contract Documents.
   C. Identify field dimensions; show relation to adjacent or critical features for Work or products.
   D. Action on Architectural Shop Drawings:
      1. Shop Drawings which are reviewed with no corrections will be stamped "A ACTION". The Architect will return one stamped reproducible transparency to the Contractor shall be responsible for reproducing and distributing them as necessary.
      2. Shop Drawings which have been reviewed and require only minor corrections will be stamped "B ACTION". The Architect will return one stamped reproducible transparency to the Contractor who shall be responsible for reproducing and distribution them as necessary.
      3. Shop Drawings which have been reviewed and rejected will be stamped "C ACTION".
4. If the Shop Drawings are stamped "C ACTION", the Architect will return two stamped copies, one opaque and one transparent, to the Contractor. The Contractor shall resubmit revised shop drawings to the Architect until "A ACTION" or "B ACTION" has been indicated as described above.

E. Action on Engineering Shop Drawings: As above, unless otherwise indicated in the specification.

3.09 PRODUCT DATA

A. Unless otherwise noted in the specifications, submit four copies; two copies will be retained by the Architect/Engineer.

B. Mark each copy to identify applicable products, models, options, and other data; supplement manufacturer's standard data to provide information unique to the Work.

C. Submit only pages which are pertinent, referenced to specification Section and Article number. Show reference standards, performance characteristics, and capacities, wiring and piping diagrams and controls, component parts, finishes, dimensions, and required clearances.

D. Modify manufacturer's standard schematic drawings and diagrams to supplement standard information and to provide information specifically applicable to the Work. Delete information not applicable.

E. Action on Architectural Product Data Literature:
   1. Product Data which has been reviewed and results in no corrections will be stamped "A ACTION". The Architect/Engineer will return two stamped copies to the Contractor. The contractor shall be responsible for reproducing and distributing copies as necessary.
   2. Product Data which is reviewed and requires only minor corrections will be stamped "B ACTION".
   3. Product Data which has been reviewed and rejected will be stamped "C ACTION".
   4. If stamped "C ACTION", the Architect/Engineer will return two stamped copies to the Contractor. The Contractor shall resubmit new information to the Architect/Engineer until "A ACTION" or "B ACTION" has been indicated as described above.

F. Action on Engineering Product Data Literature: As above, unless otherwise indicated in the specifications.

G. After review, reproduce and distribute in accordance with requirements in Contractor's Duties above.
   1. File one copy of shop drawings in Project Record Documents file for transmittal to Owner at completion of project. See Section 01 700 for additional information.

3.10 SUBMITTALS FOR REVIEW

A. When the following are specified in individual sections, submit them for review:
   1. Product data.
   2. Shop drawings.
   3. Samples for selection.
   4. Samples for verification.

B. Submit to Architect for review for the limited purpose of checking for compliance with information given and the design concept expressed in Contract Documents.
   1. Samples will be reviewed for aesthetic, color, or finish selection.

C. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 7800 - CONTRACT CLOSEOUT.

3.11 MANUFACTURER'S INSTRUCTIONS

A. When required in individual Specification Section, submit manufacturer's printed instruction for delivery, storage, assembly, installation, start-up, adjusting, finishing, and maintenance in quantities specified for product data.
B. Submit at the same time that shop drawings are submitted.

3.12 SAMPLES
A. Unless otherwise indicated in individual specification sections, submit two sets of samples.
B. Submit full range of manufacturer's standard colors, textures, and patterns for Architect/Engineer's selection.
C. Submit samples to illustrate functional characteristics of the product, with integral parts and attachment devices. Illustrate color range by bracketing with number of samples required to fully describe range to be supplied.
D. Coordinate submittals of different sections for interfacing work.
E. Include identification on each sample, giving full descriptive information.
F. One set of samples will be returned to the Contractor and one set will be retained by Architect/Engineer.
G. Action on Architectural Samples:
   1. Samples which are reviewed with no corrections will be stamped "A ACTION". The Architect will return one stamped Sample to the Contractor.
   2. Samples which are reviewed and returned for corrections as noted, and subsequent resubmittal, will be stamped "B ACTION".
   3. Samples which are reviewed and rejected because they do not comply with the requirements will be marked "C ACTION".
   4. If the Samples are stamped "B ACTION" or "C ACTION", the Architect will return one stamped Sample to the Contractor. The Contractor shall resubmit two new sets of Samples until "A ACTION has been indicated as described above.

3.13 SUBMITTALS FOR INFORMATION
A. When the following are specified in individual sections, submit them for information:
   1. Design data.
   2. Certificates.
   3. Test reports.
   4. Inspection reports.
   5. Manufacturer's instructions.
   6. Manufacturer's field reports.
   7. Other types indicated.
B. Submit for Architect's knowledge as contract administrator or for Owner.

3.14 NUMBER OF COPIES OF SUBMITTALS
A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.
B. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
   1. Retained samples will not be returned to Contractor.

3.15 SUBMITTAL PROCEDURES
A. General Requirements:
B. Transmit each submittal with approved form.
C. Deliver submittals to Architect at the Laredo Office.
   1. Email Electronic submittals to the project construction administrator.
      a. The Contractor is responsible for to confirm that electronic submittals have been received by the Architect.
D. Process Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal.
1. Initial Review: Allow 5 business days for initial review of each submittal. Allow additional time if process must be delayed to permit coordination with subsequential submittals. Architect will advise Contractor when submittal being processed must be delayed for coordination.

2. Concurrent Review: Where concurrent review of submittals by Architect's consultants, Owner, or other parties is required, allowed 10 business days for intitial review for each submittal.

3. If intermediate submittal is necessary, process it in the same manner as initial submittal.

4. Allow 10 business days for processing each re-submittal.

5. No extension of Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing.

E. Pick-up reviewed submittals from the Architect at the Laredo Office.

3.16 CONTRACTOR REQUESTED PRODUCT SUBSTITUTIONS

A. Contractor requested product substitutions will ONLY be considered for acceptance by the Architect if the following conditions are met:

1. Documented Delivery Problem: The Contractor must provide substantial written documentation to support a claim of a delivery problem which is in conflict with the construction schedule, including but not limited to copies of correspondence to and from the product manufacturer which demonstrates that a delivery problem exists relative to the timely completion of construction work. A Contractor requested product substitution will NOT be considered if the Constructor or any subcontractor has delayed executing subcontract for labor agreements or scheduling subcontract work from the time of construction contract award.

2. Construction Cost Savings: A contractor requested product substitution must result in a net savings in total construction cost, with the proposed credit to Tenant/Landlord itemized and submitted along with the product substitution request.

3. The product substitution request must be submitted to the Architect in writing, using the Request for Product Substitution form. Contractor to request copy of form from the Architect.

END OF SECTION
SECTION 01 3140
STRUCTURAL ENGINEER: SHOP DRAWINGS/FIELD VISITS

PART 1 - GENERAL
1.01 SCOPE
   A. This section defines and clarifies specific items of the Contract that are peculiar to the structural
      engineer's responsibilities. Refer to General Conditions for overall contractual agreements and
      to appropriate section of this specification for specifics on shop drawing, product data, and
      samples submitted.

PART 2 - GENERAL DEFINITIONS
2.01 STRUCTURAL ENGINEER OF RECORD
   A. The engineer responsible for the design of the primary structural system and whose
      seal/signature appears on the contract structural drawings. Responsibility for any secondary
      structural and non-structural systems not shown on the structural drawings rests with the prime
      professional, the architect.

2.02 SPECIALTY ENGINEER
   A. The engineer who is lawfully eligible to seal plans and designs for pre-engineered elements on
      systems which become part of the overall building.

2.03 GRADUATE ENGINEER
   A. The engineer who is an Engineer-In-Training and working under the direct supervision of a
      Licensed Engineer.

2.04 SUBMITTALS
   A. Items identified in the contract documents to be submitted by the contractor. Refer to individual
      sections of the specifications for specific items to be submitted.

2.05 FIELD OBSERVATIONS
   A. Visits to the jobsite by the structural engineer-of-record or his authorized representative to
      ascertain whether the work is generally in accordance with the structural contract documents.
      These observations are not exhaustive nor continuous.

PART 3 - PROCEDURAL REQUIREMENTS
3.01 SHOP DRAWINGS
   A. Refer to applicable section for specific requirements for number of copies to be submitted, time
      for review, etc. All submittals must come by way of the general contractor though the architect.
      Certain submittals, identified in specific sections of the specifications, generally regarding
      pre-engineered elements, will require a specialty engineer’s seal and signature.

3.02 FIELD OBSERVATIONS
   A. Structural engineer shall be notified at least 24 hours in advance of any concrete pour or other
      action that will cover up structural elements that have not been reviewed by the structural
      engineer. Refer to individual sections for specific stages of construction which require
      observation.

3.03 ENGINEER’S ACTIONS
   A. SHOP DRAWINGS
      1. As per General or Special Conditions, the structural engineer will review shop drawings for
         the limited purpose of checking for conformance with information given and the design
         concept expressed in the contract documents.
      2. The structural engineer-of-record shall review the submittals and return them to the
         architect with one of the following statements checked off on the stamp:
3. "NO exceptions Taken" informs the Architect that the structural engineer takes no exception to the submittal being approved as per and in accordance with AIA Document 201, section 4.2.7.

4. "Make Corrections Noted" informs the Architect that the structural engineer has made corrections on the submittals but otherwise takes no exception to the submittal being approved as per and in accordance with AIA Document 201, section 4.2.7.

5. "Revise and Resubmit" indicates important items must be corrected and resubmitted. Marks on the submittal may not necessarily cover all of the defects of the submittal. This action expresses the structural engineer's concern and his recommendation to the Architect that the submittal be reviewed and resubmitted as per and in accordance with AIA Document 201, section 4.2.7.

6. "Return One Corrected Copy For File" informs the Architect that the submittal may be approved as per AIA Document 201, section 4.2.7, but a corrected copy showing that corrections have been acknowledged must be returned for the structural engineer's file.

### 3.04 SHOP DRAWINGS WITH SPECIALTY ENGINEER'S SEAL AND SIGNATURE

A. Certain shop drawings may be identified in specific sections of the specifications pertaining to pre-engineered structural elements specified by the structural engineer-of-record and designed by specialty engineers. The structural engineer shall verify that submittals have received prior approvals as required by the contract documents. Submittals shall bear the signature and professional seal of the specialty engineer responsible for the design as required by the contract documents. The structural engineer shall review the submittal for type, position, and connection to other elements within the primary structural system, and for criteria and loads used for their design. Action on these submittals will be the same as for other shop drawings.

1. **SHOP DRAWINGS FOR NON-STRUCTURAL ELEMENTS**
   a. Submittal of shop drawings covering items not shown or specified on structural plans by the Structural Engineer will be reviewed only to verify that the specialty engineer sealing the drawings/calculations has generally followed usual and customary application of code-mandated loads and design procedures. These submittals will be stamped “REVIEWED” indicating that the items listed interface with the primary structural framing without deleterious effect and no further action is taken.

### 3.05 SITE VISITS

A. The structural engineer-of-record ("SER") will make site visits at intervals appropriate to the stage of construction and as defined by the contract to visually observe the quality and the progress of the construction work relative to the primary structural system. The general contractor is responsible to notify the SER when structural elements are ready for review and prior to their being covered up. Failure to do so may result in key observations not being made, preventing the engineer from recommending acceptance of the work. A written report will be made of each visit listing discrepancies, if any, and describing what was observed. One copy will be given to contractor's representative at the jobsite, and one copy will be mailed to the Architect. If a follow-up visit is necessary it will be so noted on the report.

1. The SER shall not have control over or charge of and shall not be responsible for construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work for This Part of the Project, since these are solely the Contractor's responsibility under the Contract for Construction. The SER shall not be responsible for the Contractor's or a Subcontractor's schedule or failure to carry out the Work in accordance with the Contract Documents. The SER shall not have control over or charge of acts or omissions of the Contractor, Subcontractors, their agents or employees or other persons performing portions of the Work.

END OF SECTION
SECTION 01 4000
QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Submittals.
B. References and standards.
C. Testing and inspection agencies and services.
D. Control of installation.
E. Mock-ups.
F. Manufacturers' field services.
G. Defect Assessment.

1.02 RELATED REQUIREMENTS
A. Document 00 7200 - General Conditions: Inspections and approvals required by public authorities.
B. General Conditions for City of Laredo Construction Contracts.
C. Section 01 3000 - Administrative Requirements: Submittal procedures.
D. Section 01 6000 - Product Requirements: Requirements for material and product quality.

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS
A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Design Data: Submit for Architect's knowledge as contract administrator for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents, or for Owner's information.
C. Test Reports: After each test/inspection, promptly submit two copies of report to Architect and to Contractor.
   1. Include:
      a. Date issued.
      b. Project title and number.
      c. Name of inspector.
      d. Date and time of sampling or inspection.
      e. Identification of product and specifications section.
      f. Location in the Project.
      g. Type of test/inspection.
      h. Date of test/inspection.
      i. Results of test/inspection.
      j. Compliance with Contract Documents.
      k. When requested by Architect, provide interpretation of results.
D. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities specified for Product Data.
   1. Indicate material or product complies with or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

E. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

F. Erection Drawings: Submit drawings for Architect's benefit as contract administrator or for Owner.
   1. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents.

1.05 REFERENCES AND STANDARDS

A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Comply with reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.

C. Obtain copies of standards where required by product specification sections.

D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.

E. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.

F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Architect shall be altered from Contract Documents by mention or inference otherwise in any reference document.

1.06 INSPECTIONS BY THE CONTRACTOR

A. Prior to the installation of materials over any substrate, inspect substrate to ensure supporting surface and construction are acceptable and adequate for its intended purpose and is complete and in an acceptable condition to receive subsequent layers. If subsequent construction will be installed by subcontractors, conduct inspections in the company of such subcontractors.

B. At the completion of the Work of any trade and before concealment of such work by subsequent construction, the General Contractor's Project Superintendent or his designated representative shall inspect the Work for compliance with Contract Documents and shall require any nonconforming work to be repaired or replaced.

1.07 TESTING AND INSPECTION AGENCIES AND SERVICES

A. Contractor shall employ and pay for services of an independent testing agency to perform other specified testing.

B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

C. Contractor Employed Agency:
PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.

D. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Have work performed by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 MOCK-UPS

A. Tests shall be performed under provisions identified in this section and identified in the respective product specification sections.

B. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.

C. Accepted mock-ups shall be a comparison standard for the remaining Work.

D. Where mock-up has been accepted by Architect and is specified in product specification sections to be removed, protect mock-up throughout construction, remove mock-up and clear area when directed to do so by Architect.

3.03 TESTING AND INSPECTION

A. See individual specification sections for testing and inspection required.

B. Testing Agency Duties:
   1. Test samples of mixes submitted by Contractor.
   3. Perform specified sampling and testing of products in accordance with specified standards.
   4. Ascertained compliance of materials and mixes with requirements of Contract Documents.
   5. Promptly notify Architect and Contractor of observed irregularities or non-compliance of Work or products.
   6. Perform additional tests and inspections required by Architect.
   7. Submit reports of all tests/inspections specified.

C. Limits on Testing/Inspection Agency Authority:
   1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
   2. Agency may not approve or accept any portion of the Work.
   3. Agency may not assume any duties of Contractor.
   4. Agency has no authority to stop the Work.

D. Contractor Responsibilities:
   1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.

3. Provide incidental labor and facilities:
   a. To provide access to Work to be tested/inspected.
   b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
   c. To facilitate tests/inspections.
   d. To provide storage and curing of test samples.

4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.

5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.

6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.

E. Re-testing required because of non-compliance with specified requirements shall be performed by the same agency on instructions by Architect.

F. Re-testing required because of non-compliance with specified requirements shall be paid for by Contractor.

3.04 MANUFACTURERS' FIELD SERVICES

A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance equipment, and ________ as applicable, and to initiate instructions when necessary.

B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.05 DEFECT ASSESSMENT

A. Replace Work or portions of the Work not complying with specified requirements.

END OF SECTION
SECTION 01 5000
TEMPORARY FACILITIES AND CONTROLS

PART 1  GENERAL

1.01  SECTION INCLUDES
A. Temporary sanitary facilities.
B. Temporary Controls: Barriers, enclosures, and fencing.
C. Security requirements.
D. Vehicular access and parking.
E. Waste removal facilities and services.

1.02  RELATED REQUIREMENTS
A. Section 01 5100 - Temporary Utilities.
B. Section 01 5500 - Vehicular Access and Parking.

1.03  TEMPORARY UTILITIES - SEE SECTION 01 5100
A. Provide and pay for all electrical power, lighting, water, heating and cooling, and ventilation required for construction purposes.
B. Existing facilities may not be used.
C. Use trigger-operated nozzles for water hoses, to avoid waste of water.

1.04  TEMPORARY ELECTRICITY
A. Provide main service disconnect and overcurrent protection at convenient location.
B. Permanent convenience receptacles may not be utilized during construction.

1.05  TEMPORARY WATER SERVICE
A. Provide water source for construction operations.
B. Extend branch piping with outlets located so water is available by hoses with threaded connections.
C. Provide temporary pipe insulation to prevent freezing.

1.06  TEMPORARY SANITARY FACILITIES
A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
B. Maintain daily in clean and sanitary condition.
C. At end of construction, return facilities to same or better condition as originally found.

1.07  BARRIERS
A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
B. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.08  FENCING
A. Construction: Contractor's option.
B. Provide 6 foot (1.8 m) high fence around construction site; equip with vehicular and pedestrian gates with locks.

1.09  VEHICULAR ACCESS AND PARKING - SEE SECTION 01 5500
A. Coordinate access and haul routes with governing authorities and Owner.
B. Provide and maintain access to fire hydrants, free of obstructions.
C. Provide means of removing mud from vehicle wheels before entering streets.
D. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.

1.10 WASTE REMOVAL
A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
B. Provide containers with lids. Remove trash from site periodically.
C. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.
D. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.
E. Continuously monitor site condition. When spills or dumping occur, determine identity of those responsible and take appropriate action to prevent further incidents.

1.11 TEMPORARY CONTROL
A. Protect site against contamination of all types. Instruct all employed about the site to properly dispose of all wastes, liquid or solid, to prevent possible contamination.
   1. Prohibit dumping of chemicals, paints, oils, solvents, cleaning agents, solid waste or any other compounds which might be detrimental to the site or those at the site.
   2. Dispose of all wastes in proper containers supplied by Contractor and serviced regularly (not less than weekly and more often as required by volume of debris being produces).
B. Continuously monitor site condition. When spills or dumping occur, deter identity of those responsible and take appropriate action to prevent further incidents.
C. Continuously monitor and manage nuisances arising from construction activities such as noise, dust pollution and debris. When possible, schedule construction activities to produce as little impact on adjoining and adjacent properties as possible.
D. Do not employ construction activities which produce excessive noise or dust. Control dust using sufficient water to prevent undue discomfort to neighbors and pedestrians.
E. Provide sedimentation control, erosion control and gravel construction drive to prevent contamination of adjacent water sheds and paved surfaces. Erect or install before commencement of activities at the site.

1.12 WATER CONTROL
A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion. Comply with local code requirements.

1.13 PROGRESS CLEANING
A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition. Continuously clean the site and the construction area, both exterior and interior.
B. Remove waste materials, debris, and rubbish from site weekly and dispose off-site in a lawful manner.
C. Remove dirt, mud, rocks and debris from paved surfaces surrounding project site. Maintain in clean condition. Clean paved surfaces at intervals commensurate with amounts of debris being deposited.
D. Clean the site and the construction areas, both interior and exterior, each Friday leaving the site and building clean and orderly over the weekend.
1.14 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, materials, prior to Date of Substantial Completion inspection.

B. Remove underground installations to a minimum depth of 2 feet (600 mm). Grade site as indicated.

C. Clean and repair damage caused by installation or use of temporary work.

D. Restore new permanent facilities used during construction to specified condition.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION
SECTION 01 6000
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES
A. General product requirements.
B. Transportation, handling, storage and protection.
C. Product option requirements.
D. Substitution limitations.
E. Procedures for Owner-supplied products.
F. Maintenance materials, including extra materials, spare parts, tools, and software.

1.02 RELATED REQUIREMENTS
A. Section 01 2500 - Substitution Procedures: Substitutions made during procurement and/or construction phases.
B. Section 01 4000 - Quality Requirements: Product quality monitoring.

PART 2 PRODUCTS

2.01 NEW PRODUCTS
A. Products: Means material, machinery, components, equipment, fixtures, and systems forming the Work. Products does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components required for reuse.
B. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.
C. Provide new products unless specifically required or permitted by Contract Documents.
D. Use of products having any of the following characteristics is not permitted:
   1. Made using or containing CFC's or HCFC's.

2.02 VERIFICATION OF NON-CONTAMINATION
A. Submit Contractor's written certification that the materials used in the constructin of the Project are totally free of all forms of polychlorinated biphenyl (PCB) or asbestos, including actinolite, amosite, anthophyllite, chrysotile, crocidolite, and tremolite.
B. For each of the following materials provided, submit a letter from the manufacturer certifying that products are totally free of all forms of polychlorinated byphenyl (PCB) or asbestos, including actinolite, amosite, anthophyllite, chrysotile, crocidolite, and tremolite.
   1. Low density fill.
   2. Fireproofing/fire stopping.
   3. Dampproofing.
   5. Sealants.
   6. Prefabricated wall panels or siding.
   8. Mechanical insulation.
   10. Other products indicated in the specification.
C. Do not use products containing lead based solders for installation of the potable water supply or in the manufacture of any component that will be connected to the potable water supply.
2.03 PRODUCT OPTIONS
A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.
C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

2.04 MAINTENANCE MATERIALS
A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.
B. Deliver to Project site; obtain receipt prior to final payment.

PART 3 EXECUTION
3.01 SUBSTITUTION LIMITATIONS
A. See Section 01 2500 - Substitution Procedures.
B. Supplementary Conditions of the Contract specify time restrictions and requirements for submitting requests for Substitutions in addition to requirements specified in this Section.
C. A request for substitution constitutes a representation that the submitter:
   1. Has complied with the representations, certifications and agreements listed in the Supplementary Conditions of the Contract.
   2. Agrees to be responsible for all costs incurred by all trades which result from each substitution of material or equipment including costs for additional time required of the Architect/Engineer to plan the relocation or rearrangement of physical features of the project to accommodate such substitutions.
   3. Agrees that, should a substitution be accepted and this substitution prove within the Guarantee Period to be defective or otherwise unsatisfactory for service for which it was intended, the Contractor shall replace defective material with material originally specified at no additional cost.
D. Requests for time extensions will not be approved for delays due to rejected substitutions.
E. No substitution will be allowed without the Architect's/Engineer's written approval.
F. Substitution Submittal Procedure:
   1. If proposed substitution is rejected, supply specified product.

3.02 TRANSPORTATION AND HANDLING
A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.
B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.
C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
D. Transport and handle products in accordance with manufacturer's instructions.
E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.
H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.
3.03 STORAGE AND PROTECTION

A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication. See Section 01 7419.

B. Store and protect products in accordance with manufacturers' instructions.

C. Store with seals and labels intact and legible.

D. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.

E. For exterior storage of fabricated products, place on sloped supports above ground.

F. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.

G. Comply with manufacturer's warranty conditions, if any.

H. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

I. Prevent contact with material that may cause corrosion, discoloration, or staining.

J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

K. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION
SECTION 01 7000
EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Examination, preparation, and general installation procedures.
B. Cutting and patching.
C. Surveying for laying out the work.
D. Cleaning and protection.
E. Starting of systems and equipment.
F. Demonstration and instruction of Owner personnel.
G. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.

1.02 RELATED REQUIREMENTS
A. General Conditions for City of Laredo Construction Contract
B. Section 01 3000 - Administrative Requirements: Submittals procedures, Electronic document submittal service.
C. Section 01 4000 - Quality Requirements: Testing and inspection procedures.

1.03 SUBMITTALS
A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.
   1. On request, submit documentation verifying accuracy of survey work.
   2. Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in compliance with Contract Documents.
   3. Submit surveys and survey logs for the project record.
C. Project Record Documents: Accurately record actual locations of capped and active utilities.

1.04 QUALIFICATIONS
A. For surveying work, employ a land surveyor registered in the State in which the Project is located and acceptable to Architect. Submit evidence of surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate. Employ only individual(s) trained and experienced in collecting and recording accurate data relevant to ongoing construction activities,
B. For field engineering, employ a professional engineer of the discipline required for specific service on Project, licensed in the State in which the Project is located. Employ only individual(s) trained and experienced in establishing and maintaining horizontal and vertical control points necessary for laying out construction work on project of similar size, scope and/or complexity.

1.05 PROJECT CONDITIONS
A. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.
B. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
C. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
D. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
   1. Minimize amount of bare soil exposed at one time.
   2. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.
   3. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
   4. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

E. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.

F. Pest and Rodent Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.

G. Rodent Control: Provide methods, means, and facilities to prevent rodents from accessing or invading premises.

H. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

1.06 COORDINATION

A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

B. Notify affected utility companies and comply with their requirements.

C. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

D. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on drawings. Follow routing indicated for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

E. Coordinate completion and clean-up of work of separate sections.

F. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner’s activities.

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

A. New Materials: As specified in product sections; match existing products and work for patching and extending work.

B. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.
D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.

E. Verify that utility services are available, of the correct characteristics, and in the correct locations.

F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

A. Provide temporary supports to ensure structural integrity of the Work. Provide devices and methods to protect other portions of Project from damage.

B. Provide protection from elements for areas which may be exposed by uncovering work.

C. Maintain excavations free of water.

D. Clean substrate surfaces prior to applying next material or substance.

E. Seal cracks or openings of substrate prior to applying next material or substance.

F. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 LAYING OUT THE WORK

A. Verify locations of survey control points prior to starting work.

B. Promptly notify Architect of any discrepancies discovered.

C. Protect survey control points prior to starting site work; preserve permanent reference points during construction.

D. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.

E. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.

F. Utilize recognized engineering survey practices.

G. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:

   1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations; and ________.
   2. Grid or axis for structures.
   3. Building foundation, column locations, ground floor elevations, and ________.

H. Periodically verify layouts by same means.

I. Maintain a complete and accurate log of control and survey work as it progresses.

3.04 GENERAL INSTALLATION REQUIREMENTS

A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.

B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.

C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.

D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.

E. Make neat transitions between different surfaces, maintaining texture and appearance.

3.05 CUTTING AND PATCHING

A. Whenever possible, execute the work by methods that avoid cutting or patching.
B. Perform whatever cutting and patching is necessary to:
   1. Complete the work.
   2. Fit products together to integrate with other work.
   3. Match work that has been cut to adjacent work.
   4. Repair areas adjacent to cuts to required condition.
   5. Repair new work damaged by subsequent work.
   6. Remove samples of installed work for testing when requested.
   7. Remove and replace defective and non-complying work.

C. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.

D. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.

E. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

F. Restore work with new products in accordance with requirements of Contract Documents.

G. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

H. Patching:
   1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
   2. Match color, texture, and appearance.
   3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.06 PROGRESS CLEANING
A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.07 PROTECTION OF INSTALLED WORK
A. Protect installed work from damage by construction operations.

B. Provide special protection where specified in individual specification sections.

C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

G. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.
3.08 SYSTEM STARTUP
   A. Coordinate schedule for start-up of various equipment and systems.
   B. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.
   C. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
   D. Verify that wiring and support components for equipment are complete and tested.
   E. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.
   F. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.09 DEMONSTRATION AND INSTRUCTION
   A. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.
   B. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
   C. Provide a qualified person who is knowledgeable about the Project to perform demonstration and instruction of Owner's personnel.

3.10 ADJUSTING
   A. Adjust operating products and equipment to ensure smooth and unhindered operation.

3.11 FINAL CLEANING
   A. Execute final cleaning prior to final project assessment.
   B. Use cleaning materials that are nonhazardous.
   C. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
   D. Clean debris from roofs and drainage systems.
   E. Clean site; sweep paved areas, rake clean landscaped surfaces.
   F. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

END OF SECTION
SECTION 01 7800
CONTRACT CLOSEOUT

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Closeout Procedures.
B. Final Cleaning.
C. Adjusting.
D. Project Record Documents.
E. Operation and Maintenance Data.
F. Warranties and bonds.
G. Spare parts and maintenance manuals.

1.02 RELATED REQUIREMENTS
A. Section 00 7200 - General Conditions: Performance bond and labor and material payment bonds, warranty, and correction of work.
B. Section 01 5000 - Construction Facilities and Temporary Controls: Progress cleaning.
C. Section 01 3000 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
D. Section 01 7000 - Execution and Closeout Requirements: Contract closeout procedures.
E. Individual Product Sections: Specific requirements for operation and maintenance data.
F. Individual Product Sections: Warranties required for specific products or Work.

1.03 CLOSEOUT PROCEDURES
A. Immediately prior to request for Substantial Completion, inspect the Work and replace all materials or portions of the construction that are damaged, defaced, stained, faded, scratched, abraded, chipped, cracked or in any manner rendered unsightly.
B. Before requesting Substantial Completion review, prepare a list of items to be completed and/or corrected (Punch List), the value of items on the list, and reasons why the work is not complete.
C. When Contractor considers Work or designated portion of Work is substantially complete, submit: 1) request for Substantial completion review with a list of items to be completed or corrected, one of which shall not be cleaning and 2) Record Documents as required below.
D. Submit written certification that Contract Documents have been reviewed, Work has been inspected and that Work is complete in accordance with Contract Documents.
E. Submit to Architect/Engineer with written request for review Certificate of Occupancy or evidence that request for Certificate of Occupancy has been sent to city of Jourdanton and that Certificate of Occupancy has been denied or is being withheld through no fault of the Contractor.
F. After receipt of required submittals, Architect/Engineer will schedule review.
G. Should Architect/Engineer review find Work is not substantially complete, he will promptly notify Contractor in writing, listing observed deficiencies.
H. Contractor shall remedy deficiencies and send a second written notice for review.
I. Architect/Engineer will re-review the work.
J. If Architect has to review work more than three (3) times, a Change Order will be issued for the amount of time the Architect must spend, so that the Owner can get credit for the time and then pay the Architect.
K. When Architect/Engineer finds Work is substantially complete he will prepare a Certificate of Substantial Completion in accordance with provisions of General Conditions with a revised tentative list of items to be completed or corrected (Punch List).

L. Complete modifications or correction required by Punch List within 14 days from date of receipt of Punch List.

1.04 FINAL CLEANING

A. Execute final cleaning prior to final inspection.

B. In general:
   1. Clean interior and exterior glass and surfaces exposed to view.
   2. Polish transparent and glossy surfaces to a bright clean shine.
   4. Mop hard surfaced finish flooring. Waxing is not required.
   5. Clean light fixtures, plumbing fixtures and interior equipment.
   6. Remove temporary labels, stains and foreign substances.

C. Use only materials and methods recommended by manufacturer of material being cleaned.

D. Use materials which will not create hazards to health or property, and which will not damage surfaces.

E. Clean equipment and fixtures to a sanitary condition.

F. Replace filters of operating equipment. Service permanent equipment placed in service during construction. Return to like new condition.

G. Clean debris from roofs, gutters, downspouts, and drainage systems.

H. Clean site; wash and sweep paved areas, rake clean landscaped surfaces.

I. Remove waste and surplus materials, rubbish, and construction facilities from the site.

1.05 ADJUSTING

A. Adjust operating Products and equipment to ensure smooth and unhindered operation.

1.06 SUBMITTALS

A. Evidence of Compliance with Requirements of Governing Authorities:
   1. Certificates of Inspection.
   2. Certificate of Occupancy, if not previously delivered.

B. Keys and Keying Schedule: Under provisions of Section 08710.

C. Evidence of Payment and Release of Liens: In accordance with Conditions of the Contract.

D. Consent of Surety to Final Payment.

E. Certificates of Insurance for Products and Completed Operations: In accordance with Supplementary Conditions.

F. Final closeout submittals not previously received.

G. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.

H. Operation and Maintenance Data:
   1. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.

I. Warranties and Bonds:
   1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
   2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

J. Subcontractors list with address, phone numbers, fax numbers and contact person name.

K. Warranties.

L. Release of Liens.

M. General:
   1. All CADD disc shall be "Autocad" on CD Rom.
   2. All text disc to be "WordPerfect" or "Word".

1.07 STATEMENT OF ADJUSTMENT OF ACCOUNTS
   A. Submit final statement reflecting adjustments to Contract Sum indicating:
      1. Original Contract Sum.
      2. Previous Change Orders
      3. Changes under allowances
      4. Deductions for uncorrected work
      5. Deductions for Architect's additional services originating from substitutions
      6. Deductions for reinspection fees
      7. Other adjustments to Contract Sum
      8. Total Contract Sum as adjusted
      9. Previous payments
     10. Sum remaining due
   B. Architect/Engineer will issue a final Change Order, if required, reflecting approved adjustments to Contract Sum not previously made by Change Orders.

1.08 APPLICATION FOR FINAL PAYMENT
   A. Submit application for final payment in accordance with provisions of Conditions of the Contract.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS
   A. Maintain on site one set of the following record documents; record actual revisions to the Work:
      1. Drawings.
      2. Specifications.
      3. Addenda.
      4. Change Orders and other modifications to the Contract.
      5. Reviewed shop drawings, product data, and samples.
      6. Manufacturer's instruction for assembly, installation, and adjusting.
      7. Test and inspection reports from testing laboratory.
   B. Ensure entries are complete and accurate, enabling future reference by Owner.
   C. Store record documents separate from documents used for construction.
   D. Record information concurrent with construction progress.
   E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
      1. Manufacturer's name and product model and number.
         a. and serial number.
      2. Product substitutions or alternates utilized.
      3. Changes made by Addenda and modifications.
         a. with corresponding Addenda or Modification number.
F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
   1. Measured depths of foundations in relation to finish first floor datum.
   2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
   3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
   4. Field changes of dimension and detail.
   5. Submit all Record Documents to Architect with claim for Substantial Completion inspection.

3.02 OPERATION AND MAINTENANCE DATA
A. Submit one copy of completed set of volumes in final form with request for Substantial Completion inspection. This copy will be returned after Substantial Completion with Architect comments. Revise content of documents as required prior to final submittal.
B. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
C. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
D. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.

3.03 SPARE PARTS AND MAINTENANCE MATERIALS
A. Provide products, spare parts, maintenance and extra materials in quantities specified in individual specification Sections.
B. Deliver to Project site and place in locations as directed; obtain receipt prior to final payment.
C. The Contractor shall provide services of skilled and competent supervisory personnel to instruct the Owner’s personnel in the operation and maintenance of all operating equipment and systems provided as part of the Contract.

3.04 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES
A. For Each Product, Applied Material, and Finish:
   1. Product data, with catalog number, size, composition, and color and texture designations.
   2. Information for re-ordering custom manufactured products.
B. Instructions for Care and Maintenance: Manufacturer’s recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
C. Where additional instructions are required, beyond the manufacturer’s standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

3.05 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS
A. For Each Item of Equipment and Each System:
   1. Description of unit or system, and component parts.
   2. Identify function, normal operating characteristics, and limiting conditions.
   3. Include performance curves, with engineering data and tests.
   4. Complete nomenclature and model number of replaceable parts.
B. Where additional instructions are required, beyond the manufacturer’s standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
C. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
D. Include color coded wiring diagrams as installed.

E. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

F. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

G. Provide servicing and lubrication schedule, and list of lubricants required.

H. Include manufacturer's printed operation and maintenance instructions.

I. Include sequence of operation by controls manufacturer.

J. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

K. Provide control diagrams by controls manufacturer as installed.

L. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

M. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

N. Include test and balancing reports.

O. Additional Requirements: As specified in individual product specification sections.

3.06 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.

B. Where systems involve more than one specification section, provide separate tabbed divider for each system.

C. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.

D. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.

E. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.

F. Text: Manufacturer's printed data, or typewritten data on 24 pound paper.

G. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

H. Arrange content by systems under section numbers and sequence of Table of Contents of this Project Manual.

I. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, in three parts as follows:
   1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect, Contractor, Subcontractors, and major equipment suppliers.
      a. Air and water balance reports.
      b. Certificates.
      c. Photocopies of warranties and bonds.

J. Provide a listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.
K. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of
Architect, Consultants, and Contractor with name of responsible parties; schedule of products
and systems, indexed to content of the volume.

3.07 WARRANTIES AND BONDS
A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers,
and manufacturers, within 10 days after completion of the applicable item of work. Except for
items put into use with Owner’s permission, leave date of beginning of time of warranty until
Date of Substantial completion is determined.
   1. Submit prior to final Application for Payment.
B. Verify that documents are in proper form, contain full information, and are notarized.
C. Co-execute submittals when required.
D. Retain warranties and bonds until time specified for submittal.
E. For items of Work delayed beyond date of Substantial Completion, provide updated submittal
within ten days after acceptance, listing date of acceptance as start of warranty period.
F. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of
Project; name, address and telephone number of Contractor and equipment supplier; and name
of responsible company principal.
G. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project
Manual, with each item identified with the number and title of the specification section in which
specified, and the name of product or work item.
H. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing.
Provide full information, using separate typed sheets as necessary. List Subcontractor,
supplier, and manufacturer, with name, address, and telephone number of responsible principal.

END OF SECTION
SECTION 03 1000
CONCRETE FORMING AND ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Formwork for cast-in-place concrete, with shoring, bracing and anchorage.
B. Openings for other work.
C. Form accessories.
D. Form stripping.

1.02 RELATED REQUIREMENTS
A. Section 03 2000 - Concrete Reinforcing.
B. Section 03 3000 - Cast-in-Place Concrete.
C. Section 05 1200 - Structural Steel Framing: Placement of embedded steel anchors and plates in cast-in-place concrete.

1.03 REFERENCE STANDARDS
B. ACI 301 - Specifications for Structural Concrete; 2010 (Errata 2012).
C. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2011.
D. ACI 347R - Guide to Formwork for Concrete; 2014.
H. PS 1 - Structural Plywood; 2009.

1.04 SUBMITTALS
A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Shop Drawings: Indicate pertinent dimensions, materials, bracing, and arrangement of joints and ties.
C. Shop Drawings: Indicate layout of prefabricated forms, including beams, drops and proposed concrete pour breaks.

1.05 QUALITY ASSURANCE
A. Designer Qualifications: Design formwork under direct supervision of a Professional Structural Engineer experienced in design of concrete formwork and licensed in Texas.
B. Maintain one copy of each installation standard on site throughout the duration of concrete work.

1.06 DELIVERY, STORAGE, AND HANDLING
A. Deliver prefabricated forms and installation instructions in manufacturer's packaging.
B. Store prefabricated forms off ground in ventilated and protected manner to prevent deterioration from moisture.

PART 2 PRODUCTS

2.01 FORMWORK - GENERAL
A. Provide concrete forms, accessories, shoring, and bracing as required to accomplish cast-in-place concrete work.
B. Design and construct concrete that complies with design with respect to shape, lines, and dimensions.
C. Comply with applicable State and local codes with respect to design, fabrication, erection, and removal of formwork.
D. Comply with relevant portions of ACI 347R, ACI 301, and ACI 318.

2.02 WOOD FORM MATERIALS
A. Softwood Plywood: PS 1, B-B High Density Concrete Form Overlay, Class I.

2.03 PERMANENT PREFabricated FOAM PANEL FORMWORK
A. Floor/Roof Deck Forms: Pre-engineered expanded polystyrene foam plastic deck and beam/joist forms with factory installed metal channel furring strips flush with face of panel and field installed form stiffener slots.
   1. Structural Performance: In accordance with applicable code.
   2. Form Cross Section: As indicated on drawings; flat-bottomed solid foam blocks with voids only for stiffeners and beam/joist cross-section; interlocking long edges.
B. Expanded Polystyrene (EPS) Insulation Board: ASTM C578, Type VIII.
   1. Density: 1.0 pounds per cubic foot.
   2. Compressive Strength of 10.0 psi with a maximum 5% deformation.
   3. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
   4. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.

2.04 FORMWORK ACCESSORIES
A. Form Ties: Removable type, galvanized metal, fixed length, cone type, with waterproofing washer, 3/4 inch back break dimension, free of defects that could leave holes larger than 1 inch in concrete surface.
B. Form Release Agent: Capable of releasing forms from hardened concrete without staining or discoloring concrete or forming bugholes and other surface defects, compatible with concrete and form materials, and not requiring removal for satisfactory bonding of coatings to be applied.
C. Form Release Agent: Colorless mineral oil that will not stain concrete.
D. Dovetail Anchor Slot: Galvanized steel, at least 22 gage, 0.0299 inch thick, foam filled, release tape sealed slots, anchors for securing to concrete formwork.
E. Flashing Reglets: Galvanized steel, at least 22 gage, 0.0299 inch thick, longest possible lengths, with alignment splines for joints, foam filled, release tape sealed slots, anchors for securing to concrete formwork.
F. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.
G. Embedded Anchor Shapes, Plates, Angles and Bars: As specified in Section 05 1200.
H. Waterstops: Rubber, minimum 1,750 psi tensile strength, minimum 50 degrees F to plus 175 degrees F working temperature range, maximum possible lengths, ribbed profile, preformed corner sections, heat welded jointing.

PART 3 EXECUTION
3.01 EXAMINATION
A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.02 EARTH FORMS
A. Hand trim sides and bottom of earth forms. Remove loose soil prior to placing concrete.

3.03 ERECTION - FORMWORK
A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.
B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.

C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.

D. Align joints and make watertight. Keep form joints to a minimum.

E. Obtain approval before framing openings in structural members that are not indicated on drawings.

F. Coordinate this section with other sections of work that require attachment of components to formwork.

G. If formwork is placed after reinforcement, resulting in insufficient concrete cover over reinforcement, request instructions from Architect/Structural Engineer of Record before proceeding.

3.04 APPLICATION - FORM RELEASE AGENT

A. Apply form release agent on formwork in accordance with manufacturer’s recommendations.

B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.

C. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.05 REMOVAL OF FORMS

A. Side forms of beams, walls and columns may be removed after cumulatively curing at not less than 50 degrees F (10 degrees C) for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form removal operations, and provided curing and protection operations are maintained.

B. Wall, beam, joist and slab soffits may be removed when all of the following conditions are satisfied:
   1. Strength of concrete as shown by standard cylinder test has reached at least 2,500 psi and at least 75% of specified design strength.
   2. Concrete has cured at least 7 days (4 days for type 3 cement) or additional time as required if during cold weather.
   3. Soffit forms shall not be removed from members that are supporting any load such as construction materials or shoring for floor or roof above unless it can be determined that the member has sufficient strength to support such loading.

3.06 INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Provide formed openings where required for items to be embedded in passing through concrete work.

B. Locate and set in place items that will be cast directly into concrete.

C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.

D. Position recessed anchor slots for brick veneer masonry anchors to spacing and intervals specified in Section 04 2001.

E. Install accessories in accordance with manufacturer’s instructions, so they are straight, level, and plumb. Ensure items are not disturbed during concrete placement.

F. Install waterstops in accordance with manufacturer's instructions, so they are continuous without displacing reinforcement. Heat seal joints so they are watertight.

G. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.

H. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.
3.07 FORM CLEANING
   A. Clean forms as erection proceeds, to remove foreign matter within forms.
   B. Clean formed cavities of debris prior to placing concrete.
      1. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.
      2. During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

3.08 FORMWORK TOLERANCES
   A. Construct formwork to maintain tolerances required by ACI 117, unless otherwise indicated.
   B. Construct permanent insulated foam panel formwork to maintain tolerances required by ACI 301.
   C. Construct and align formwork for elevator hoistway in accordance with ASME A17.1.
   D. Camber slabs and beams 1/4 inch per 10 feet.

3.09 FORMWORK FINISH
   A. Construct formwork in accordance with ACI 347, unless otherwise indicated.
   B. Refer to architectural drawings for exposure of formed surfaces.
      1. The following defines class of finish:
         a. Class A - Surfaces prominently exposed to public view where appearance is of special importance, typically noted on architectural drawings as "exposed"
         b. Class B - Coarse textured concrete formed surface intended to receive plaster, stucco or wainscoting.
         c. Class C - General standard for permanently exposed surfaces where other finishes are not specified.
         d. Class D - Minimal quality requirement for surfaces where roughness is not objectionable, usually applied where surface will be permanently concealed.

3.10 FIELD QUALITY CONTROL
   A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.
   B. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and to verify that supports, fastenings, wedges, ties, and items are secure.
   C. Do not reuse wood formwork more than 2 times for concrete surfaces to be exposed to view. Do not patch formwork.

3.11 FORM REMOVAL
   A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.
   B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.
   C. Store removed forms to prevent damage to form materials or to fresh concrete. Discard damaged forms.

END OF SECTION
SECTION 03 2000
CONCRETE REINFORCING

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Reinforcing steel for cast-in-place concrete.
B. Supports and accessories for steel reinforcement.

1.02 RELATED REQUIREMENTS
A. Section 03 1000 - Concrete Forming and Accessories.
B. Section 03 3000 - Cast-in-Place Concrete.
C. Section 04 2000 - Unit Masonry: Reinforcement for masonry.

1.03 REFERENCE STANDARDS
A. ACI 301 - Specifications for Structural Concrete; 2010 (Errata 2012).
B. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2011.
F. ASTM A996/A996M - Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement; 2014.
I. CRSI (P1) - Placing Reinforcing Bars; 2011.

1.04 SUBMITTALS
A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Shop Drawings: Comply with requirements of ACI SP-66. Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.
C. The Contractor shall obtain completely detailed shop drawings showing placement plans, bar bending lists, etc. Include the specific location and size of all accessories, chairs and bar supports. The Contractor shall carefully check these drawings, then submit them to the Architect/Engineer. The Architect/Engineer may conduct limited spot checks aimed solely at determining general comprehension of the design intent, then return them to the Contractor. The Contractor shall then carefully recheck the shop drawings and approve them prior to fabrication.
1. NOTE: Regardless of the fabricators standard policy or other industry standards of practice, all straight and bent bars shall be tagged with the member mark. If the fabricator elects to use member marks other than those shown on the structural drawings, the members must also be labeled with the original engineer's member marks in addition to those of the fabricator.
D. The Engineer's spot check shall not relieve the Contractor from correcting, at his own expense, any items that may thereafter be found not to comply with the plans and specifications.
E. Manufacturer's Certificate: Certify that reinforcing steel and accessories supplied for this project meet or exceed specified requirements.
F. Reports: Submit certified copies of mill test report of reinforcement materials analysis.

1.05 QUALITY ASSURANCE
A. Perform work of this section in accordance with ACI 301.
PART 2 PRODUCTS

2.01 REINFORCEMENT

A. ALL REINFORCING (Unless noted otherwise)
   1. Reinforcing Steel:  ASTM A615/A615M, Grade 60 (60,000 psi).
      a. Plain billet-steel bars.

B. BEAM STIRRUPS and COLUMN TIES
   1. Reinforcing Steel:  Deformed bars, ASTM A996/A996M Grade 40 (280), Type A.

C. Reinforcement Accessories:
   1. Tie Wire:  Annealed, minimum 16 gage, 0.0508 inch.
   2. Chairs, Bolsters, Bar Supports, Spacers:  Sized and shaped for adequate support of reinforcement during concrete placement.

2.02 FABRICATION

A. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice.
B. Welding of reinforcement is not permitted.
C. Locate reinforcing splices not indicated on drawings at point of minimum stress.
   1. Review locations of splices with Architect/Structural Engineer of Record.

PART 3 EXECUTION

3.01 PLACEMENT

A. Place, support and secure reinforcement against displacement.  Do not deviate from required position.
B. Do not displace or damage vapor barrier.
C. Accommodate placement of formed openings.

3.02 FABRICATION

A. Reinforcing shall be fabricated in accordance with "Manual of Standard Building Code Requirements for Reinforced Concrete" (ACI 318), latest edition.  The Contractor shall be responsible for obtaining properly fabricated reinforcing and placing it properly.
B. Reinforcing steel, at the time concrete is placed, shall be free from excessive rust, scale, dried concrete, or other coatings that will destroy or reduce bond, in the opinion of the Engineer.
C. Reinforcing steel shall be accurately shop bent and placed in position, securely tied or supported to prevent movement during placing of concrete.  Field bends will not be permitted without prior approval from Engineer.  Authorized field bends shall be performed cold; no heating is permitted.  Spacer bars, supports and accessories are not scheduled but are to be furnished and placed as described under MATERIALS paragraph in this Section.  Raising of reinforcement (including welded wire fabric) during the pour will not be permitted.

3.03 CONCRETE COVER

A. SLAB AND BEAMS ON FILL
   1. Chair and/or block reinforcing securely in position with concrete cover as follows:
      a. Beam stirrups; top, 1-1/2", bottom and sides 3".
      b. Slab bars; 1-1/2" from top.
   2. Support reinforcing steel on concrete blocks or bricks spaced at approximately 4'-0" o.c. in each direction.

3.04 SPLICES

A. Necessary splices not shown on drawings or otherwise noted shall be in accordance with ACI specifications for bar sizes up to #11 size, but not less than 40 bar diameters.  Splices in bars larger than #11 shall be made with approved thermal or mechanical coupling devices.  Welding wire fabric shall be lapped 1-1/2 meshes, with a minimum lap of 8".  All lap splices shall be contact type secured with annealed tie wire.
3.05 SLAB OPENINGS
   A. Unless shown otherwise, at slab openings of 12" or less, spread main reinforcing around
      opening. At slab openings greater than 12", provide 2 #4x4'-0" bottom placed diagonally at
      each corner. At sides of openings, provide one full bar for each bar cut at opening. No main
      bars shall be cut without Engineer's approval.

3.06 CONDUITS IN SLABS
   A. Electrical and mechanical conduit in slabs or joists shall run under upper layer of reinforcing or
      wire mesh; provide a minimum of 1-1/2" clear between conduits and between conduit and
      parallel reinforcing. Do not "bundle" conduits. See CONCRETE FORMWORK Section for
      thickened slab required at large conduits.

3.07 BEAM INTERSECTIONS
   A. Unless shown otherwise on plans, at corners, angle bends and at junction with other beams,
      provide four #7x6'-0" "corner bars" (3 ft. each leg) , 2 top and 2 bottom. For deep beams with
      scheduled intermediate bars, provide matching 80 diameter corner bars" of the same size. At
      "T" intersection, place all "corner bars" so that one leg is in outside face of outside beam.

3.08 TOPPING REINFORCEMENT
   A. Reinforcement (including welded wire fabric) shall be chaired to proper depth as shown on
      plans and sections. Raising of reinforcement during pour is not acceptable.
   B. CONSTRUCTION JOINTS
   C. Provide and locate as necessary in CAST-IN-PLACE CONCRETE Section.
   D. All reinforcing shall continue through the joint.
   E. Add extra reinforcing if so directed by Engineer.

3.09 FIELD QUALITY CONTROL
   A. An independent testing agency, as specified in Section 01 4000 - Quality Requirements, will
      inspect installed reinforcement for compliance with contract documents before concrete
      placement.

END OF SECTION
SECTION 03 3000
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Floors and slabs on grade.
B. Concrete reinforcement.
C. Joint devices associated with concrete work.

1.02 RELATED REQUIREMENTS

A. Section 03 1000 - Concrete Forming and Accessories:  Forms and accessories for formwork.
B. Section 03 2000 - Concrete Reinforcing.
C. Section 03 3511 - Concrete Floor Finishes:  Densifiers, hardeners, applied coatings, and polishing.
D. Section 07 9200 - Joint Sealants:  Products and installation for sealants and joint fillers for saw cut joints and isolation joints in slabs.

1.03 REFERENCE STANDARDS

B. ACI 301 - Specifications for Structural Concrete; 2010 (Errata 2012).
C. ACI 302.1R - Guide for Concrete Floor and Slab Construction; 2004 (Errata 2007).
E. ACI 305R - Hot Weather Concreting; 2010.
F. ACI 306R - Cold Weather Concreting; 2010.
G. ACI 308R - Guide to Curing Concrete; 2001 (Reapproved 2008).
H. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2011.
W. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2015.
AB. ASTM D994/D994M - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type); 2011.
AC. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types); 2004 (Reapproved 2013).
AD. ASTM D2103 - Standard Specification for Polyethylene Film and Sheeting; 2015.
AE. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs; 2011.
AF. COE CRD-C 513 - COE Specifications for Rubber Waterstops; 1974.
AG. COE CRD-C 572 - Corps of Engineers Specifications for Polyvinylchloride Waterstop; 1974.

1.04 SUBMITTALS
A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Mix Design: Submit mix design for each type of concrete proposed.
C. Product Data: Submit manufacturers’ data on manufactured products showing compliance with specified requirements and installation instructions.
D. Samples: Submit samples of underslab vapor retarder to be used.
E. Test Reports: Submit report for each test or series of tests specified.

1.05 QUALITY ASSURANCE
A. Perform work of this section in accordance with ACI 301 and ACI 318.
B. Follow recommendations of ACI 305R when concreting during hot weather.
C. Follow recommendations of ACI 306R when concreting during cold weather.

1.06 MOCK-UP
A. Construct and erect mock-up panel for architectural concrete surfaces indicated to receive special treatment or finish as result of formwork.
   1. Panel Size: Sufficient to illustrate full range of treatment.
   2. Panel Size: 6 by 6 feet.
   3. Number of Panels: Two.
B. If requested by Architect/Structural Engineer of Record, cast concrete against mock-up panel. Obtain acceptance of resulting surface finish prior to erecting formwork.

PART 2 PRODUCTS

2.01 FORMWORK
A. Comply with requirements of Section 03 1000.

2.02 REINFORCEMENT MATERIALS
A. Comply with requirements of Section 03 2000.
2.03 CONCRETE MATERIALS
   A. Cement: ASTM C150/C150M, Type I - Normal Portland type.
      1. Acquire cement for entire project from same source.
   B. Fine and Coarse Aggregates: ASTM C33/C33M.
      1. Acquire aggregates for entire project from same source.
      2. Aggregates shall meet or exceed Class Designation of 5M per Table 4 or ASTM C33
   C. Lightweight Aggregate: ASTM C330/C330M.
   D. Fly Ash: ASTM C618, Class C or F.
   E. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.

2.04 ADMIXTURES
   A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.
   B. High Range Water Reducing and Retarding Admixture: ASTM C494/C494M Type G.
   C. High Range Water Reducing Admixture: ASTM C494/C494M Type F.
   D. Water Reducing and Accelerating Admixture: ASTM C494/C494M Type E.
   E. Water Reducing and Retarding Admixture: ASTM C494/C494M Type D.
   F. Accelerating Admixture: ASTM C494/C494M Type C.
   G. Retarding Admixture: ASTM C494/C494M Type B.
   H. Water Reducing Admixture: ASTM C494/C494M Type A.

2.05 ACCESSORY MATERIALS
   A. Underslab Vapor Retarder (Slab on Grade):
      1. Vapor retarder shall have an ASTM E-96 water vapor permeance not to exceed 0.009 perms when tested in accordance with ASTM E 1745 Class A, minimum 15 mils thick in accordance with ACI 302, 1R-04. Products: Stego Wrap (15 mil) by Stego Industries, Reef Griffylyn "15 mil green" by Reef Industries, Strata Barrier 16 mil by Strata Systems, Inc., or "15 mil Perminator" by W. R. Meadows.
   B. Non-Shrink Cementitious Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
      1. Minimum Compressive Strength at 48 Hours: 2,000 pounds per square inch.
      2. Minimum Compressive Strength at 28 Days: 7,000 pounds per square inch.
   C. Curing Materials: Comply with requirements of Section 03 3900.

2.06 BONDING AND JOINTING PRODUCTS
   A. Latex Bonding Agent: Non-redispersable acrylic latex, complying with ASTM C1059/C1059M, Type II.
   B. Epoxy Bonding System:
   C. Waterproofing Admixture Slurry: Slurry coat of Portland cement, sand, and crystalline waterproofing additive, mixed with water in proportions recommended by manufacturer to achieve waterproofing at cold joints in concrete.
      1. Manufacturers:
         c. Xypex Chemical Corporation; XYPEX Concentrate: www.xypex.com/#sle.
         d. Substitutions: See Section 01 6000 - Product Requirements.
   D. Waterstops: Rubber, complying with COE CRD-C 513.
      1. Configuration: Ribbed with centerbulb
      2. Size: 6”.
      3. Manufacturers:
a. Greenstreak Model 705.
b. Greenstreak Model 721 (for form saver).
c. Substitutions: See Section 01 6000 - Product Requirements.

E. Reglets: Formed steel sheet, galvanized, with temporary filler to prevent concrete intrusion during placement.
   1. Size: As indicated on drawings.

F. Slab Isolation Joint Filler: 1/2 inch thick, height equal to slab thickness, with removable top section that will form 1/2 inch deep sealant pocket after removal.

G. Joint Filler: Nonextruding, resilient asphalt impregnated fiberboard or felt, complying with ASTM D 1751, 1/4 inch thick and 4 inches deep; tongue and groove profile.

H. Joint Filler: Compressible asphalt mastic with felt facers, complying with ASTM D 994, 1/4 inch thick and 4 inches deep.

I. Slab Construction Joint Devices: Combination keyed joint form and screed, galvanized steel, with rectangular or round knockout holes for conduit or rebar to pass through joint form at 6 inches on center; ribbed steel stakes for setting.

2.07 CURING MATERIALS

A. Evaporation Reducer: Liquid thin-film-forming compound that reduces rapid moisture loss caused by high temperature, low humidity, and high winds; intended for application immediately after concrete placement.
   1. Manufacturers:
      b. SpecChem, LLC; SpecFilm Concentrate or SpecFilm: www.specchemllc.com/#sle.
      d. Substitutions: See Section 01 6000 - Product Requirements.

   1. Product dissipates within 4 to 6 weeks.
   2. Manufacturers:
      c. Substitutions: See Section 01 6000 - Product Requirements.

C. Curing Compound, Non-dissipating: Liquid, membrane-forming, clear, non-yellowing acrylic; complying with ASTM C309.
   4. VOC Content: OTC compliant.
   5. Manufacturers:

D. Moisture-Retaining Sheet: ASTM C171.
   1. Curing paper, regular.
   2. Polyethylene film, white opaque, minimum nominal thickness of 4 mil, 0.004 inch.
   3. White-burlap-polyethylene sheet, weighing not less than 3.8 ounces per square yard.

E. Polyethylene Film: ASTM D2103, 4 mil, 0.004 inch thick, clear.

F. Water: Potable, not detrimental to concrete.
2.08 CONCRETE MIX DESIGN

A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.

B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
   1. For trial mixtures method, employ independent testing agency acceptable to Architect/Structural Engineer of Record for preparing and reporting proposed mix designs.

C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.

D. Normal Weight Concrete:
   1. Compressive Strength, when tested in accordance with ASTM C 39/C 39M at 28 days: 3000 psi.
      a. Fly Ash Content: Maximum 20 percent of cementitious materials by weight.
      b. Cement Content: Minimum 470 lb per cubic yard.
      c. Maximum Slump: 5 inches.+/- 1/2".
         1) Slump shall be increased to 8 inches for drilled footings by means of chemical admixtures.
      d. Maximum Aggregate Size:
         1) SUSPENDED STRUCTURES
            (a) Unless detailed otherwise on plans maximum aggregate size shall be as follows:
               (1) Slabs on Metal Deck, 3/4".
         2) SLAB AND BEAMS ON FILL
            (a) Unless detailed otherwise on plans maximum aggregate size shall be as follows:
               (1) Beams and slabs, 1".

E. Control Low Strength Material (Flowable Fill):
   1. Compressive Strength, when tested in accordance with ASTM C 39/C 39M at 28 days: 50 to 100 psi.
   2. Cement Content: Minimum 100 lb per cubic yard.
   3. Fly Ash Content: Minimum 300 lb per cubic yard.
   4. Sand Content: Minimum 2,600 lb per cubic yard.
   5. Added Water Minimum 500 lb per cubic yard.

2.09 MIXING

A. On Project Site: Mix in drum type batch mixer, complying with ASTM C685/C685M. Mix each batch not less than 1-1/2 minutes and not more than 5 minutes.

B. Transit Mixers: Comply with ASTM C94/C94M.

C. Adding Water: If concrete arrives on-site with slump less than suitable for placement, do not add water that exceeds the maximum water-cement ratio or exceeds the maximum permissible slump.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.02 CONSTRUCTION JOINTS

A. Provide in monolithic concrete framing so that not more than 400 cubic yards is placed in one day and no side dimension of the section being concreted is greater than 150 feet. Larger areas shall be approved by the Engineer.

B. Locate so as not to impair the strength of the structure, and coordinate the location and details with the Architect/Engineer. Location shall generally be near the middle of the spans of slabs and beams with wood or steel-formed soffits. When soffits are formed with cardboard cartons, locate construction joint on centerline of pier.
C. Provisions shall be made for transfer of shear and other forces through the joint. Generally this shall consists of forming horizontal keyways at mid-depth, 1-1/2" deep X 1/3 of beam or slab depth and allowing all reinforcing to continue through the joint. Add extra reinforcing if so directed by Engineer.

D. Follow procedure for "Bonding new concrete to old", as described herein.

3.03 PREPARATION

A. Formwork: Comply with requirements of ACI 301. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.

B. Conduits in slab and beams.
   1. Conduits in slab shall run under reinforcing.
   2. No conduits shall cross in slab.
   3. Maintain minimum 1 1/2" clearance between individual conduits and conduit / reinforcing steel.
   4. Conduit shall not run parallel in the bottom or under beams.
   5. Conduit in concrete pan system shall refer to details on drawings for acceptable run locations.
   6. The maximum conduit size in beams and slab is 3/4" without engineers approval.
   7. Increase slab thickness where more than 6 conduits are grouped or where conduit must cross each other.

C. Verify that forms are clean and free of rust before applying release agent.

D. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.

E. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning and applying bonding agent in accordance to bonding agent manufacturer's instructions.
   1. Use epoxy bonding system for bonding to damp surfaces, for structural load-bearing applications, and where curing under humid conditions is required.
   2. Use latex bonding agent only for non-load-bearing applications.

F. Where new concrete with integral waterproofing is to be bonded to previously placed concrete, prepare surfaces to be treated in accordance with waterproofing manufacturer's instructions. Saturate cold joint surface with clean water, and remove excess water before application of coat of waterproofing admixture slurry. Apply slurry coat uniformly with semi-stiff bristle brush at rate recommended by waterproofing manufacturer.

G. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.

H. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade. Lap joints minimum 6 inches. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Repair damaged vapor retarder before covering.

3.04 INSTALLING REINFORCEMENT AND OTHER EMBEDDED ITEMS

A. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.

B. Install welded wire reinforcement in maximum possible lengths, and offset end laps in both directions. Splice laps with tie wire.

C. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with concrete placement.

D. Provide waterstop material at all joints below grade.

3.05 PLACING CONCRETE

A. Place concrete in accordance with ACI 304R.
B. Place concrete for floor slabs in accordance with ACI 302.1R.
C. Notify Architect/Structural Engineer of Record not less than 24 hours prior to commencement of placement operations.
D. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.
E. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

3.06 SLAB JOINTING
A. Locate joints as indicated on drawings.
B. Provide waterstop material per paragraph 2.06.C at all joints below grade and joints shown to have waterstop.
C. Anchor joint fillers and devices to prevent movement during concrete placement.
D. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.
E. Repair underslab vapor retarder damaged during placement of concrete reinforcing. Repair with vapor retarder material; lap over damaged areas minimum 6 inches and seal watertight.
F. Separate slabs on grade from vertical surfaces with joint filler.
G. Place joint filler in floor slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.
H. Extend joint filler from bottom of slab to within 1/2 inch of finished slab surface. Conform to Section 07 9005 for finish joint sealer requirements.
I. Install joint devices in accordance with manufacturer's instructions.
J. Install construction joint devices in coordination with floor slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.
K. Apply sealants in joint devices in accordance with Section 07 9005.
L. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
M. Place concrete continuously between predetermined expansion, control, and construction joints.
N. Do not interrupt successive placement; do not permit cold joints to occur.

3.07 FLOOR FLATNESS AND LEVELNESS
A. Flatness and levelness tolerances for floors shall conform to the requirements set forth in ACI 117, "Standard Tolerances for Concrete Construction and Materials", particularly section 4.5.6 and 4.5.7. Either of the following specifications is acceptable.
1. Face Floor Profile Numbers (F-Numbers):
   a. CONVENTIONAL, BULL-FLOATED; Flatness Ff = 15 Level Fl = 13
   b. CONVENTIONAL STRAIGHTEDGED; Flatness Ff = 20 Level Fl = 15
   c. FLAT; Flatness Ff = 30 Level Fl = 20
   d. VERY FLAT; Flatness Ff = 50 Level Fl = 30
2. 10-ft. Straightedge Method:
   a. CONVENTIONAL, BULL-FLOATED; 1/2 in.
   b. CONVENTIONAL, STRAIGHTEDGED; 5/16 in.
   c. FLAT; 3/16 in.
   d. VERY FLAT; 1/8 in.
B. Unless noted otherwise, slab surfaces shall conform to the following criteria:
1. Offices, classrooms, corridors, etc: FLAT.
2. Slabs (permanent or temporary) to be used as casting beds for job cast tilt walls: VERY FLAT
3. Warehouses, storerooms, equipment rooms: STRAIGHTEDGED.
4. Sidewalks, plazas, pavement: BULL-FLOATED.
5. Gymnasium Floors: VERY FLAT

3.08 SEPARATE FLOOR TOPPINGS
   A. Prior to placing floor topping, roughen substrate concrete surface and remove deleterious material. Broom and vacuum clean.
   B. Place required dividers, edge strips, reinforcing, and other items to be cast in.
   C. Apply bonding agent to substrate in accordance with manufacturer's instructions.
   D. Place concrete floor toppings to required lines and levels.
      1. Place topping in checkerboard panels not to exceed 20 feet in either direction.

3.09 FLOOR FLATNESS AND LEVELNESS TOLERANCES
   A. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

3.10 CONCRETE FINISHING
   A. Repair surface defects, including tie holes, immediately after removing formwork.
   B. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch or more in height.
   C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch or more in height. Provide finish as follows:
      1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.
   D. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
      1. Surfaces to Receive Thick Floor Coverings: "Wood float" as described in ACI 302.1R; thick floor coverings include quarry tile, ceramic tile, and Portland cement terrazzo with full bed setting system.
      2. Surfaces to Receive Thin Floor Coverings: "Steel trowel" as described in ACI 302.1R; thin floor coverings include carpeting, resilient flooring, seamless flooring, resinous matrix terrazzo, thin set quarry tile, and thin set ceramic tile.
      3. Other Surfaces to Be Left Exposed: Trowel as described in ACI 302.1R, minimizing burnish marks and other appearance defects.
         a. Chemical Hardener: See Section 03 3511.
   E. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at 1:100 nominal.

3.11 CURING AND PROTECTION
   A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
   B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
      1. Normal concrete: Not less than seven days.
      2. High early strength concrete: Not less than four days.
   C. Formed Surfaces: Cure by moist curing with forms in place for full curing period.
   D. Surfaces Not in Contact with Forms:
      1. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.
      2. Final Curing: Begin after initial curing but before surface is dry.

3.12 FIELD QUALITY CONTROL
   A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.
   B. Provide free access to concrete operations at project site and cooperate with appointed firm.
C. Concrete testing shall be at point of discharge. If concrete it pumped concrete shall be tested at the end of the discharge hose. If deposited directly from truck test may be made at truck.

D. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.

E. Compressive Strength Tests: ASTM C 39/C 39M. For each test, mold and cure four concrete test cylinders. Obtain test samples for every 80 cu yd or less of each class of concrete placed each day with a minimum of 50 cu yd between each test.

F. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.

G. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C143/C143M. Slump test shall be at point of discharge.

H. An independent testing agency will inspect all installed reinforcing for conformance to the contract documents

I. Reinforcing steel in structural concrete shall be observed by the structural engineer prior to pouring structural concrete. Refer to the Schedule of Preferred Site Observations By Structural Engineer on sheet S1.0 for required reinforcing site observations for structural concrete.

3.13 DEFECTIVE CONCRETE

A. Test Results: The testing agency shall report test results in writing to Architect/Structural Engineer of Record and Contractor within 24 hours of test.

B. Defective Concrete: Concrete not complying with required lines, details, dimensions, tolerances or specified requirements.

C. Repair or replacement of defective concrete will be determined by the Architect/Structural Engineer of Record. The cost of additional testing shall be borne by Contractor when defective concrete is identified.

D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect/Structural Engineer of Record for each individual area.

3.14 BELOW STRENGTH CONCRETE

A. If the 28-day cylinder strengths fall below the specified strength, the concrete represented by such test cylinders shall be considered unacceptable and subject to removal. Consideration will be given to the acceptance of such concrete if it can be demonstrated to the satisfaction of the Engineer that the cylinder tests do not accurately represent the strength of the concrete in place, or that the structure is fully capable of carrying the loads for which it was designed. This data may be obtained by a series of non-destructive tests and core tests in accordance with ASTM C-42 of the concrete in place, and/or by load testing in accordance with applicable codes. All costs in connection with this additional testing and/or removal and replacement of defective concrete shall be paid by the Contractor.

END OF SECTION
SECTION 03 3533
STAMPED CONCRETE FINISHING

PART 2  PRODUCTS
1.01  STAMPED CONCRETE APPLICATIONS

1.02  STAMPING MATERIALS

A. Stamping Mats: Mat type imprinting tools for texturing freshly placed concrete, in pattern and texture to achieve required surface profile and design.
   1. Mat Composition: Polyurethane.

B. Release Agent: Bond breaker compound capable of releasing stamping forms from concrete without creating surface defects or leaving any residue; type as recommended by stamping mat manufacturer; compatible with concrete, form materials and specified coloring agents.

END OF SECTION
SECTION 04 0511
MORTAR AND MASONRY GROUT

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Mortar for masonry.

1.02 RELATED REQUIREMENTS
A. Section 04 2600 - Single-Wythe Unit Masonry: Installation of mortar and grout.

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS
A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Product Data: Include design mix and indicate whether the Proportion or Property specification of ASTM C270 is to be used. Also include required environmental conditions and admixture limitations.

PART 2 PRODUCTS

2.01 MORTAR AND GROUT APPLICATIONS
A. At Contractor's option, mortar and grout may be field-mixed from packaged dry materials, made from factory premixed dry materials with addition of water only, or ready-mixed.
1. Exterior Masonry Veneer: Type N.
2. Pointing Mortar for Prefaced or Specially Faced Unit Masonry: One part Portland cement, 1/8 part hydrated lime, and two parts graded (80 mesh) aggregate, proportioned by volume. Add aluminum tristearate, calcium stearate, or ammonium stearate equal to 2 percent of Portland cement by weight.

2.02 MATERIALS
A. Packaged Dry Material for Mortar for Unit Masonry: Premixed Portland cement, hydrated lime, and sand; complying with ASTM C387/C387M and capable of producing mortar of the specified strength in accordance with ASTM C270 with the addition of water only.
1. Type: Type S.
2. Color: Mineral pigments added as required to produce approved color sample.
3. Water repellent mortar for use with water repellent masonry units.
4. Manufacturers:
   a. Quickcrete Companies.: QUIKRETE Mason Mix: www.quikrete.com/#sle
   b. Substitutions: See Section 01 6000 - Product Requirements.
B. Portland Cement: ASTM C150/C150M.
1. Type: Type I - Normal; ASTM C150/C150M.
2. Color: Color as required to produce approved color sample.

C. Masonry Cement: ASTM C91/C91M.
   1. Type: Type N; ASTM C91/C91M.

D. Hydrated Lime: ASTM C207, Type S.

E. Quicklime: ASTM C5, non-hydraulic type.

F. Mortar Aggregate: ASTM C144.

G. Pigments for Colored Mortar: Pure, concentrated mineral pigments specifically intended for mixing into mortar and complying with ASTM C979/C979M.

H. Water: Clean and potable.

2.03 MORTAR MIXING

A. Thoroughly mix mortar ingredients using mechanical batch mixer, in accordance with ASTM C270 and in quantities needed for immediate use.

B. Maintain sand uniformly damp immediately before the mixing process.

C. Colored Mortar: Proportion selected pigments and other ingredients to match Architect's sample, without exceeding manufacturer's recommended pigment-to-cement ratio; mix in accordance with manufacturer's instructions, uniform in coloration.

D. Do not use anti-freeze compounds to lower the freezing point of mortar.

E. If water is lost by evaporation, re-temper only within two hours of mixing.

PART 3  EXECUTION

3.01 INSTALLATION

A. Install mortar and grout to requirements of section(s) in which masonry is specified.

B. Work grout into masonry cores and cavities to eliminate voids.

C. Do not displace reinforcement while placing grout.

D. Remove excess mortar from grout spaces.

END OF SECTION
SECTION 04 2600
SINGLE-WYTHE UNIT MASONRY

PART 1  GENERAL
1.01  SECTION INCLUDES
A. Concrete masonry units.
B. Reinforcement, anchorage, and accessories.
C. Flashings.

1.02  RELATED REQUIREMENTS
A. Section 04 0511 - Mortar and Masonry Grout: Mortar and grout for single wythe unit masonry.
B. Section 06 1000 - Rough Carpentry: Nailing strips for installation in masonry.
C. Section 07 6200 - Sheet Metal Flashing and Trim: Cap flashings over masonry work.
D. Section 07 9200 - Joint Sealants: Sealing control and expansion joints.

1.03  REFERENCE STANDARDS
G. BIA Technical Notes No. 28B - Brick Veneer/Steel Stud Walls; 2005.

1.04  SUBMITTALS
A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide data for decorative and pre-faced masonry units and fabricated wire reinforcement.
C. Samples: Submit Two samples of decorative block and pre-faced units to illustrate color, texture and extremes of color range.
D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.05  DELIVERY, STORAGE, AND HANDLING
A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

1.06  FIELD CONDITIONS
A. Cold and Hot Weather Requirements: Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.

PART 2  PRODUCTS
2.01  CONCRETE MASONRY UNITS
A. Concrete Block: Comply with referenced standards and as follows:
1. Size: Standard units with nominal face dimensions of 16 x 8 inches (400 x 200 mm) and nominal depths as indicated on drawings for specific locations.
b. Exterior Exposed Faces: Ground Face:
c. Interior Exposed Faces: Ground Face

B. Special Shapes: Provide non-standard blocks configured for corners, lintels, headers, and control joint edges.
2. Bond Beam Unit: 8" x 8" x 16"
3. 2" x 8" x 16" Cap

2.02 REINFORCEMENT AND ANCHORAGE
A. Manufacturers:
2. Substitutions: See Section 01 6000 - Product Requirements.
B. Reinforcing Steel: ASTM A615/A615M, Grade 40 (40,000 psi) (280 MPa) yield strength, deformed billet bars; galvanized.
C. Single Wythe Joint Reinforcement: ASTM A951/A951M.
1. Type: Truss or ladder.
3. Size: 0.1483 inch (3.8 mm) side rods with 0.1483 inch (3.8 mm) cross rods; width as required to provide not less than 5/8 inch (16 mm) of mortar coverage on each exposure.

2.03 FLASHINGS
A. Metal Flashing Materials:
B. Drip Edge: Stainless steel; angled drip with hemmed edge; compatible with membrane and adhesives.

2.04 LINTELS
A. Concrete Masonry Units: 8" x 8" x 16" Split Bond Beam One Face

PART 3 EXECUTION

3.01 EXAMINATION
A. Verify that field conditions are acceptable and are ready to receive masonry.

3.02 PREPARATION
A. Direct and coordinate placement of metal anchors supplied for installation under other sections.

3.03 COURSING
A. Establish lines, levels, and coursing indicated. Protect from displacement.
B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
C. Concrete Masonry Units:
1. Coursing: One unit and one mortar joint to equal 8 inches (200 mm).

3.04 PLACING AND BONDING

3.05 REINFORCEMENT AND ANCHORAGE

3.06 MASONRY FLASHINGS
A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
1. Extend flashings full width at such interruptions and at least 6 inches (152 mm), minimum, into adjacent masonry or turn up at least 1 inch (25.4 mm), minimum, to form watertight pan at non-masonry construction.
2. Remove or cover protrusions or sharp edges that could puncture flashings.
3. Seal lapped ends and penetrations of flashing before covering with mortar.

B. Lap end joints of flashings at least 6 inches (152 mm), minimum, and seal watertight with flashing sealant/adhesive.

END OF SECTION
PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Concrete block.
   B. Mortar and grout.
   C. Reinforcement and anchorage.
   D. Accessories.

1.02 RELATED REQUIREMENTS
   A. Section 03 2000 - Concrete Reinforcing: Reinforcing steel for grouted masonry.

1.03 REFERENCE STANDARDS
   F. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.
   G. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.

1.04 SUBMITTALS
   A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
   B. Product Data: Provide data for masonry units, fabricated wire reinforcement, and mortar and grout.

1.05 MOCK-UP
   A. Construct a masonry wall as a mock-up panel sized 8 feet long by 6 feet high; include mortar and accessories, structural backup, reinforcement, and grout in mock-up.
   B. Locate where directed.

1.06 DELIVERY, STORAGE, AND HANDLING
   A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

1.07 FIELD CONDITIONS
   A. Cold and Hot Weather Requirements: Comply with requirements of ACI 530/530.1/ERTA or applicable building code, whichever is more stringent.
   B. Maintain materials and surrounding air temperature to minimum 40 degrees F prior to, during, and 48 hours after completion of masonry work.
PART 2 PRODUCTS

2.01 CONCRETE MASONRY UNITS
A. Concrete Block: Comply with referenced standards and as follows:
   1. Size: Standard units with nominal face dimensions of 16 by 8 inches and nominal depths as indicated on drawings for specific locations.
   2. Special Shapes: Provide non-standard blocks configured for corners.

2.02 MORTAR AND GROUT MATERIALS
A. Masonry Cement: ASTM C91/C91M Type N.
   1. Substitutions: See Section 01 6000 - Product Requirements.

2.03 REINFORCEMENT AND ANCHORAGE
A. Manufacturers:
   4. Substitutions: See Section 01 6000 - Product Requirements.
B. Reinforcing Steel: Type specified in Section 03 2000; size as indicated on drawings; galvanized finish.
C. Strap Anchors: Bent steel shapes configured as required for specific situations, 1-1/4 in width, 0.105 in thick, lengths as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage from masonry face, corrugated for embedment in masonry joint, hot dip galvanized to ASTM A153/A153M, Class B.
D. Wall Ties: Corrugated formed sheet metal, 7/8 inch wide by 0.05 inch thick, hot dip galvanized to ASTM A 153/A 153M, Class B, sized to provide not more than 1 inch and not less than 1/2 inch of mortar coverage from masonry face.

2.04 ACCESSORIES
A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.
   1. Manufacturers:
      d. Substitutions: See Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION
A. Verify that field conditions are acceptable and are ready to receive masonry.
B. Verify that related items provided under other sections are properly sized and located.
C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.02 PREPARATION
A. Direct and coordinate placement of metal anchors supplied for installation under other sections.
B. Clean reinforcement of loose rust.
C. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.
D. For areas where high-lift grouting will be employed, provide cleanout openings as follows:

3.03 COURSING
A. Establish lines, levels, and coursing indicated. Protect from displacement.
B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
C. Concrete Masonry Units:
   1. Bond: Running.

3.04 PLACING AND BONDING
A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
B. Lay hollow masonry units with face shell bedding on head and bed joints.
C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
D. Remove excess mortar as work progresses.
E. Interlock intersections and external corners.
F. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
G. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

3.05 REINFORCEMENT AND ANCHORAGE
A. Reinforcement Bars: Secure at locations indicated and to avoid displacement during grouting. Minimum spacing between bars or to masonry surfaces shall be one bar diameter.
B. Joint Reinforcement: Install horizontal joint reinforcement 16 inches on center.
C. Anchors: Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Unless otherwise indicated on drawings or closer spacing is indicated under specific wall type, space anchors at maximum of 36 inches horizontally and 24 inches vertically.

3.06 GROUTING
A. Use either high-lift or low-lift grouting techniques, at Contractor's option, subject to other limitations of Contract Documents.
B. Low-Lift Grouting:
   1. Limit height of pours to 12 inches.
   2. Limit height of masonry to 16 inches above each pour.
   3. Pour grout only after vertical reinforcing is in place; place horizontal reinforcing as grout is poured. Prevent displacement of bars as grout is poured.
   4. Place grout for each pour continuously and consolidate immediately; do not interrupt pours for more than 1-1/2 hours.
C. High-Lift Grouting:
   1. Verify that horizontal and vertical reinforcement is in proper position and adequately secured before beginning pours.
   2. Place grout for spanning elements in single, continuous pour.

3.07 CONTROL AND EXPANSION JOINTS
A. Do not continue horizontal joint reinforcement through control or expansion joints.
B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.

3.08 TOLERANCES
A. Maximum Variation from Alignment of Columns: 1/4 inch.
B. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.
C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.
D. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
E. Maximum Variation of Joint Thickness: 1/8 inch in 3 ft.

3.09 FIELD QUALITY CONTROL
A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.

3.10 CLEANING
A. Remove excess mortar and mortar smears as work progresses.
B. Use non-metallic tools in cleaning operations.

3.11 PROTECTION
A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

END OF SECTION
PART 1 GENERAL

1.01 SECTION INCLUDES

A. Anchored cut stone veneer at exterior walls.
B. Adhered cut stone veneer at exterior walls.
C. Metal anchors and accessories for anchored veneer.
D. Accessories for adhered veneer.
E. Setting mortar.

1.02 RELATED REQUIREMENTS

A. Section 04 2000 - Unit Masonry: Joint reinforcement, Ties, Anchors, and Through-wall flashing.

1.03 REFERENCE STANDARDS


1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide data on stone units, mortar, and reinforcement.
C. Samples: Submit two stone samples illustrating minimum and maximum stone sizes, _____, color range, texture, and markings.
D. Samples: Submit mortar color samples.

1.05 MOCK-UP

A. Construct stone wall mock-up, 4 feet (____ m) long by 1.3 feet (____ m) wide; include stone anchor accessories, corner condition, and typical control joint in mock-up.
B. Locate where directed.
C. Mock-up may remain as part of the Work.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Stone Quarriers:
   2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 STONE

A. Limestone: ________; complying with ASTM C568/C568M Classification II - Medium Density.
   2. Grain Direction: Vertical.
2.03 MORTAR APPLICATIONS
   A. At Contractor's option, mortar may be field-mixed from packaged dry materials, made from
      factory premixed dry materials with addition of water only, or ready-mixed.
   B. Setting Bed Mortars: Setting bed used to adhere stone veneer units to cement board.

2.04 ACCESSORIES - ANCHORED VENEER
   A. Wall Ties: Formed steel wire, at least 0.0625 inch (___ mm) diameter, stainless steel complying
      with ASTM A580/A580M, eye and pintle type, with provision for vertical adjustment after
      attachment.

2.05 ACCESSORIES - ADHERED VENEER
   A. Waterproofing and Crack Isolation Membrane at Exterior Installations: Provides topside
      protection from water intrusion; Specifically designed for bonding to concrete, masonry, cement
      board, or cementitious scratch coat substrates under stone veneer setting mortar; complies with
      ANSI A118.10 and ANSI A118.12.
      1. Paintable Fluid or Trowel Applied Type:
         a. Products:
            1) ARDEX Engineered Cements; ARDEX 8+9: www.ardexamericas.com/#sle.
            2) Substitutions: See Section 01 6000 - Product Requirements.
      B. Rainscreen Drainage Material:
         1. Rainscreen Drainage Mat: Polyester or polypropylene mesh.
            a. Manufacturers:
               1) Cav Air Ator, .40 thick.
                  ir-ator
               2) Substitutions: See Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify that support work and site conditions are ready to receive work of this section.
   B. Verify that items built-in under other sections are properly located and sized.

3.02 PREPARATION - ADHERED VENEER
   A. Dampen masonry surfaces to reduce excessive suction.
   B. Clean concrete surfaces of foreign matter using approved acid solutions, solvents, or
      detergents, and then rinse surfaces thoroughly with clean water.
   C. Roughen smooth concrete surfaces and apply bonding compound in accordance with
      manufacturer's written installation instructions.

3.03 INSTALLATION - ANCHORED VENEER
   A. Cut stone at site to produce clean faces.
   B. Size stone units to fit opening dimensions and perimeter conditions.
   C. Wet absorptive stone in preparation for placement to minimize moisture suction from mortar.
   D. Arrange stone pattern to provide color uniformity and minimize visual variations, and provide a
      uniform blend of stone unit sizes.
   E. Fill dowel holes in stone units with mortar.
   F. Arrange stone coursing in running bond with consistent joint width.
   G. Set stone in full mortar setting bed to fully support stone over bearing surface. Use setting
      buttons or shims to maintain correct joint width.
3.04 REINFORCEMENT AND ANCHORAGE - ANCHORED VENEER
   A. Install horizontal joint reinforcement 16 inches (400 mm) on center.
   B. Embed wall ties in masonry back-up to bond veneer to back-up at maximum 16 inches (400 mm) on center vertically and 36 inches (900 mm) on center horizontally.
   C. In addition, place wall ties at maximum 3 inches (75 mm) on center each way around perimeter of openings, within 12 inches (300 mm) of openings.

3.05 CLEANING
   A. Remove excess mortar as work progresses, and upon completion of work.
   B. Clean exterior stone per ASTM C1515.
   C. Use non-metallic tools in cleaning operations.

3.06 PROTECTION
   A. During temporary storage on site, at the end of working day, and during rainy weather, cover stone work exposed to weather with non-staining waterproof coverings, securely anchored.

END OF SECTION
SECTION 05 1200
STRUCTURAL STEEL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Structural steel framing members.
B. Base plates, shear stud connectors and expansion joint plates.

1.02 RELATED REQUIREMENTS
A. Section 05 2100 - Steel Joist Framing.
B. Section 05 3100 - Steel Decking: Support framing for small openings in deck.
C. Section 05 5000 - Metal Fabrications: Steel fabrications affecting structural steel work.

1.03 REFERENCE STANDARDS
I. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.
K. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel; International Accreditation Service, Inc; 2011.

1.04 SUBMITTALS
A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Shop Drawings:
   1. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments, and fasteners.
   2. Connections not detailed.
   3. Indicate cambers and loads.
   4. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.
C. Manufacturer's Mill Certificate: Certify that products meet or exceed specified requirements.
D. Fabricator Test Reports: Comply with ASTM A1011/A1011M.
E. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.
F. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is accredited under IAS AC172. Refer to AISC 360-10 N3.2 (3) - (13) for additional submittal review requirements required by IBC 2015 1705.2 and AISC 360-10 N5.2

1.05 QUALITY ASSURANCE
A. Fabricate structural steel members in accordance with AISC (MAN) "Steel Construction Manual."
B. Structural steel members designated as architecturally-exposed structural steel (AESS) to also comply with Section 05 1213.

C. Fabricator: Company specializing in performing the work of this section with minimum 5 years of experience.

D. Erector: Company specializing in performing the work of this section with minimum 5 years of experience.

PART 2 PRODUCTS

2.01 MATERIALS

A. Steel Angles and Plates: ASTM A36/A36M.

B. Steel W Shapes and Tees: ASTM A992/A992M.

C. Rolled Steel Structural Shapes: ASTM A992/A992M.

D. Steel Plate: ASTM A514/A514M.

E. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

2.02 FABRICATION

A. Shop fabricate to greatest extent possible.

B. Continuously seal joined members by continuous welds. Grind exposed welds smooth.

C. Fabricate connections for bolt, nut, and washer connectors.

D. Develop required camber for members.

2.03 FINISH

A. Shop prime structural steel members. Do not prime surfaces that will be fireproofed, field welded, in contact with concrete, or high strength bolted.

PART 3 EXECUTION

3.01 ERECTION

A. Erect structural steel in compliance with AISC 303.

B. Allow for erection loads, and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing.

C. Field weld components and shear studs indicated on shop drawings.

D. Use carbon steel bolts only for temporary bracing during construction, unless otherwise specifically permitted on drawings. Install high-strength bolts in accordance with AISC "Specification for Structural Joints Using ASTM A325 or A490 Bolts". Bolts in connections not within the slip critical category nor subject to tension loads shall be installed in properly aligned holes and need only be tightened to the snug tight condition. The snug tight condition is defined as the tightness that exists when all plies in a joint are in firm contact. This may be attained by a few impacts of an impact wrench or the full effort of a man using an ordinary spud wrench. Slip critical connections will be identified on the drawings.

E. Do not field cut or alter structural members without approval of Architect/Structural Engineer of Record.

F. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.

3.02 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.
3.03 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.

END OF SECTION
PART 1  GENERAL

1.01 SECTION INCLUDES

A. This Section includes requirements regarding the appearance and surface preparation of Architecturally Exposed Structural Steel (AESS).

1. Refer to Division 5, Section "Structural Steel" for all other requirements regarding steelwork not included in this section.

2. This section applies to any members noted on Architectural (and Structural) drawings as AESS (and in the areas defined as AESS below).

1.02 RELATED SECTIONS

A. Section 05 1200 - Structural Steel Framing:

B. Section 05 5000 - Metal Fabrications:

C. Section 05300 - Metal Deck:

D. Division 9 Section “Special Coatings” for finish coat requirements and coordination with primer and surface preparation specified in this section.

E. Division 9 Section “Painting” for finish coat requirements and coordination with primer and surface preparation specified in this section.

1.03 SUBMITTALS

A. General: Submit each item below according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product Data for each type of product specified.

C. Shop Drawings detailing fabrication of AESS components.

1. Provide erection drawings clearly indicating which members are considered as AESS members.

2. Include details that clearly identify all of the requirements listed in sections 2.3 “Fabrication” and 3.3 “Erection” of this specification. Provide connections for exposed AESS consistent with concepts shown on the architectural or structural drawings.

3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length and type of each weld. Identify grinding, finish and profile of welds as defined herein.

4. Indicate type, size, finish and length of bolts, distinguishing between shop and field bolts. Identify high-strength bolted slip-critical, direct-tensioned shear/bearing connections. (Indicate to which direction bolt heads should be oriented.)

5. Clearly, indicate which surfaces or edges are exposed and what class of surface preparation is being used.

6. Indicate special tolerances and erection requirements as noted on the drawings or defined herein.

D. Qualification data for firms and persons specified in the “Quality Assurance” Article to demonstrate their capabilities and experience. Include lists of completed projects names and address, names and addresses of architects and owners, and other information specified.

1. (For each project, submit photographs showing detail of installed AESS.)

1.04 QUALITY ASSURANCE

A. Fabricator Qualifications: In addition to those qualifications listed in Division 5 Section “Structural Steel,” engage a firm experienced in fabricating AESS similar to that indicated for this Project with a record of successful in-service performance, as well as sufficient production capacity to fabricate AESS without delaying the Work.

B. Erector Qualifications: In addition to those qualifications listed in Division 5 Section “Structural Steel,” engage an experienced Erector who has completed AESS work similar in material,
design, and extent to that indicted for this Project and with a record of successful in-service performance.

C. Comply with applicable provisions of the following specifications and documents:

D. Mock-ups: At least four weeks prior to fabricating AESS, the contractor shall construct mock-ups to demonstrate aesthetic effects as well as qualities of materials and execution. A mock-up for each of the following elements shall be constructed:
   1. Build mock-ups to comply with the following requirements, using materials indicated for final unit of Work.
   2. Locate mock-ups on-site or in the fabricator's shop as directed by Architect. Mock-ups shall be full-size pieces unless the Architect approves smaller models.
   3. Notify the Architect one-week in advance of the dates and times when mock-ups will be available for review.
   4. Demonstrate the proposed range of aesthetic effects regarding each element listed under the fabrication heading below.
   5. Mock-up will have finished surface (including surface preparation and paint system).
   6. Obtain Architect's approval of mock-ups before starting fabrication of final units.
   7. Retain and maintain mock-ups during construction in an undisturbed condition as a standard for judging the completed work.
      a. Approved mock-ups in an undisturbed condition at the time of Substantial completion may become part of the completed work.

1.05 REFERENCES
A. SSPC-Paint 15 - Steel Joist Shop Paint; Society for Protective Coatings; 1999 (Ed. 2004).
D. ASTM A780 - Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.

1.06 PRE-INSTALLATION MEETING
A. Convene one week before starting work of this section.
B. Pre-installation Conference: The General Contractor shall schedule and conduct conference at the project site to comply with requirements of Division 1 Section “Project Meetings.” As a minimum, the meeting shall include the General Contractor, Fabricator, Erector, the finish-painting subcontractor, and the Architect. Coordinate requirements for shipping, special handling, attachment of safety cables and temporary erection bracing; touch up painting and other requirements for AESS.

1.07 DELIVERY, STORAGE, AND HANDLING
A. Deliver AESS to project site in such quantities and at such times to ensure continuity of installation.
B. Store materials to permit easy access for inspection and identification. Keep steel members off ground by using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration. Use special care in handling to prevent twisting or warping of AESS members.
C. Erect pre-painted finish pieces using padded slings or other methods such that they are not damaged. Provide padding as required to protect while rigging and aligning member's frames. Weld tabs for temporary bracing and safety cabling only at points concealed from view in the completed structure or where approved by the Architect during the pre-installation meeting. Methods of removing temporary erection devices and finishing the AESS members shall be approved by the Architect prior to erection.
1.08 PROJECT CONDITIONS

A. Field Measurements: Where AESS is indicated to fit against walls and other construction, verify dimensions by field measurements before fabrication and indicate measurements on shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the work.

1.09 COORDINATION

A. Coordinate installation of anchors for AESS members that connect to the work of other trades. Furnish setting drawings, templates, and directions for installing anchors, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to the project site in time for installation. (Anchorage concepts shall be as indicated on drawings and approved on final shop drawings.)

PART 2 PRODUCTS

2.01 MATERIALS

A. General:
   1. Meet requirements Division 5 Section “Structural Steel” as amended below.
   2. High-Strength Bolts, Nuts, and Washers: Per Section 05120 heavy hex heads and nuts (Provide rounded bolt heads with twist bolts): Provide standard carbon steel (Cadmium plated) (Mechanically galvanized) finish.

B. PRIMERS
   1. Compatibility: The General Contractor shall submit all components/procedures of the paint system for AESS as a single coordinated submittal. As a minimum, identify required surface preparation, primer, and intermediate coat (if applicable) and finish coat. All of the items shall be coordinated with the finish coat specified in Division 9.
   3. Primer: Fast curing, universal modified alkyd, rust inhibiting shop coat with good resistance to normal atmospheric corrosion. Primer shall comply with all federal standards for VOC, lead and chromate levels.
   4. Primer: Acrylic water-soluble shop coat with good resistance to normal atmospheric corrosion. Primer shall comply with all federal standards for VOC, lead and chromate levels.
   5. Primer: Fast-curing two-part epoxy. Primer shall comply with all federal standards for VOC, lead and chromate levels.
   6. Primer: Organic, epoxy/zinc-rich, meeting class B surface requirements for slip-critical connections. Primer shall comply with all federal standards for VOC, lead and chromate levels.
   7. Primer: Inorganic zinc-rich meeting class B surface requirements for slip-critical connections. Primer shall comply with all federal standards for VOC, lead and chromate levels.
   8. Galvanizing Repair Paint; High-zinc-dust-content paint for galvanizing welds and repair-painting galvanized steel, with dry-film coating not less than 90-percent zinc dust by weight.

C. FABRICATION
   1. Fabricate and assemble AESS in the shop to the greatest extent possible. Locate field joints in AESS assemblies at concealed locations or as approved by the Architect. Detail AESS assemblies to minimize field handling and expedite erection.
   2. Fabricate AESS with exposed surfaces smooth, square and of surface quality consistent with the approved mock-up. Use special care in handling and shipping of AESS both before and after shop painting.
   3. In addition to special care used to handle and fabricate AESS, employ the following fabrication techniques.
a. Fabrication Tolerance: Fabricate steel to one half the normal tolerance as specified in the Code of Standard Practice Section 10.

b. Welds ground smooth: Fabricator shall grind welds of AESS smooth. For groove welds, the weld shall be made flush to the surfaces each side and be within +1/16”/-0” of plate thickness.

c. Contouring and blending of welds: Where fillet welds are indicated to be ground-contoured, or blended, oversize welds as required and grind to provide a smooth transition and to match profile on approved mock-up.

d. Continuous Welds: Where welding is noted on the drawings, provide continuous welds of a uniform size and profile.

e. Minimize Weld Show Through: At locations where welding on the far side of an exposed connection occurs, grind distortion and marking of the steel to a smooth profile with adjacent material.

f. Coping and Blocking Tolerance: Maintain a uniform gap of 1/8" & 1/32” at all copes and blocks.

g. Joint Gap Tolerance: Maintain a uniform gap of 1/8” & 1/32”.

h. Piece Marks Hidden: Fabricate such that piece marks are fully hidden in the final structure or made with such media to permit full removal after erection.

i. Mill Mark Removal: Fabricator shall deliver steel with no mill marks (stenciled, stamped, raised, etc) in exposed locations. Mill marks shall be omitted by cutting of mill material to appropriate lengths where possible. Where not possible, the fabricator can fill and/or grind to a surface finish consistent with the approved mock-up.

j. Grinding of sheared edges: Fabricator shall grind all edges of sheared, punched or flame-cut steel to match approved mock-up.

k. Rolled Members: Member specified to be rolled to a final curved shape shall be fully shaped in the shop and tied during shipping to prevent stress relieving. Distortion of the web or stem and of outstanding flanges or legs of angles shall be visibly acceptable to the Architect from a distance of 20’ under any lighting condition determined by the Architect. Tolerances for the vertical and horizontal walls of rectangular HSS members after rolling shall be the specified dimension & 1/2”.

l. Seal weld open ends of round and rectangular hollow structural section with 3/8” closure plates. Provide continuous, sealed welds at angle to gusset-plate connections and similar locations where AESS is exposed to weather.

2.02 SHOP CONNECTIONS

A. Bolted Connections: Make in accordance with Section 05120. Provide bolt type, finish as noted herein and align bolt heads as indicated on the approved shop erection drawings.

B. Welded Connections: Comply with AWS D1.1 and Section 05120. Appearance and quality of welds shall be consistent with the mock-up. Assemble and weld built-up sections by methods that will maintain alignment of members without warp exceeding the tolerance of this section.

2.03 SHOP PRIMING

A. Shop-prime steel surfaces, except the following:

1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2”.

2. Surfaces to be field welded.

3. Surfaces to be high-strength bolted with slip-critical connections, if primer does not meet the specified AISC slip coefficient.

B. Surface Preparation: Clean surfaces to be painted. Remove loose rust, loose mill scale, and spatter, slag, or flux deposits. Prepare surfaces according to SSPC Specifications as follows:

1. SSPC-SP 1 “Solvent Cleaning”

2. SSPC-SP 2 “Hand Tool Cleaning.” (This level of surface preparation will not be adequate for most paint systems for AESS construction.)
3. SSPC-SP 3 “Power Tool Cleansing” (This level of surface prep is the minimum for most AESS projects. It may be acceptable for alkyd primers and acrylic or alkyd finish coats, particularly in interior applications.)

4. SSPC-SP 6 “Commercial Blast Cleaning.” (This level of surface prep adds significantly to the total cost of the steel. It is required for epoxy primer s to allow adequate bonding to the steel. Recommended for locations where a rust inhibitive primer will be used in an exterior application. It is also required where polyurethane finish coats will be used over the primer.)

5. Coordinate the required blast profile with the approved paint submittal prior to beginning surface preparation.

C. Priming: Immediately after surface preparation, apply primer according to manufacturer’s instructions to provide a dry film thickness of not less than 1.5 mils (0.038 mm). Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
   1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
   2. Apply two coats of shop primer to surfaces that are inaccessible after assembly or erection.

2.04 GALVANIZING
   A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to AESS
      1. Indicated for galvanizing according to ASTM A 123. Fabricate such that all connections of assemblies are made in the field with bolted connections. Provide galvanized finish or members and assemblies within the range of color and surface textures presented in the mock-ups.

PART 3 EXECUTION

3.01 EXAMINATION
   A. The erector shall check all AESS members upon delivery for twist, kinks, gouges or other imperfections which might result in rejection of the appearance of the member. Coordinate remedial action with fabricator prior to erecting steel.

3.02 PREPARATION
   A. Provide connections for temporary shoring, bracing and supports only where noted on the approved shop drawings. Temporary connections not shown shall be made at locations not exposed to view in the final structure or as approved by the Architect. Handle, lift and align pieces using padded slings and/or other protection required to maintain the appearance of the AESS through the process of erection.

3.03 ERECTION
   A. Set AESS accurately in locations and to elevations indicated, and according to AISC specifications referenced in this Section.
   B. In addition to the special care used to handle and erect AESS, employ the following erection techniques:
      1. AESS erection tolerances: Erection tolerances shall meet the requirements of standard frame tolerances for structural steel per Chapter 7 of the AISC Code of Standard Practice.
   C. Field welding: Weld profile, quality, and finish shall be consistent with mock-ups approved prior to fabrication.
   D. Splice members only where indicated.
   E. Obtain permission for any torch cutting or field fabrication from the Architect. Finish sections thermally cut during erection to a surface appearance consistent with the mock up.
   F. Do not enlarge unfair holes in members by burning or by using drift pins. Ream holes that must be enlarged to admit bolts. Replace connection plates that are misaligned where holes cannot be aligned with acceptable final appearance.
3.04 FIELD CONNECTIONS

A. Bolted Connections: Install bolts of the specified type and finish in accordance with Division 5 section “Structural Steel.”

B. Welded Connections: Comply with AWS D1.1 for procedures, and appearance. Refer to Division 5 section “Structural Steel” for other requirements.
   1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without warp. Verify that weld sizes, fabrication sequence, and equipment used for AESS will limit distortions to allowable tolerances.
   2. Obtain Architect's approval for appearance of welds in repaired or field modified work.
   3. Provide continuous all around, sealed welds at angle to gusset-plate connections, tube to tube, and similar locations where connection will allow moisture to get between members and where AESS is exposed to weather or visible to view.

3.05 FIELD QUALITY CONTROL

A. Structural requirements: The Owner will engage an independent testing and inspecting agency to perform field inspections and tests and to prepare test reports. Refer to Division 5 section “Structural Steel” for detailed bolt and weld testing requirements.

B. AESS acceptance: The Architect shall observe the AESS steel in place and determine acceptability based on the mock-up. The Testing Agency shall have no responsibility for enforcing the requirements of this section.

3.06 ADJUSTING AND CLEANING

A. Touch-up painting: Cleaning and Touch-up painting for field welds, bolted connections, and abraded areas of shop paint shall be completed to blend with the adjacent surfaces of AESS. Such touch up work shall be done in accordance with manufacturer’s instructions as specified in Division 9, Section “Painting.”

B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780.
   1. Repair Materials for Galvanized Surfaces Exposed to View: ASTM A780, zinc based solder, color matched to material being repaired.

END OF SECTION
SECTION 05 5213
PIPE AND TUBE RAILINGS

PART 1  GENERAL

1.01  SECTION INCLUDES
A. Free-standing railings at steps.

1.02  RELATED REQUIREMENTS
A. Section 03 3000 - Cast-in-Place Concrete: Placement of anchors in concrete.
B. Section 09 9113 - Exterior Painting: Paint finish.

1.03  REFERENCE STANDARDS

1.04  SUBMITTALS
A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.

PART 2  PRODUCTS

2.01  MANUFACTURERS
A. Handrails and Railings:
   1. TSAR (Texas Stair and Railing) .Custom Fabrication, https://www.tsarinc.com
   2. Substitutions: See Section 01 6000 - Product Requirements.

2.02  RAILINGS - GENERAL REQUIREMENTS
A. Design, fabricate, and test railing assemblies in accordance with the most stringent requirements of applicable local code.
B. Allow for expansion and contraction of members and building movement without damage to connections or members.
C. Dimensions: See drawings for configurations and heights.
   1. Top Rails and Wall Rails: 1-1/2 inches (38 mm) diameter, round.
   2. Intermediate Rails: 1-1/4 by 1 inch (32 by 25 mm) rectangular.
   3. Posts: 1-1/2 inches (38 mm) diameter, round.
D. Provide anchors and other components as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable provide flush countersunk fasteners.
E. Provide slip-on non-weld mechanical fittings to join lengths, seal open ends, and conceal exposed mounting bolts and nuts, including but not limited to elbows, T-shapes, splice connectors, flanges, escutcheons, and wall brackets.

2.03  FABRICATION
A. Accurately form components to suit specific project conditions and for proper connection to building structure.
B. Fit and shop assemble components in largest practical sizes for delivery to site.
C. Fabricate components with joints tightly fitted and secured. Provide spigots and sleeves to accommodate site assembly and installation.

END OF SECTION
PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Structural dimension lumber framing.
   B. Exposed timber structural framing.
   C. Rough opening framing for doors, windows, and roof openings.
   D. Sheathing.
   E. Subflooring.
   F. Miscellaneous framing and sheathing.

1.02 RELATED REQUIREMENTS
   A. Section 06 1500 - Wood Decking.
   B. Section 06 1753 - Shop-Fabricated Wood Trusses.
   C. Section 06 1800 - Glued-Laminated Structural Units.

1.03 REFERENCE STANDARDS
   D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.
   G. SPIB (GR) - Grading Rules; 2014.

1.04 SUBMITTALS
   A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

1.05 DELIVERY, STORAGE, AND HANDLING
   A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS
   A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
      1. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
      2. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

2.02 DIMENSION LUMBER
   A. Grading Agency: Southern Pine Inspection Bureau, Inc; SPIB (GR).
   B. Sizes: Nominal sizes as indicated on drawings, S4S.
   C. Moisture Content: S-dry or MC19.
   D. Stud Framing (2 by 2 through 2 by 6):
2. Grade: No. 3 or Stud.

E. Joist, Rafter, and Small Beam Framing (2 by 6 through 4 by 16):
   1. Machine stress-rated (MSR) as follows:
      b. E (minimum modulus of elasticity): 1,600,000 psi.
   2. Species: Southern Pine.

PART 3 EXECUTION

3.01 PREPARATION
   A. Coordinate installation of rough carpentry members specified in other sections.

3.02 INSTALLATION - GENERAL
   A. Select material sizes to minimize waste.
   B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

3.03 FRAMING INSTALLATION
   A. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.
   B. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.
   C. Install structural members full length without splices unless otherwise specifically detailed.
   D. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes and AWC (WFCM) Wood Frame Construction Manual.
   E. Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists; use metal joist hangers unless otherwise detailed.
   F. Provide bridging at joists in excess of 8 feet span as detailed. Fit solid blocking at ends of members.
   G. Frame wall openings with two or more studs at each jamb; support headers on cripple studs.

3.04 INSTALLATION OF CONSTRUCTION PANELS
   A. Subflooring: Glue and nail to framing; staples are not permitted.
   B. Roof Sheathing: Secure panels with long dimension perpendicular to framing members, with ends staggered and over firm bearing.
      1. Nail panels to framing; staples are not permitted.
   C. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using nails, screws, or staples.
      1. Use plywood or other acceptable structural panels at building corners, for not less than 96 inches, measured horizontally.

3.05 TOLERANCES
   A. Framing Members: 1/4 inch from true position, maximum.
   B. Surface Flatness of Floor: 1/8 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.
   C. Variation from Plane (Other than Floors): 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

3.06 CLEANING
   A. Waste Disposal:
      1. Comply with applicable regulations.
      2. Do not burn scrap on project site.
3. Do not burn scraps that have been pressure treated.
4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or “waste-to-energy” facilities.

B. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.
C. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION
SECTION 06 1323
HEAVY TIMBER FRAMING

PART 1  GENERAL
1.01  SECTION INCLUDES
   A. Heavy structural timber for posts, beams, joists, purlins,, and columns.
   B. Connection hardware.

1.02  REFERENCE STANDARDS
   A. AITC 108 - Standard For Heavy Timber Construction; 2002.
   B. ASTM F606 - 12 - Standard Test Methods for Determining the Mechanical Properties of
      Externally and Internally Threaded Fasteners in Wood.
   C. ASTM D1761 - 12 - Standard Test Methods for Mechanical Fasteners in Wood.
   D. ASTM D4442 - 12 - Standard Test Methods for Direct Moisture Content Measurement of Wood
      and Wood Base Materials.
   E. ASTM D2395 - 12 - Standard Test Methods for Specific Gravity of Wood and Wood Based
      Materials

PART 2  PRODUCTS
2.01  WOOD MATERIALS
   A. Wood fabricated from old growth timber is not permitted.
   B. Lumber Grading Rules: RIS (GR).

2.02  WOOD TREATMENT
   A. Wood Preservative (Pressure Treatment): AWPA U1, Use Category UC3B, Commodity
      Specification A, using waterborne preservative to 0.25 lb/cu ft retention.

PART 3  EXECUTION
3.01  ERECTION
   A. Set structural members level and plumb, in correct position.
   B. Make provisions for erection loads, and for sufficient temporary bracing to maintain structure
      safe, plumb, and in true alignment until completion of erection and installation of permanent
      bracing.
   C. Do not field cut or alter structural members without approval of Architect/Structural Engineer of
      Record.

END OF SECTION
SECTION 07 4113
METAL ROOF PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Structural roofing system of preformed steel panels.

1.02 RELATED REQUIREMENTS
A. Section 05 1200 - Structural Steel Framing: Roof framing and purlins.
B. Section 06 1000 - Rough Carpentry: Roof sheathing.

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS
A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Storage and handling requirements and recommendations.
   2. Installation methods.
   3. Specimen warranty.
C. Shop Drawings: Include layouts of roof panels, details of edge and penetration conditions, spacing and type of connections, flashings, underlayments, and special conditions.
   1. Show work to be field-fabricated or field-assembled.
D. Selection Samples: For each roofing system specified, submit color chips representing manufacturer's full range of available colors and patterns.
E. Test Reports: Indicate compliance of metal roofing system to specified requirements.
F. Warranty: Submit specified manufacturer's warranty and ensure that forms have been completed in Owner's name and are registered with manufacturer.

1.05 QUALITY ASSURANCE
A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING
A. Store roofing panels on project site as recommended by manufacturer to minimize damage to panels prior to installation.

1.07 WARRANTY
A. See Section 01 7800 - CONTRACT CLOSEOUT, for additional warranty requirements.
PART 2 PRODUCTS

2.01 MANUFACTURERS
A. Metal Roof Panels:
   1. MBCI Battenlok HS. www.mbcicom/battenlokHS.html

2.02 STRUCTURAL METAL ROOF PANELS
A. Structural Metal Roofing: Provide complete roofing assemblies, including roof panels, clips, fasteners, connectors, and miscellaneous accessories, tested for compliance with the following minimum standards:
   1. Structural Design Criteria: Provide panel assemblies designed to safely support design loads at support spacing indicated, with deflection not to exceed L/180 of span length(L) when tested in accordance with ASTM E1592.
   2. Overall: Complete weathertight system tested and approved in accordance with ASTM E1592.
   3. Thermal Movement: Design system to accommodate without deformation anticipated thermal movement over ambient temperature range of 100 degrees F (56 degrees C).
   4. Thermal Performance: Provide thermal resistance through entire system, R-value (RSI-value) of 15 deg F hr sq ft/ BTU; 2 inch thick (2.6 K sq m /W; 50.8 mm thick), when tested in accordance with ASTM C1363.

B. Metal Panels: Factory-formed panels with factory-applied finish.
   1. Type: Double skin, factory-assembled with foamed-in-place urethane insulation.
   2. Texture: Smooth.
   3. Width: Maximum panel coverage of 16 inches (406 mm).

2.03 ATTACHMENT SYSTEM

2.04 FABRICATION
A. Panels: Provide factory or field fabricated panels with applied finish and accessory items, using manufacturer's standard processes as required to achieve specified appearance and performance requirements.

2.05 FINISHES
A. Fluoropolymer Coil Coating System: Polvvinylidene fluoride (PVDF) multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent PVDF resin, and at least 80 percent of coil coated aluminum surfaces having minimum total dry film thickness (DFT) of 0.9 mil, 0.0009 inch (0.023 mm); color and gloss as selected by Architect from manufacturer's standard line.
   1. Manufacturers:
      a. PPG Metal Coatings; Duranar: www.ppgmetalcoatings.com/#sle.
      b. Substitutions: See Section 01 6000 - Product Requirements.

2.06 ACCESSORIES
A. Miscellaneous Sheet Metal Items: Provide flashings, gutters, downspouts, trim, moldings, closure strips, and Metal Coping of the same material, thickness, and finish as used for the roofing panels. Items completely concealed after installation may optionally be made of stainless steel.
   1. Gutters: SMACNA Style I
   2. Downspouts: Open face, rectangular profile.

B. Rib and Ridge Closures: Provide prefabricated, close-fitting components of steel with corrosion resistant finish or combination steel and closed-cell foam.

C. Sealants:
   1. Exposed Sealant: Elastomeric; silicone, polyurethane, or silyl-terminated polyether/polyurethane.
2. Concealed Sealant: Non-curing butyl sealant or tape sealant.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation of preformed metal roof panels until substrates have been properly prepared.
B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Coordinate roofing work with provisions for roof drainage, flashing, trim, penetrations, and other adjoining work to assure that the completed roof will be free of leaks.
B. Separate dissimilar metals by applying a bituminous coating, self-adhering rubberized asphalt sheet, or other permanent method approved by roof panel manufacturer.
C. Where metal will be in contact with wood or other absorbent material subject to wetting, seal joints with sealing compound and apply one coat of heavy-bodied bituminous paint.

3.03 INSTALLATION

A. Overall: Install roofing system in accordance with approved shop drawings and panel manufacturer's instructions and recommendations, as applicable to specific project conditions. Anchor all components of roofing system securely in place while allowing for thermal and structural movement.
1. Minimize field cutting of panels. Where field cutting is absolutely required, use methods that will not distort panel profiles. Use of torches for field cutting is absolutely prohibited.
B. Accessories: Install all components required for a complete roofing assembly, including flashings, gutters, downspouts, trim, moldings, closure strips, preformed crickets, caps, equipment curbs, rib closures, ridge closures, and similar roof accessory items.
C. Roof Panels: Install panels in strict accordance with manufacturer's instructions, minimizing transverse joints except at junction with penetrations.

3.04 CLEANING

A. Clean exposed sheet metal work at completion of installation. Remove grease and oil films, excess joint sealer, handling marks, and debris from installation, leaving the work clean and unmarked, free from dents, creases, waves, scratch marks, or other damage to the finish.

3.05 PROTECTION

A. Do not permit storage of materials or roof traffic on installed roof panels. Provide temporary walkways or planks as necessary to avoid damage to completed work. Protect roofing until completion of project.
B. Touch-up, repair, or replace damaged roof panels or accessories before Date of Substantial Completion.

END OF SECTION
PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Non-fire-rated hollow metal doors and frames.

1.02 RELATED REQUIREMENTS
   A. Section 09 9113 - Exterior Painting: Field painting.

1.03 REFERENCE STANDARDS
   C. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2017.
   H. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames; 2016.
   J. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2011.

1.04 SUBMITTALS
   A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
   B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced standards/guidelines.
   C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.
   D. Installation Instructions: Manufacturer’s published instructions, including any special installation instructions relating to this project.

1.05 QUALITY ASSURANCE
   A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years documented experience.
   B. Maintain at project site copies of reference standards relating to installation of products specified.
PART 2  PRODUCTS

2.01 MANUFACTURERS
   A. Hollow Metal Doors and Frames:
      1. Ceco Door, an Assa Abloy Group company; Omega:  www.assaabloydss.com/#sle.
      2. Steelcraft, an Allegion brand; B Series:  www.allegion.com/#sle.

2.02 PERFORMANCE REQUIREMENTS
   A. Requirements for Hollow Metal Doors and Frames:
      1. Steel Sheet:  Comply with one or more of the following requirements; galvannealed steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.
      2. Accessibility:  Comply with ICC A117.1 and ADA Standards.
      3. Door Edge Profile:  Manufacturers standard for application indicated.
      5. Hardware Preparations, Selections and Locations:  Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
      6. Zinc Coating for Typical Interior and/or Exterior Locations:  Provide metal components zinc-coated (galvanized) and/or zinc-iron alloy-coated (galvannealed) by the hot-dip process in accordance with ASTM A653/A653M, with manufacturer’s standard coating thickness, unless noted otherwise for specific hollow metal doors and frames.
   B. Combined Requirements:  If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.03 HOLLOW METAL DOORS
   A. Door Finish:  Factory primed and field finished.
   B. Type A, Exterior Doors:  Thermally insulated.
      1. Based on SDI Standards:  ANSI/SDI A250.8 (SDI-100).
         a. Level 2 - Heavy-duty.
         b. Physical Performance Level B, 500,000 cycles; in accordance with ANSI/SDI A250.4.
         c. Model 1 - Full Flush.
         d. Door Face Metal Thickness:  18 gage, 0.042 inch (1.0 mm), minimum.
      2. Door Core Material:  Manufacturers standard core material/construction and in compliance with requirements.
      3. Door Thickness:  1-3/4 inch (44.5 mm), nominal.
      4. Weatherstripping:  Refer to Section 08 7100.

2.04 HOLLOW METAL FRAMES
   A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.
   B. Frame Finish:  Factory primed and field finished.
   C. Exterior Door Frames:  Full profile/continuously welded type.
      1. Galvanizing:  Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A40/ZF120 coating.
      2. Frame Metal Thickness:  18 gage, 0.042 inch (1.0 mm), minimum.
      3. Weatherstripping:  Separate, see Section 08 7100.
2.05 FINISHES
   A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

2.06 ACCESSORIES
   A. Louvers: Roll formed steel with overlapping frame; finish same as door components; factory-installed.
   B. Astragals and Edges for Double Doors: Pairs of door astragals, and door edge sealing and protection devices.
   C. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.

PART 3 EXECUTION
3.01 INSTALLATION
   A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.
   B. Coordinate frame anchor placement with wall construction.
   C. Install door hardware as specified in Section 08 7100.

3.02 TOLERANCES
   A. Clearances Between Door and Frame: Comply with related requirements of specified frame standards or custom guidelines indicated in accordance with SDI 117 or NAAMM HMMA 861.
   B. Maximum Diagonal Distortion: 1/16 inch (1.6 mm) measured with straight edge, corner to corner.

3.03 ADJUSTING
   A. Adjust for smooth and balanced door movement.

   END OF SECTION
PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Fiberglass doors.
   B. Fiberglass door frames.
   C. Door hardware.

1.02 RELATED REQUIREMENTS
   A. Section 09 9113 - Exterior Painting: Field painting.

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS
   A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
   B. Product Data: Provide manufacturer's standard details, installation instructions, hardware and anchor recommendations.
   C. Shop Drawings: Indicate layout and profiles; include assembly methods.
      1. Indicate product components, including hardware reinforcement locations and preparations, accessories, finish colors, patterns, and textures.
      2. Indicate wall conditions, door and frame elevations, sections, materials, gages, finishes, location of door hardware by dimension, and details of openings; use same reference numbers indicated on drawings to identify details and openings.
   D. Test Reports: Submit certified test reports from qualified independent testing agency indicating doors comply with specified performance requirements.

1.05 DELIVERY, STORAGE, AND HANDLING
   A. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
   B. Store materials in original packaging, under cover, protected from exposure to harmful weather conditions and from direct contact with water.
      1. Store at temperature and humidity conditions recommended by manufacturer.
      2. Do not use non-vented plastic or canvas shelters.
      3. Immediately remove wet wrappers.
C. Store in position recommended by manufacturer, elevated minimum 4 inch (102 mm) above grade, with minimum 1/4 inch (6.4 mm) space between doors.

1.06 FIELD CONDITIONS
A. Do not install doors until structure is enclosed.
B. Maintain temperature and humidity at manufacturer's recommended levels during and after installation of doors.

PART 2 PRODUCTS

2.01 MANUFACTURERS
A. Molded Fiberglass Doors:
   2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 DOOR AND FRAME ASSEMBLIES
A. Door and Frame Assemblies: Factory-fabricated, prepared and machined for hardware.
   1. Screw-Holding Capacity: Tested to 890 lbs (404 kgs), minimum.
   2. Surface Burning Characteristics: Flame spread index (FSI) of 0 to 25, Class A, and smoke developed index (SDI) of 450 or less, when tested in accordance with ASTM E84.
   3. Flammability: Self-extinguishing when tested in accordance with ASTM D635.
   4. Chemical Resistance: Resist degradation due to exposure to tap water and distilled water.
   a. Chlorine-treated moisture in air.
   5. Sizes: As indicated on drawings.
   6. Clearance Between Door and Frame: 1/8 inch (3 mm), maximum.
   7. Clearance Between Bottom of Door and Finished Floor: 3/4 inch (19 mm), maximum; not less than 1/4 inch (6 mm) clearance to threshold.

2.03 COMPONENTS
A. Doors: Fiberglass construction with reinforced core.
   1. Thickness: 1-3/4 inch (44 mm), nominal.
   2. Core Material: Manufacturer's standard core material for application indicated.
   3. Construction:
   4. Face Sheet Texture: Smooth.
   5. Door Panel: As indicated on drawings.
   7. Waterproof Integrity: Provide factory fabricated edges, cut-outs, and hardware preparations of fiberglass reinforced plastic (FRP); provide cut-outs with joints sealed independently of glazing, louver inserts, or trim.
   8. Hardware Preparations: Factory reinforce, machine, and prepare for door hardware including field installed items; provide solid blocking for each item; field cutting, drilling or tapping is not permitted; obtain manufacturer's hardware templates for preparation as necessary.

2.04 PERFORMANCE REQUIREMENTS
A. Provide door assemblies that have been designed and fabricated in compliance with specified performance requirements.
B. Fiberglass Reinforced Plastic (FRP) Face Sheet Properties:
   1. Izod Impact Resistance: ASTM D256, 7 ft lbf/inch of width, minimum, with notched izod.
   2. Tensile Strength at Break: ASTM D638, 13,250 psi, minimum.
   3. Water Absorption: ASTM D570, 0.16 percent, maximum, after 24 hours at 74 degrees F (23 degrees C).
   4. Flexural Strength: ASTM D790, 27,000 psi, minimum.
   5. Barcol Hardness: ASTM D2583, minimum of 40 units.
2.05 FINISHES
   A. Primer: Aliphatic urethane for field finishing.

2.06 ACCESSORIES
   A. Stops for Glazing and Louver: Fiberglass, unless otherwise indicated or required by fire rating;
      provided by door manufacturer to fit factory made openings, with color and texture to match
      door; fasteners shall maintain waterproof integrity.
      2. Opening Sizes and Shapes: As indicated on drawings.
   B. Louvers for Non-Fire-Rated Doors: Same materials, construction, finish, and color as door;
      fixed vanes, 45 degree sloped vanes.
      1. Insect Screens: Fiberglass mesh.
   C. Door Hardware:
      2. Weatherstripping: National Guard Products, Inc; 120NSS. www.ngpinc.com/#sle.
      3. Thresholds: Fiberglass, with skid resistant surface, extends full width of door opening, 1/2
         inch (12.7 mm) high by 6 inch (152 mm) wide; same color as frame.

PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify actual dimensions of openings by field measurements before door fabrication; show
      recorded measurements on shop drawings.
   B. Do not begin installation until substrates have been properly prepared.

3.02 PREPARATION
   A. Prepare surfaces using the methods recommended by the manufacturer for achieving the best
      result for the substrate under the project conditions.
   B. Clean and prepare substrate in accordance with manufacturer's directions.

3.03 INSTALLATION
   A. Install in accordance with manufacturer's instructions; do not penetrate frames with anchors.
   B. Install exterior doors in accordance with ASTM E2112.
   C. Set units plumb, level, and true-to-line, without warping or racking doors, and with specified
      clearances; anchor in place.
   D. Separate aluminum and other metal surfaces from sources of corrosion of electrolytic action at
      points of contact with other materials.

3.04 ADJUSTING
   A. Lubricate, test, and adjust doors to operate easily, free from warp, twist or distortion, and to fit
      watertight for entire perimeter.
   B. Adjust hardware for smooth and quiet operation.
   C. Adjust doors to fit snugly and close without sticking or binding.

3.05 PROTECTION
   A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION
SECTION 08 7100
DOOR HARDWARE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Hardware for wood, aluminum, hollow metal, and Fiberglas doors.
B. Hardware for fire-rated doors.
C. Thresholds.
D. Weatherstripping and gasketing.
E. Door hardware for other doors indicated.
F. Keyed Cylinders as indicated.

1.02 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry
B. Section 08 1213 - Hollow Metal Frames.

1.03 REFERENCE STANDARDS

C. BHMA A156.4 - American National Standard for Door Controls - Closers; 2013.
D. BHMA A156.6 - American National Standard for Architectural Door Trim; 2015.
F. BHMA A156.16 - American National Standard for Auxiliary Hardware; 2018.
G. BHMA A156.21 - American National Standard for Thresholds; 2014.
K. DHI / ANSI A115.IG - Installation Guide for Doors and Hardware
L. ICC - International Buuilding Code
M. ITS (DIR) - Directory of Listed Products; current edition.
Q. UL (DIR) - Online Certifications Directory; Current Edition.
S. ANSI-A156.xx - Various Performance Standards for Finish Hardware

1.04 INTENT OF HARDWARE GROUPS

A. Should items of hardware not definitly specified be required for completion of the work, furnish such items of type and quantity comparable to adjacent hardware and appropriate for service required.
B. Where items of hardware aren't definitely or correctly specified, are required for completion of the Work, a written statement of such omission, error, or other discrepancy to be submitted to Architect, prior to date specified for receipt of bids for clarification by addendum; or, furnish such items in the type and quantity established by this specification, and appropriate to the service intended.

1.05 SUBSTITUTIONS:
   A. See Section 01 3000 - Administrative Requirements, for substitution procedures.

1.06 SUBMITTALS
   A. Special Submittal Requirements: Combine Submittals of this section with Sections listed below to ensure the Design Intent of the system/assembly is understood and can be reviewed together.
   B. See Section 01 3000 - Administrative Requirements, for submittal procedures.
   C. Product Data: Manufacturer's specifications and technical data including the following:
      1. Detailed specifications of construction and fabrication.
      3. Wiring diagrams for each electric product specified. Coordinate voltage with electrical before submitting.
      4. Submit 6 copies of catalog cuts with hardware schedule.
      5. Provide 90012 := Quality Management and 14001 - Environmental Management for products listed in Materials Section 2.2
   D. Shop Drawings - Hardware Schedule: Submit 6 complete reproducible copies of detailed hardware schedule in a vertical(portrait) format.
      1. List groups and suffixes in proper sequence
      2. Completely describe door and list architectural door numbers
      3. Manufacturer, product name, and catalog number
      4. Function, type and style
      5. Size and finish of each item
      6. Mounting Heights
      7. Explanation of abbreviations and symbols used within schedule
      8. Detailed wiring drawings, specifically developed for each opening, indicating electric hardware, security equipment and access control equipment, and door and frame rough-ins required for specific opening.
   E. Templates: Submit templates and "reviewed Hardware Schedule" to door and frame supplier and others as applicable to enable proper and accurate sizing and locations of cutouts and reinforcing.
      1. Templates, wiring diagrams and "reviewed Hardware Schedule" of electrical terms to electrical for coordination and verification of voltages and locations.
   F. Samples for Verification:
      1. Submit minimum size of 2 by 4 inch (51 by 102 mm) for sheet samples, and minimum length of 4 inch (102 mm) for other products.
      2. Submit one (1) sample of hinge, latchset, lockset, closer, and Lever and Rose/Escutcheon (pair) illustrating style, color, and finish.
      3. Return full-size samples to Contractor.
      4. Submit product description with samples.
   G. Contract Close Out Submittals
      1. Operating and maintenance manuals: Submit 3 sets containing the following:
         a. Complete information in care, maintenance, and adjustment, data on repair and replacement parts, and information on preservation of finishes.
         b. Catalog pages for each product
         c. Name, address, and phone number of local representative for each manufacturer.
d. Parts list for each product
2. Copy of final hardware schedule, edited to reflect, "As Installed".
3. Copy of final keying schedule.
4. As installed "wiring Diagrams" for each piece of hardware connected to power, both low voltage and 110 volts.
5. One set of special tools required for maintenance and adjustment of hardware, including changing of cyinders.

1.07 QUALITY ASSURANCE
A. Statement of Qualification for distributor and installers.
B. Statement of compliance with regulatory requirements and single source responsibility.
C. Distributers Qualifications: Firm with three years experience in the distribution of commercial hardware.
   1. Distributor to employ full time Architectural Consultant (AHC) for the purpose of scheduling and coordinating hardware and establishing kewying schedule.
   2. Hardware Schedule shall be prepared and signed by an AHC.
D. Installers Qualifications: Firm with therr years experience installation of similar hardware to that required for this project, including specific requirements indicated.
E. Regulatory Label Requirements: Provide testing agency label or stamp on hardware for labeled openings.
   1. Provide UL listed hardware for nabeled and 20 minute openings in conformance with requirements for class of opening scheduled
   2. Underwriters Laboratories requirements have precedence over this specification where conflicts exist.
F. Single Source Responsibility: Except where specified in hardware schedule, furnish products of only one manufacturer for each type of hardware.

1.08 DELIVERY, STORAGE, AND HANDLING
A. Package hardware items individually; label and identify each package with door opening code to match door hardware schedule.
   1. Deliver products in original unpoened package with legible manufacturers identification.
   2. Package hardware to prevent damage during transit and storage.
   3. Mark hardware to correspond with "reviewed hardware Schedule".
   4. Deliver hardware to door and frame manufacturer upon request.
B. Storage and Protection: Comply with manufacturers recomendations.

1.09 PROJECT CONDITIONS
A. Coordinate hardware and other work. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing, and similar requirements, as necessary for the proper installation and function, regardless of omissions or conflicts in the information on the Contract Documents.
B. Review Shop Drawings for doors and entrances to confirm that adequate provisions will be made for the proper installation of hardware.

1.10 WARRANTY
A. See Section 01 7800 - CONTRACT CLOSEOUT, for additional warranty requirements.
B. Warranty against defects in material and workmanship for period indicated, from Date of Substantial Completion.
   1. Closers: Ten Years
   2. Exit Devices: Five Years
   3. Locksets and Cylinders: Three years, minimum.
   4. Other Hardware: Two years, minimum.
1.11 1.9 MAINTENANCE

A. Extra Service Materials: Deliver to Owner extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels. Comply with Division 1 Closeout Submittals Section.
   1. Special Tools: Provide special wrenches and tools applicable to each different or special hardware component.
   2. Maintenance Tools: Provide maintenance tools and accessories supplied by hardware component manufacturer.
   3. Delivery, Storage and Protection: Comply with Owner’s requirements for delivery, storage and protection of extra service material.

B. Maintenance Service: Submit for Owner’s consideration maintenance service agreement for electronic products installed.

1.12 FINISH:

A. Designations used in Schedule of Finish Hardware - 3.05, and elsewhere to indicate hardware finishes are those listed in ANSI/BHMA A156.18 including coordination with traditional U.S. finishes shown by certain manufacturers for their products.

B. Powder coat door closers to match other hardware, unless otherwise noted.

C. Aluminum items shall be finished to match predominant adjacent material. Seals to coordinate with frame color.

1.13 KEYS AND KEYING:

A. Provide construction keying during the construction period. Construction keys and operating keys shall not be part of the Owner’s permanent keying system. Permanent keys (prepared according to the accepted keying schedule) will be furnished to the Owner.

B. Cylinders: Schlage Conventional to match existing.

C. Permanent keys and cores: Stamped with the applicable key mark for identification. These visual key control marks or codes will not include the actual key cuts. Permanent keys will also be stamped "Do Not Duplicate."

D. Transmit Grand Masterkeys, Masterkeys and other Security keys to Owner by Registered Mail, return receipt requested.
   1. Furnish keys in the following quantities:
      a. 1 each Grand Masterkeys
      b. 4 each Masterkeys
      c. 2 each Change keys each keyed core
      d. 15 each Construction masterkeys
      e. 1 each Control keys
   2. The Owner, or the Owner’s agent, will install permanent keying.
   3. Keying Schedule: Arrange for a keying meeting, and programming meeting with Architect Owner and hardware supplier, and other involved parties to ensure locksets and locking hardware, are functionally correct and keying and programming complies with project requirements. Furnish 3 typed copies of keying and programming schedule to Architect.

PART 2 PRODUCTS

2.01 DESIGN AND PERFORMANCE CRITERIA

A. Provide specified door hardware as required to make doors fully functional, compliant with applicable codes, and secure to extent indicated.

B. Provide individual items of single type, of same model, and by same manufacturer.

C. Provide door hardware products that comply with the following requirements:
   1. Applicable provisions of federal, state, and local codes.
2. Fire-Rated Doors: NFPA 80, listed and labeled by qualified testing agency for fire protection ratings indicated, based on testing at positive pressure in accordance with NFPA 252 or UL 10C.

3. Hardware on Fire-Rated Doors: Listed and classified by UL (DIR), ITS (DIR), testing firm acceptable to authorities having jurisdiction, or _____ as suitable for application indicated.

### 2.02 HINGES

#### A. Manufacturers:


#### B. Hinges: Comply with BHMA A156.1, Grade 1.

1. Butt Hinges: Comply with BHMA A156.1 and BHMA A156.7 for templated hinges.
   
   a. Provide hinge width required to clear surrounding trim.
   
   b. Template screw hole locations
   
   c. Bearings are to be fully hardened.
   
   d. Bearing shell is to be consistent shape with barrel.
   
   e. Minimum of 2 permanently lubricated non-detachable bearings on standard weight hinge and 4 permanently lubricated bearing on heavy weight hinges.
   
   f. Equip with easily seated, non-rising pins.
   
   g. Non Removable Pin screws shall be slotted stainless steel screws.
   
   h. Hinges shall be full polished, front, back and barrel.
   
   i. Hinge pin is to be fully plated.
   
   j. Bearing assembly is to be installed after plating.
   
   k. Sufficient size to allow 180-degree swing of door
   
   l. Furnish five knuckles with flush ball bearings
   
   m. Provide hinge type as listed in schedule.
   
   n. Furnish 3 hinges per leaf to 7 foot 6 inch height. Add one for each additional 30 inches in height or fraction thereof.
   
   o. Tested and approved by BHMA for all applicable ANSI Standards for type, size, function and finish
   
   p. UL10C listed for Fire rated doors.


   a. Tested and approved by BHMA for ANSI A156.26-1996 Grade 1
   
   b. Anti-spinning through fastener
   
   c. UL10C listed for 3 hour Fire rating
   
   d. Non-handed
   
   e. Lifetime warranty
   
   f. Provide Fire Pins for 3-hour fire ratings
   
   g. Sufficient size to permit door to swing 180 degrees

3. Provide hinges on every swinging door.

4. Provide following quantity of butt hinges for each door:

   a. Doors From 60 inches (1.5 m) High up to 90 inches (2.3 m) High: Three hinges.

### 2.03 LOCK CYLINDERS

#### A. Lock Cylinders: Provide key access on outside of each lock, unless otherwise indicated.

1. Provide cylinders from same manufacturer as locking device.

2. Provide cams and/or tailpieces as required for locking devices.

3. Provide the necessary cylinder housings, collars, rings & springs as recommended by the manufacturer for proper installation.

4. Provide the proper cylinder cams or tail piece as required to operate all locksets and other keyed hardware items listed in the hardware sets.

5. Coordinate and provide as required for related sections
2.04 CYLINDRICAL LOCKS

A. Manufacturers:

B. Cylindrical Locks (Bored): Comply with BHMA A156.2, Grade 1, 4000 Series.
1. Bored Hole: 2-1/8 inch (54 mm) diameter.
2. Latchbolt Throw: 1/2 inch (12.7 mm), minimum.
3. Backset: 2-3/4 inch (70 mm) unless otherwise indicated.
4. Strikes: Provide manufacturer's standard strike for each latchset or lockset with strike box and curved lip extending to protect frame in compliance with indicated requirements.
   a. Finish: To match lock or latch.
5. Tested and approved by BHMA for ANSI A156.2, Series 4000, Operational Grade 1, Extra-Heavy Duty, and be UL10C listed.
7. Fit modified ANSI A115.2 door preparation.
8. Locksets and cores to be of the same manufacturer to maintain complete lockset warranty
9. Locksets to have anti-rotational studs that are thru-bolted
10. Keyed lever shall not have exposed “keeper” hole
11. Each lever to have independent spring mechanism controlling it
12. 2-3/4 inch (70 mm) backset
13. 9/16 inch (14 mm) throw latchbolt
14. Provide sufficient curved strike lip to protect door trim
15. Outside lever sleeve to be seamless, of one-piece construction made of a hardened steel alloy
16. Keyed lever to be removable only after core is removed, by authorized control key
17. Provide locksets with 7-pin removable and interchangeable core cylinders
18. Hub, side plate, shrouded rose, locking pin to be a one-piece casting with a shrouded locking lug.
19. Locksets outside locked lever must withstand minimum 1400 inch pounds of torque. In excess of that, a replaceable part will shear. Key from outside and inside lever will still operate lockset.
20. Core face must be the same finish as the lockset.
21. Functions and design as indicated in the hardware groups.

2.05 DOOR PULLS AND PUSH PLATES

A. Manufacturers:

B. Door Pulls and Push Plates: Comply with BHMA A156.6.
1. Pull Type: Straight, unless otherwise indicated.
2. Push Plate Type: Flat, with square corners, unless otherwise indicated.
   a. Edges: Beveled, unless otherwise indicated.
3. Material: Aluminum, unless otherwise indicated.
4. Push Plates: Provide with four beveled edges ANSI J301, .050 thickness, size as indicated in hardware set. Furnish oval-head countersunk screws to match finish.
5. Pulls with plates: Provide with four beveled edges ANSI J301, .050 thickness Plate s with ANSI J401 Pull as listed in hardware set. Provide proper fasteners for door construction.

2.06 CLOSERS

A. Manufacturers; Surface Mounted:

B. Closers: Comply with BHMA A156.4, Grade 1.
1. Type: Surface mounted to door.
2. Provide door closer on each exterior door.
3. Tested and approved by BHMA for ANSI 156.4, Grade 1
4. UL10C certified
6. Closer shall have extra-duty arms and knuckles
7. Conform to ANSI 117.1
8. Maximum 2 7/16 inch case projection with non-ferrous cover
9. Separate adjusting valves for closing and latching speed, and backcheck
10. Provide adapter plates, shim spacers and blade stop spacers as required by frame and door conditions
11. Full rack and pinion type closer with 1½’’ minimum bore
12. Mount closers on non-public side of door, unless otherwise noted in specification
13. Closers shall be non-handed, non-sized and multi-sized.

2.07 KICK PLATES
A. Manufacturers:
B. Kick Plates: Provide along bottom edge of push side of every door with closer, except aluminum storefront and glass entry doors, unless otherwise indicated.
   1. Size: 8 inch (203 mm) high by 2 inch (51 mm) less door width (LDW) on push side of door.
   2. Provide with four beveled edges ANSI J102, 10 inches high by width less 2 inches on single doors and 1 inch on pairs of doors. Furnish oval-head countersunk screws to match finish.

2.08 MOP PLATES
A. Manufacturers:
B. Mop Plates: Provide along bottom edge of push side of doors to provide protection from cleaning liquids and equipment damage to door surface.
   1. Size: 6 inch (152 mm) high by 1-1/2 inch (38 mm) less door width (LDW) on pull side and 2 inch (51 mm) LDW on push side of door.
   2. Provide with four beveled edges ANSI J103, 4 inches high by width less 1 inch on single doors and 1 inch on pairs of doors. Furnish oval-head countersunk screws to match finish.

2.09 WALL STOPS
A. Manufacturers:
B. Wall Stops: Comply with BHMA A156.16, Grade 1 and Resilient Material Retention Test as described in this standard.
   1. Type: Bumper, concave, wall stop.
   3. Wall stop and floor stop shall be wrought bronze, brass or stainless steel.
   4. Provide fastener suitable for wall construction.
   5. Coordinate reinforcement of walls where wall stop is specified.
   6. Provide dome stops where wall stops are not practical.
   7. Provide spacers or carpet riser for floor conditions encountered
C. Over Head Stops: Provide a Surface mounted or concealed overhead when a floor or wall stop cannot be used or when listed in the hardware set.
   1. Concealed overhead stops shall be heavy duty bronze or stainless steel.
   2. Surface overhead stops shall be heavy duty bronze or stainless steel.
2.10 ASTRAGALS
A. Manufacturers:
   1. National Guard Products, Inc; 125 NA: www.ngpinc.com/#sle.
B. Astragals: Comply with BHMA A156.22.
   1. Type: Split, two parts, and with sealing gasket.
   2. Material: Aluminum, with neoprene weatherstripping.
   3. Provide non-corroding fasteners at exterior locations.

2.11 THRESHOLDS
A. Manufacturers:
B. Thresholds: Comply with BHMA A156.21.
   1. Provide threshold at each exterior door, unless otherwise indicated.
   2. Type: Flat surface.
   4. Threshold Surface: Fluted horizontal grooves across full width.
   5. Field cut threshold to profile of frame and width of door sill for tight fit.
   6. Provide non-corroding fasteners at exterior locations.
   7. Door Bottoms/Sweeps: Surface mounted or concealed door bottom where listed in the hardware sets.
      a. Door seal shall be resilient seal of (Neoprene, Polyurethane, Nylon Brush, Silicone)
      b. UL10C Positive Pressure rated seal set when required.
   8. Thresholds shall be aluminum beveled type with maximum height of ½” for conformance with ADA requirements. Furnish as specified and per details. Provide fasteners and screws suitable for floor conditions.

2.12 WEATHERSTRIPPING AND GASKETING
A. Manufacturers:
B. Weatherstripping and Gasketing: Comply with BHMA A156.22.
   1. Head and Jamb Type: Adjustable.
   2. Door Sweep Type: Encased in retainer.
   3. Material: Aluminum, with brush weatherstripping.
   4. Provide at head and jambs only those units where resilient or flexible seal strip is easily replaceable. Where bar-type weatherstrip is used with parallel arm mounted closers install weatherstrip first.
      a. Weatherstrip shall be resilient seal of (Neoprene, Polyurethane, Vinyl, Pile, Nylon Brush, Silicone)
      b. UL10C Positive Pressure rated seal set when required.
   5. Door Bottoms/Sweeps: Surface mounted or concealed door bottom where listed in the hardware sets.
      a. Door seal shall be resilient seal of (Neoprene, Polyurethane, Nylon Brush, Silicone)
      b. UL10C Positive Pressure rated seal set when required.

2.13 SIGNAGE
A. Manufacturers:
   1. Basis of Design: BAL 0103 & BAL 1012.
B. Signage:
   1. Provide for Rest Rooms only
2. Text Required: "RESTROOM" with symbols and braille text.
3. Material: In metal with paint used to create necessary text, Fasten to wall adjacent to strike side of door.
4. Fasten to wall adjacent to strike side of door

2.14 SILENCERS
A. Silencers: Provide at equal locations on door frame to mute sound of door's impact upon closing.
   1. Single Door: Provide three on strike jamb of frame.
   2. Pair of Doors: Provide two on head of frame, one for each door at latch side.

2.15 SEALS
A. All seals shall be finished to match adjacent frame color. Seals shall be furnished as listed in schedule. Material shall be UL listed for labeled openings.

2.16 FINISHES

2.17 SCHEDULE OF FINISH HARDWARE:
A. Manufacturer List:

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>BE</td>
<td>Best Access Systems</td>
</tr>
<tr>
<td>NA</td>
<td>National Guard</td>
</tr>
<tr>
<td>SC</td>
<td>Schlage</td>
</tr>
<tr>
<td>SD</td>
<td>Stanley Door Closers</td>
</tr>
<tr>
<td>SH</td>
<td>Stanley Commercial Hardware</td>
</tr>
<tr>
<td>ST</td>
<td>Stanley</td>
</tr>
<tr>
<td>TR</td>
<td>Trimco</td>
</tr>
</tbody>
</table>

B. Finish List

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AL</td>
<td>Aluminum</td>
</tr>
<tr>
<td>626</td>
<td>Satin Chromium Plated</td>
</tr>
<tr>
<td>630</td>
<td>Satin Stainless Steel</td>
</tr>
<tr>
<td>689</td>
<td>Aluminum Painted</td>
</tr>
<tr>
<td>US26D</td>
<td>Chromium Plated, Dull</td>
</tr>
</tbody>
</table>

C. Set #1

Door # D101, D102, D105, D106, D107

| 3 | Hinges  | FBB179 4 1/2 X 4 1/2 | US26D | ST |
| 1 | Privacy Set | 9K3-0L14D | 626 | BE |
| 1 | Door Closer | CLD-4551 SN | 689 | SH |
| 1 | Kick Plate | K0050 10" x 34" | 630 | TR |
| 1 | Mop Plate | KM050 6" x 35" | 630 | TR |
| 1 | Wall Bumper | 1270CVPV | 626 | TR |
| 1 | Threshold | 425 | NA |
| 1 | Door Sweep | 200 NA | NA |
| 1 | Gasketing | 2525C-17 17" | NA |

D. Set #2

Door # D103

| 2 | Continuous Hinge | 661HD UL 83" | AL | ST |
| 1 | Flushbolt | 3917 12" | 626 | TR |
| 1 | Dust Proof Strike | 3910 | 626 | TR |
| 1 | Lockset | 9K3-7D14D PATD | 626 | BE |
| 2 | Door Closer CLD-4550 CS-H SN | 689 | SH |
PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that doors and frames are ready to receive this work; labeled, fire-rated doors and frames are properly installed, and dimensions are as indicated on shop drawings.

B. Do not proceed until unsatisfactory conditions have been corrected.

3.02 HARDWARE LOCATIONS

A. Mount hardware units at heights indicated in the following publications except as specifically indicated or required to comply with the governing regulations.
   1. Recommended Locations for Builder’s Hardware for Standard Steel Doors and Frames, by the Door and Hardware Institute (DHI).
   2. Recommended locations for Architectural Hardware for flush wood doors (DHI).

3.03 INSTALLATION

A. Install hardware in accordance with manufacturer’s instructions and applicable codes.

B. Do not install surface mounted items until finishes have been completed on the substrate.

C. Verify that electric power is available to power operated devices and of correct characteristics

D. Set units level, plumb and true to line and location.

E. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

F. 

G. Install Conforming to ICC/ANSI A117.1 Accessible and Usable Building and Facilities.
   1. Adjust door closer sweep periods so that from the open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the landing side of the door

H. Install hardware on fire-rated doors and frames in accordance with applicable codes and NFPA 80.

I. Installed hardware using the manufacturers fasteners provided. Drill and tap all screw holes located in metallic materials. Do not use “Riv-Nuts” or similar products.

3.04 FIELD QUALITY CONTROL AND FINAL ADJUSTMENT

A. Contractor/Installers, Field Services: After installation is complete, contractor shall inspect the completed door openings on site to verify installation of hardware is complete and properly adjusted, in accordance with both the Contract Documents and final shop drawings.

   1. Check and adjust closers to ensure proper operation.
a. Verify levers are free from binding.
   b. Ensure latchbolts and dead bolts are engaged into strike and hardware is functioning.

2. Check latchset, lockset, and exit devices are properly installed and adjusted to ensure proper operation.

3. Report findings, in writing, to architect indicating that all hardware is installed and functioning properly. Include recommendations outlining corrective actions for improperly functioning hardware if required.

3.05 CLEANING

3.06 PROTECTION

   A. Protect finished Work under provisions of Section 01 7000 - Execution and Closeout Requirements.

   B. Do not permit adjacent work to damage hardware or finish.

END OF SECTION
PART 1 GENERAL

1.01 SECTION INCLUDES
A. Louvers, frames, and accessories.

1.02 RELATED REQUIREMENTS
A. Section 07 6200 - Sheet Metal Flashing and Trim.
B. Section 07 9200 - Joint Sealants: Sealing joints between frames and adjacent construction.
C. Section 09 9113 - Exterior Painting: Field painting.

1.03 REFERENCE STANDARDS
B. AMCA 511 - Certified Ratings Program for Air Control Devices; 2010.

1.04 SUBMITTALS
A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide data describing design characteristics, maximum recommended air velocity, design free area, materials and finishes.
C. Shop Drawings: Indicate louver layout plan and elevations, opening and clearance dimensions, tolerances; head, jamb and sill details; blade configuration, screens, blankout areas required, and frames.

PART 2 PRODUCTS

2.01 MANUFACTURERS
A. Louvers:
   1. Ruskin; Stationary Louvers: www.ruskin.com/#sle.
   2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 LOUVERS
A. Louvers: Factory fabricated and assembled, complete with frame, mullions, and accessories; AMCA Certified in accordance with AMCA 511.
1. Drainable Blades: Continuous rain stop at front or rear of blade aligned with vertical gutter recessed into both jambs of frame.
2. Screens: Provide insect screens at intake louvers and bird screens at exhaust louvers.
B. Stationary Louvers, Type 6063T5: Horizontal blade, formed galvanized steel sheet construction, with intermediate mullions matching frame.
1. Free Area: 50 percent, minimum.
3. Frame: 4 inches (100 mm) deep, channel profile; corner joints mitered and, with continuous recessed caulking channel each side.
4. Aluminum Thickness: Frame 12 gage, 0.0808 inch (2.05 mm) minimum; blades 12 gage, 0.0808 inch (2.05 mm) minimum.
5. Aluminum Finish: Class I natural anodized; finish welded units after fabrication.
6. Screen: 5/8" x .040 (16 x1)
2.03 MATERIALS

2.04 FINISHES
   A. Class I Color Anodized Finish: AAMA 611 AA-M12C22A42 Integrally colored anodic coating not less than 0.7 mils (0.018 mm) thick.
   B. Primer: Zinc chromate, alkyd type.
   C. Color: As selected from manufacturer's standard colors.

2.05 ACCESSORIES
   A. Screens: Frame of same material as louver, with reinforced corners; removable, screw attached; installed on inside face of louver frame.
   B. Insect Screen: 18 x 16 size aluminum mesh.
   C. Fasteners and Anchors: Galvanized steel.
   D. Sealant for Setting Sills and Sill Flashing: Non-curing butyl type.

PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify that prepared openings and flashings are ready to receive this work and opening dimensions are as indicated on shop drawings.
   B. Verify that field measurements are as indicated.

3.02 INSTALLATION
   A. Install louver assembly in accordance with manufacturer's instructions.
   B. Install louvers level and plumb.
   C. Align louver assembly to ensure moisture shed from flashings and diversion of moisture to exterior.
   D. Secure louver frames in openings with concealed fasteners.

3.03 CLEANING
   A. Strip protective finish coverings.
   B. Clean surfaces and components.

END OF SECTION
SECTION 09 3000
TILING

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Tile for wall applications.
   B. Tile for counters.
   C. Ceramic trim.
   D. Non-ceramic trim.

1.02 REFERENCE STANDARDS

1.03 SUBMITTALS
   A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
   B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.

1.04 MOCK-UP
   A. See Section 01 4000 - Quality Requirements, for general requirements for mock-up.
   B. Construct tile mock-up where indicated on drawings, incorporating all components specified for the location.
      1. Minimum size of mock-up is indicated on drawings.
      2. Approved mock-up may remain as part of the Work.

1.05 DELIVERY, STORAGE, AND HANDLING
   A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.06 FIELD CONDITIONS
   A. Do not install solvent-based products in an unventilated environment.
   B. Maintain ambient and substrate temperature above 50 degrees F (10 degrees C) and below 100 degrees F (38 degrees C) during installation and curing of setting materials.

PART 2 PRODUCTS

2.01 TILE
   A. Glazed Wall Tile, Type Glazed Porcelain: ANSI A137.1, standard grade.
      1. Size: 8 inch (by 40 inch), nominal.
      2. Edges: Square.
      4. Color(s): Troms Gold - PEI IV.
      5. Pattern: Stack.
      6. Trim Units: Matching bead, bullnose, cove, and base shapes in sizes coordinated with field tile.
      7. Products:
         a. Interceramic; Norway: https://interceramicusa.com/products/serie/norway/4821
      8. Substitutions: See Section 01 6000 - Product Requirements.
B. Metal Tile, Type Wall Tile:
1. Composition: Metal wrapped porcelain tile.
2. Size: 1 inch by 1 inch (____by____ mm), nominal.
4. Edges: Square.
5. Mesh-Mounted Tiles: Multiple size rectangular tiles on 4 by 12 inch (____by____ mm) nominal mesh backing.
6. Color(s): To be selected by Architect from manufacturer's standard range.
7. Pattern: Square Mosaic.
8. Products:
      https://interceramicusa.com/products/serie/inox-mosaics/2100

2.02 TRIM AND ACCESSORIES
A. Ceramic Trim: Matching bullnose and cove base ceramic shapes in sizes coordinated with field tile.
   1. Applications:
      a. Open Edges: Bullnose.
      b. Inside Corners: Jointed.
      c. Floor to Wall Joints: Cove base.
   2. Manufacturers: Same as for tile.
B. Non-Ceramic Trim: Satin brass anodized extruded aluminum, style and dimensions to suit application, for setting using tile mortar or adhesive.
   1. Applications:
      a. Open edges of wall tile.
      b. Expansion and control joints, floor and wall.
      c. Borders and other trim as indicated on drawings.
   2. Manufacturers:

2.03 SETTING MATERIALS
A. Manufacturers:
   1. LATICRETE International, Inc; Spectralock Pro: www.laticrete.com/#sle.
   2. Substitutions: See Section 01 6000 - Product Requirements.
   1. Products:

2.04 GROUTS
A. Manufacturers:
   1. LATICRETE International, Inc; Spectralock Pro: www.laticrete.com/#sle.
   2. Substitutions: See Section 01 6000 - Product Requirements.
B. High Performance Polymer Modified Grout: ANSI A118.7 polymer modified cement grout.
   1. Applications: Use this type of grout where indicated and where no other type of grout is indicated.
   2. Use sanded grout for joints 1/8 inch (3.2 mm) wide and larger; use unsanded grout for joints less than 1/8 inch (3.2 mm) wide.
   3. Color(s): As selected by Architect from manufacturer's full line.
   4. Products:
2.05 ACCESSORY MATERIALS
   A. Waterproofing Membrane Walls: Specifically designed for bonding to cementitious substrate under thick mortar bed or thin-set tile; complying with ANSI A118.10.
      1. Fluid or Trowel Applied Type:
         a. Products:
            1) LATICRETE International, Inc; LATICRETE HYDRO BAN: www.laticrete.com/#sle.
            2) Substitutions: See Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify that concrete sub-floor surfaces are ready for tile installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within limits recommended by tile manufacturer and setting materials manufacturer.

3.02 PREPARATION
   A. Protect surrounding work from damage.
   B. Vacuum clean surfaces and damp clean.
   C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.

3.03 INSTALLATION - GENERAL
   A. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.
   B. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.
   C. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.
   D. Install non-ceramic trim in accordance with manufacturer's instructions.
   E. Sound tile after setting. Replace hollow sounding units.
   F. Keep control and expansion joints free of mortar, grout, and adhesive.
   G. Prior to grouting, allow installation to completely cure; minimum of 48 hours.
   H. Grout tile joints unless otherwise indicated. Use standard grout unless otherwise indicated.

3.04 CLEANING
   A. Clean tile and grout surfaces.

3.05 PROTECTION
   A. Do not permit traffic over finished floor surface for 4 days after installation.

END OF SECTION
PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.
B. Field application of paints.
C. Scope: Finish exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
   1. Exposed surfaces of steel structure and framing.
   2. Exposed walls and bottom of swimming pools and fountains.
D. Do Not Paint or Finish the Following Items:
   1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
   5. Stainless steel, anodized aluminum, bronze, terne coated stainless steel, zinc, and lead.
   6. Marble, granite, slate, and other natural stones.
   7. Floors, unless specifically indicated.
   8. Ceramic and other types of tiles.
   10. Glass.
   11. Concrete masonry units in utility, mechanical, electrical, and Open Air spaces.

1.02 RELATED REQUIREMENTS

A. Section 05 5000 - Metal Fabrications: Shop-primed items.

1.03 REFERENCE STANDARDS

A. ASTM D4258 - Standard Practice for Surface Cleaning Concrete for Coating; 2005 (Reapproved 2017).
B. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association; Current Edition.
D. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).
E. SSPC-SP 6 - Commercial Blast Cleaning; 2007.
F. SSPC-SP 13 - Surface Preparation of Concrete; 1997 (Reaffirmed 2003).

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide complete list of products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
   2. MPI product number (e.g. MPI #47).
   3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
   4. Manufacturer's installation instructions.
5. If proposal of substitutions is allowed under submittal procedures, explanation of substitutions proposed.

C. Samples: Submit two paper chip samples, 2" by 2" inch (51 by 51 mm) in size illustrating range of colors and textures available for each surface finishing product scheduled.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

1.06 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Paints:

B. Primer Sealers: Same manufacturer as top coats.

C. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PAINTS AND FINISHES - GENERAL

A. Paints and Finishes: Ready mixed, unless required to be a field-catalyzed paint.
   1. Where MPI paint numbers are specified, provide products listed in Master Painters Institute Approved Product List, current edition available at www.paintinfo.com, for specified MPI categories, except as otherwise indicated.
   2. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
   3. Supply each paint material in quantity required to complete entire project's work from a single production run.
   4. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

B. Flammability: Comply with applicable code for surface burning characteristics.

C. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.

D. Colors: To be selected from manufacturer's full range of available colors.
   1. Selection to be made by Architect after award of contract.

2.03 PAINT SYSTEMS - EXTERIOR

   1. Two top coats and one coat primer.

B. Paint E-TR-C - Transparent Finish on Concrete Floors:
1. 2 coats sealer over 1 coat stain.
2. Sealer: Water Based Sealer for Concrete Floors; MPI #99.
   a.  Products:
      1) Sherwin-Williams H&C Clarishield Water-Based Wet-Look Concrete Sealer.
         (MPI #99)
C. Paint ME-OP-2A - Ferrous Metals, Primed, Alkyd, 2 Coat:
   1.  Touch-up with rust-inhibitive primer recommended by top coat manufacturer.
   2.  Semi-gloss: Two coats of alkyd enamel; ____.

2.04 PRIMERS
A. Primers: Provide the following unless other primer is required or recommended by
   manufacturer of top coats.
   1.  Alkali Resistant Water Based Primer; MPI #3.
      a.  Products:
         1) Sherwin-Williams Loxon Concrete and Masonry Primer Sealer, LX02W50. (MPI
            #3)
   2.  Interior/Exterior Latex Block Filler; MPI #4.
      a.  Products:
         1) Sherwin-Williams Loxon Block Surfacer. (MPI #4)
   3.  Interior/Exterior Quick Dry Alkyd Primer for Metal; MPI #76.
      a.  Products:
         1) Sumter Coatings, Inc. Universal Inhibitive Primer.

2.05 ACCESSORY MATERIALS
A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding
   materials, and clean-up materials as required for final completion of painted surfaces.
B. Patching Material: Latex filler.
C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION
3.01 EXAMINATION
A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
B. Examine surfaces scheduled to be finished prior to commencement of work. Report any
   condition that may potentially effect proper application.
C. Test shop-applied primer for compatibility with subsequent cover materials.
D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes
   unless moisture content of surfaces are below the following maximums:
   1. Masonry, Concrete, and Concrete Masonry Units: 12 percent.
   2. Concrete Floors and Traffic Surfaces: 8 percent.

3.02 PREPARATION
A. Clean surfaces thoroughly and correct defects prior to application.
B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best
   result for the substrate under the project conditions.
C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim,
   escutcheons, and fittings, prior to preparing surfaces for finishing.
D. Seal surfaces that might cause bleed through or staining of topcoat.
E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate
   and bleach. Rinse with clean water and allow surface to dry.
F. Concrete:
1. Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
2. Clean concrete according to ASTM D4258. Allow to dry.

G. Masonry:
   1. Clean surfaces with pressurized water. Use pressure range of 600 to 1,500 psi (4,140 to 10,350 kPa) at 6 to 12 inches (150 to 300 mm). Allow to dry.

H. Concrete Floors and Traffic Surfaces: Remove contamination, acid etch, and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.

I. Ferrous Metal:
   1. Solvent clean according to SSPC-SP 1.
   2. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.

3.03 APPLICATION
   A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
   B. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
   C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
   D. Apply each coat to uniform appearance.
   E. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
   F. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 PROTECTION
   A. Protect finishes until completion of project.
   B. Touch-up damaged finishes after Substantial Completion.

3.05 SCHEDULE - PAINT SYSTEMS
   A. Concrete, Concrete Masonry Units (CMU), Concrete Block, Brick Masonry: Finish surfaces exposed to view, except Ground Faced Block.
   B. Steel Fabrications: Finish surfaces exposed to view, except Fasteners.

END OF SECTION
PART 1 GENERAL

1.01 SECTION INCLUDES
A. Commercial toilet accessories.
B. Commercial shower and bath accessories.
C. Under-lavatory pipe supply covers.
D. Electric hand/hair dryers.
E. Utility room accessories.

1.02 RELATED REQUIREMENTS
A. Section 22 4000 - Plumbing Fixtures: Under-lavatory pipe and supply covers.

1.03 REFERENCE STANDARDS

1.04 ADMINISTRATIVE REQUIREMENTS
A. Coordinate the work with the placement of internal wall reinforcement, concealed ceiling supports, and reinforcement of toilet partitions to receive anchor attachments.

1.05 SUBMITTALS
A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.

PART 2 PRODUCTS

2.01 MANUFACTURERS
A. Commercial Toilet, Shower, and Bath Accessories:
   2. Substitutions: Section 01 6000 - Product Requirements.
B. Under-Lavatory Pipe Supply Covers:
   2. Substitutions: Section 01 6000 - Product Requirements.
C. Electric Hand/Hair Dryers:
   2. American Specialties Inc 0199-1-93.,

2.02 MATERIALS
A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.

2.03 COMMERCIAL TOILET ACCESSORIES
A. Toilet Paper Dispenser: Single roll, surface mounted bracket type, stainless steel, spindleless type for tension spring delivery designed to prevent theft of tissue roll.
      a. 7305 Toilet Tissue Holder (Single)– Surface Mounted, Satin Finish.
B. Soap Dispenser: Liquid soap dispenser, wall-mounted, surface, with stainless steel cover and horizontal stainless steel tank and working parts; push type soap valve, check valve, and window gauge refill indicator, tumbler lock.
   a. 0350 Soap Dispenser (Surgical-type) – Surface Mounted.

C. Grab Bars: Stainless steel, smooth surface.
   1. Standard Duty Grab Bars:
      a. Push/Pull Point Load: 250 pound-force (1112 N), minimum.
      b. Dimensions: 1-1/4 inch (32 mm) outside diameter, minimum 0.05 inch (1.3 mm) wall
         thickness, exposed flange mounting, 1-1/2 inch (38 mm) clearance between wall and
         inside of grab bar.
      c. Finish: Satin.
      d. Length and Configuration: As indicated on drawings.
         1) 3800 Series 1-1/2" DIA – Snap Flange Grab Bars, 36’ & 42”.

2.04 COMMERCIAL SHOWER AND BATH ACCESSORIES

A. Robe Hook: Heavy-duty stainless steel, single-prong, rectangular-shaped bracket and
   backplate for concealed attachment, satin finish.
   1. Products:
      a. American Specialties Inc

B. Child Protection Seat
   1. Products:
      b. Wall mount, White

2.05 UNDER-LAVATORY PIPE AND SUPPLY COVERS

A. Under-Lavatory Pipe and Supply Covers:
   1. Insulate exposed drainage piping including hot, cold, and tempered water supplies under
      lavatories or sinks to comply with ADA Standards.
   2. Exterior Surfaces: Smooth non-absorbent, non-abrasive surfaces.
   4. Fasteners: Reusable, snap-locking fasteners with no sharp or abrasive external surfaces.
   5. Products:
      a. Plumberex Specialty Products, Inc; Plumberex Handy-Shield Maxx:
         www.plumberex.com/#sle.

2.06 ELECTRIC HAND/HAIR DRYERS

A. Electric Hand and Hair Dryers: Traditional fan-in-case type, with downward fixed nozzle.
      b. Tamper-resistant screw attachment of cover to mounting plate.
   4. Air Velocity: 18,000 linear feet per minute (91 m/s), minimum, at full power.
   5. Heater: 500 W, minimum, at full power.
   6. Runtime as Hair Dryer: 30, nominal.
   7. Supply Voltage: As indicated on drawings.
   8. Warranty: 3 years.
   9. Electric Hand Dryer Products:

2.07 UTILITY ROOM ACCESSORIES

A. Combination Utility Shelf/Mop and Broom Holder: 0.05 inch (1.3 mm) thick stainless steel, Type
   304, with 1/2 inch (12 mm) returned edges, 0.06 inch (1.6 mm) steel wall brackets.
   1. Drying rod: Stainless steel, 1/4 inch (6 mm) diameter.
2. **Hooks**: Two, 0.06 inch (1.6 mm) stainless steel rag hooks at shelf front.
3. **Length**: 36 inches (900 mm).
   a. 0796-3 Mop Holder (Triple)– Surface Mounted.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

A. Verify existing conditions before starting work.
B. Verify exact location of accessories for installation.
C. For electrically-operated accessories, verify that electrical power connections are ready and in the correct locations.

**3.02 INSTALLATION**

A. Install accessories in accordance with manufacturers’ instructions in locations indicated on drawings.
B. Install plumb and level, securely and rigidly anchored to substrate.
C. **Mounting Heights**: As required by accessibility regulations, unless otherwise indicated.
   1. **Grab Bars**: As indicated on drawings.
   2. **Electric Hand Dryers**: Measured from floor to bottom of nozzle:
      a. Men: 44 inches (1110 mm).
      b. Women: 42 inches (1060 mm).
      c. Teenager: 41 inches (1035 mm).
      d. Child: 32 inches (810 mm).
      e. Handicap: 36 inches (910 mm).

**3.03 PROTECTION**

A. Protect installed accessories from damage due to subsequent construction operations.

**END OF SECTION**
PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Playground layout (staking).
   B. Concrete footings for playground equipment.
   C. Playground equipment.
   D. Location of each item of playground equipment is indicated on drawings.

1.02 RELATED REQUIREMENTS
   A. Section 03 3000 - Cast-in-Place Concrete: Footings for playground equipment.
   B. Section 09 9113 - Exterior Painting.
   C. Section 32 1816.13 - Playground Protective Surfacing: Protective surfacing in playground area.

1.03 DEFINITIONS
   A. Play Event: A piece of playground equipment that supports one or more play activities.
   B. Use Zone: Area under and around a play event within which the ground surfacing must meet fall impact attenuation requirements of ASTM F1292 when tested at the fall height specified for the play event.
   C. Fall Height: Vertical distance between the finished elevation of the designated play surface and the finished elevation of the protective surfacing beneath it, as defined in ASTM F1487.
   D. Protective Surfacing: Resilient ground surfacing, specified in Section 32 1816.13. The characteristics of the protective surfacing are based on the fall height of the playground equipment. Changes in either the surfacing or the fall height, particularly reducing the resilience of the protective surfacing or increasing the fall height, will reduce safety-related performance.
   E. Subgrade: Surface of the ground on which the protective surfacing is installed; the subbase for the protective surfacing is installed over the subgrade.

1.04 REFERENCE STANDARDS

1.05 ADMINISTRATIVE REQUIREMENTS
   A. Preinstallation Meetings: Convene a meeting one week before starting earthwork for playground to discuss coordination between various installers.
      1. Require attendance by personnel responsible for grading and installers of playground equipment, protective surfacing, footings, and adjacent work.
      2. Include representatives of Contractor.
      3. Notify Architect at least 2 weeks prior to meeting.

1.06 SUBMITTALS
   A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
   B. Proposals for Substitutions: Substitutions that will increase fall height, platform height, or maximum equipment height will not be considered; submit shop drawings with proposed modifications clearly identified and sufficient information to determine compliance with specified criteria.
C. Product Data: For manufactured equipment, provide manufacturer's product data showing materials of construction, compliance with specified standards, installation procedures, safety limitations, and the number of users permitted.

D. Product Data: For fabricated items, provide the following:

E. Shop Drawings: Detailed scale drawings showing play event layout, Use Zone perimeters, and fall height for each play event.
   1. Show locations and dimensions of footings and anchorage points.
   2. Clearly identify mounting elevations in relation to a fixed survey point on site and to subgrade elevation and depth of protective surfacing.
   3. Show locations of underground utilities, storm drainage system and irrigation system.
   4. Show locations of related construction such as walkways and roadways, fences, site furnishings, and plantings.

F. Samples: For each item that a color must be selected, provide color chart showing full range of colors and finishes.

G. Maintenance Data: Provide manufacturer's recommended maintenance instructions and list of replaceable parts for each equipment item, with address and phone number of source of supply.

H. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.07 QUALITY ASSURANCE

A. Maintain one copy of the latest edition of ASTM F1487 and CPSC Pub. No. 325 at project site.

B. Manufacturer Qualifications: Company regularly engaged in manufacturing materials and products specified in this section, with not less than three years of experience.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver, handle, and store equipment to project site in accordance with manufacturer's recommendations.

B. Store materials in a dry, covered area, elevated above grade.

1.09 WARRANTY

A. See Section 01 7800 - CONTRACT CLOSEOUT, for additional warranty requirements.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Playground Equipment:
   1. Landscape Structures, Inc; _____: www.playlsi.com/#sle.
   2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PLAYGROUND EQUIPMENT - GENERAL

A. Design Assumptions: Because the safety of the playground depends on strict compliance with design criteria, this information is provided for Contractor's information.
   1. Playground has been designed for children ages 2 through 5.
   2. If deviations from specified dimensions, especially fall heights, is required, obtain approval prior to proceeding; follow approval request procedure as specified for substitutions.

B. Mount equipment on concrete footings, unless otherwise indicated.
   1. Protective Surfacing Depth: As indicated on drawings.
   2. Provide supports as required to mount equipment at proper height above finish and sub-grades to allow installation of sufficient depth of protective surfacing; portion of support below top of surfacing must comply with specified requirements for equipment.
   3. Paint portion of support that is intended to be installed below top surface of protective surfacing a different color, or mark in other permanent way, so that installers and
maintainers of protective surfacing can easily determine whether sufficient depth has been installed.

C. Provide permanent label for each equipment item stating age group that equipment was designed for, manufacturer identification, and warning labels in accordance with ASTM F1487.

2.03 PLAYGROUND EQUIPMENT

A. Comply with ASTM F1487 and CPSC Pub. No. 325; provide equipment complying with specified requirements for relevant age group(s).

1. Provide components having factory-drilled holes; do not use components with extra holes that will not be filled by hardware or covered by other components.

B. Litter Receptacle (TenderTuff™)

1. Location: As indicated on drawings. (F2)
2. Model # 141685
3. Color:
4. Manufacturer:
5. Substitutions: See Section 01 6000 - Product Requirements.

C. TenderTuff™ Bench

1. Location: As indicated on drawings. (F1)
2. Model # 141683
3. Color:
4. Manufacturer:
5. Substitutions: See Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 VERIFICATION OF CONDITIONS

A. Verify that playground area has been graded to subgrade elevations required and that excess soil, rocks, and debris have been removed.

B. Verify that playground equipment footings have been installed in proper locations and at proper elevations.

C. Verify location of underground utilities and facilities in playground area; damage to underground utilities and facilities will be repaired at Contractor’s expense.

3.02 PREPARATION

A. Stake location of playground elements, including Use Zone perimeters, perimeter of protective surfacing, access and egress points, hard surfaces, walls, fences, and structures, and planting locations.

B. Stake layout of entire Use Zone perimeter before starting any work and before subbase under resilient surfacing is laid.

1. Verify that Use Zone perimeters do not overlap hard surfaces, whether currently installed or not.
2. Verify that Use Zones are free of obstructions that would extend into resilient portion of protective surfacing.
3. If conflicts or obstructions exist, notify Architect.
4. Do not proceed until revised drawings have been provided, showing corrected layout, and obstructions have been removed.
3.03 INSTALLATION
   A. Coordinate work with preparation for and installation of protective surfacing specified in Section 32 1816.13; install protective surfacing after playground equipment installation.
   B. Install in accordance with CPSC Pub. No. 325, ASTM F1487, manufacturer’s instructions, and requirements of authorities having jurisdiction (AHJ).
   C. Anchor equipment securely below bottom elevation of resilient surfacing layer.
   D. Install without sharp points, edges or protrusions, entanglement hazards, pinch, crush, or shear points.
   E. Do not modify play events on site without written approval of manufacturer.
   F. Install required signage if not factory-installed.

3.04 CLEANING
   A. Restore adjacent existing areas that have been damaged from the construction.
   B. Clean playground equipment of construction materials, dirt, stains, filings, and blemishes due to shipment or installation; clean in accordance with manufacturer’s instructions, using cleaning agents as recommended by manufacturer.
   C. Clean playground area of excess construction materials, debris, and waste.
   D. Remove excess and waste material and dispose of off-site in accordance with requirements of authorities having jurisdiction (AHJ).

3.05 PROTECTION
   A. Protect installed products until Date of Substantial Completion.
   B. Replace damaged products before Date of Substantial Completion.

END OF SECTION
SECTION 12 3600
COUNTERTOPS

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Countertops for architectural cabinet work.

1.02 RELATED REQUIREMENTS
A. Section 09 3000 - Tiling: Tile for countertops.

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS
A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Specimen warranty.
C. Shop Drawings: Complete details of materials and installation; combine with shop drawings of cabinets and casework specified in other sections.

1.05 DELIVERY, STORAGE, AND HANDLING
A. Store products in manufacturer's unopened packaging until ready for installation.
B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.06 FIELD CONDITIONS
A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 PRODUCTS

2.01 COUNTERTOPS
A. Concrete Countertops: Precast concrete; top and edges formed against melamine-finished mold; jointing as indicated on drawings; sanded and polished.
   1. Dimensions: As indicated on drawings.
   2. Thickness: 1-1/2 inches (38 mm).
   3. Sealer: Low gloss penetrating silane/siloxane, transparent.
   4. Construct forms with required inserts and knock-outs and support to remain in place through curing.
   5. Concrete Mix: Non-shrinking, machine-mixed commercial grade concrete mix for casting countertops, requiring only the addition of water.
      a. Manufacturers:
         1) Substitutions: See Section 01 6000 - Product Requirements.
      b. Compressive Strength: 4000 pounds per square inch (27.6 MPa), minimum, at 28 days.

2.02 FABRICATION
A. Fabricate tops and splashes in the largest sections practicable, with top surface of joints flush.
   1. Join lengths of tops using best method recommended by manufacturer.
   2. Fabricate to overhang fronts and ends of cabinets 1 inch (25 mm) except where top butts against cabinet or wall.
   3. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.
B. Provide back/end splash wherever counter edge abuts vertical surface unless otherwise indicated.
   1. Secure to countertop with concealed fasteners and with contact surfaces set in waterproof glue.
   2. Height: 4 inches (102 mm), unless otherwise indicated.

PART 3  EXECUTION

3.01  EXAMINATION
   A. Do not begin installation until substrates have been properly prepared.
   B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
   C. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

3.02  PREPARATION
   A. Clean surfaces thoroughly prior to installation.
   B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03  INSTALLATION
   A. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.
   B. Seal joint between back/end splashes and vertical surfaces.

3.04  CLEANING
   A. Clean countertops surfaces thoroughly.

3.05  PROTECTION
   A. Protect installed products until completion of project.
   B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION
1. GENERAL:

An investigation and report was made of the subsurface conditions at the project site by a geotechnical testing laboratory. The report is 28-pages in length and was produced by O’Conner Engineering & Science, Inc. of Laredo, Texas (OES Project No. OES-G776004-01). It is highly recommended a copy of the report be secured from the Architect (Monica Guajardo, AIA of Slay Architecture) or the Aquatic Consultant (Bryan Ziegler, PE of Aqueous Engineering) prior to bidding and construction of the work, as the Contractor will be responsible for meeting the minimum earthwork requirements outlined in the report. (An electronic version of the report can be sent by e-mail by contacting Bryan Ziegler at bz@aqueousengineering.com)

Every attempt should be made by the Contractor to acquaint himself with the site conditions. The report is not a warranty of subsurface conditions nor does it relieve the Contractor of his responsibilities in regard to these conditions.

Contractor shall report any conditions determined by him to be substantially different than those shown on the report and shall delay the work a reasonable time to allow the Engineer to investigate such occurrences. The contractor, by continuing to work, deems the subsurface conditions substantially in agreement with the report and waives any claim for additional compensation due to varied soil conditions.

END OF SECTION 13 11 00.00
SECTION 13.11 00.01  

SWIMMING POOL SPECIFICATIONS

1. GENERAL:
   A. Conditions of the Contract: The conditions of the Contract (General, Supplementary and other Conditions) and the General Requirements are hereby made a part of this Section.
   B. Scope: This item includes all labor, materials, equipment, superintendence and any other requisite necessary for the complete installation of a water tight swimming pool with all associated and appurtenant decking, piping, accessories, lights, and equipment as shown on the plans and specified herein. The contractor is to fill and balance the pool water chemistry furnishing chemicals as needed to achieve proper pool balance as follows:
      - pH 7.2 - 7.4
      - alkalinity 120 - 150 ppm
      - chlorine 1.0 - 2.0 ppm
   C. Dimensions:
      1) Plan Dimensions: Pool plan dimensions are to inside-to-inside of finish plaster or tile or face-to-face of stainless gutter. Note: On structural details and cross sections dimensions are usually to face of concrete before plastering, lining, or coating.
      2) Depths: Depths shown on plans and for depth markers (in pool or on deck) refer to depth from the overflow weir (normal water level) to finished plaster or tile bottom at a point 3'-0" out from the wall.
   D. Work Required Under Other Sections:
      1) Refer also to electrical sections of these specifications for ELECTRICAL scope of work and items to be installed.
      2) Piping for swimming pools is covered in Section 13 11 00.10.
      3) Concrete: Refer to Section 13 11 00.11 for Concrete other than Pneumatically Placed Concrete, and refer to Section 13 11 00.12 for Pneumatically Placed Concrete (Shotcrete).
      4) Plaster, if required, shall conform to Section 13 11 00.02 "Pool Plaster (Exposed Aggregate Finish)."
   E. Swimming Pool Submittal Package: One (1) complete submittal package of all pool-related and/or spa related equipment shall be provided to the Pool Engineer for review prior to construction. The submittal package shall:
      1) Include submittals for ALL pool related items to be reviewed as required by the Contract Documents. Partial submittals WILL NOT BE REVIEWED unless specific consent has been given by the Pool Engineer. The Pool Contractor may submit a table of contents of his/her intended pool submittals for the Pool Engineer’s review and comment prior to assembling his/her pool submittals. Incomplete submittals packages will be returned by the Pool Engineer to the Pool Contractor UNREVIEWED, with outstanding submittals being noted. The Pool Contractor will then be required to revise the pool submittal package and return to the Pool Engineer for review.
      2) The submittal package may be provided in either a bound, hard copy version or in an electronic format that is submitted by e-mail or mailed on a “thumb drive.” If a hard copy of the submittals are provided, the submittals shall be neatly bound in a 3-ring binder.
      3) Each submittal package, whether an electronic copy or a hard copy, shall include a cover sheet on the front of the submittal package which clearly indicates:
         a) Project Name
         b) Owner/Developer Name, Address, and Contact Information
         c) Project Location
         d) General Contractor’s Name, Address, and Contact Information
         e) Pool Subcontractor’s Name, Address, and Contact Information
         f) Submittal Date.
      4) Each submittal package, whether an electronic copy or a hard copy, shall include a table of contents clearly indicating all pool submittals located in the submittal package.

If hard copy submittals are provided, please provide one (1) copy of the submittal package to be retained by the Pool Engineer. The Pool Contractor shall coordinate the quantity of additional copies of the submittals required by the Owner, Architect, General Contractor, etc. with those parties and submit the additional copies for review with the copy provided to the Pool Engineer.
2. PRODUCTS:

   A. Conformance to Regulations and Specifications: All material used in this project shall comply with the applicable sections of the following:
   3) Virginia Graeme Baker (VGB) Act

   Specification of an item by brand name shall be construed as a statement of quality expected and not as a restriction of free trade. Substitutions of "or equals" may be made only after written consent of the Engineer.

   B. Furnish all equipment shown on the plans. Additional information is provided below. Where in conflict, the equipment listed on the Plans shall govern over these Specifications.

   C. Concrete: Concrete specification listed under another section.

   D. Plaster, if required, shall conform to Section 13 11 00.02 “Pool Plaster (Exposed Aggregate Finish).

   E. Stainless Steel Perimeter Gutter: Not Required.

   F. Tile and Signage:

      1) Tiles used for floor markers and steps or other underwater uses shall be non-glazed slip resistant 1" x 1" or 2" x 2" mosaic. Color of tiles to be Owner's selection from Dal Tile Group 4 or lower or equal from other manufacturers.
         a) On steps or benches install slip resistant tile and a 1" x 1" outside corner mold as stair nosing.
         b) Provide continuous 4-inch line of 2" x 2" tile along the bottom at 5'-0" depth line. Tile color must contrast with the color of the surrounding floor finish and will be selected during the submittal phase.
         c) On pools having a beach (zero-depth) entry, provide continuous 4-inch line of 2" x 2" tile along the bottom at the 3'-0" depth line. Tile color must contrast with the color of the surrounding floor finish and will be selected during the submittal phase.
         d) Waterline tiles and capping tiles for dam walls shall be glazed. Special unglazed hand hold tiles such as Dal Tile C701 with fittings are required where water depth adjacent exceeds 42-inches or where shown on the Plans.

      2) Mosaic “No Diving” signage and 6" x 6" “No Diving” symbol tiles are required at spacing not exceeding 25'-0" or fraction thereof where water depth is 6'-0" or less. The words “NO DIVING” AND the international symbol shall be positioned within 24 inches of the water's edge and read when facing the pool. “No Diving” tiles are to be slip resistant.

      3) Depth Marker Tiles: Mosaic slip resistant depth marker tiles shall be installed in the deck as shown. Depths shall be measured from the gutter weir elevation (water level) to the bottom of the pool at 3'-0" distance from the sidewall. Depth marker tile shall show the “foot” of depth and “inches” of depth. Feet and inches shall be abbreviated “FT.” and “IN.” respectively. In roll-out gutter pools where profile does not permit water depth tiles in the pool, a second set of depth markers made of acrylic plate with screened or stenciled letters and numbers positioned on the pool deck to be read from the water shall be installed. Tiles shall be set flush with the finish deck surface in which they are installed.

      4) Wall Tile/Architectural Tile - Refer to Architectural.

      5) All tiled corners and edges are to be constructed so as not to constitute a hazard. Corners and edges shall be made with rounded, cove or bullnose finish pieces that have been specifically manufactured for corner and edge locations. No butt joints or overlapping of tile or raw, unfinished edges will be accepted.

   G. Drains: The main drain for the main pool shall be two or more PVC, fiberglass or stainless steel or formed concrete drain boxes with fiberglass or plastic grate. Products and Materials shall be as called out on the Plans. One main drain in the pool shall be furnished with a hydrostatic relief valve. Main drains shall be installed equidistant from a common tee and not more than 20'-0" center to center and not more than 20 feet from a pool perimeter wall. Main drains less than 18" x 18" or, for rectangular grates, less than 24" across the grate diagonal shall have anti-vortex grates. Velocity across the free area of any main drain grate shall not exceed 1-1/2-feet per second at 100 percent of design filter flow rate.

   H. Underwater Lights: If lights are called out on the plans but not specifically located provide one (1) underwater light niche and fixture for each 1,000 square feet of pool surface or fraction thereof spaced equally around the pool perimeter EXCEPT do not install light fixtures in the ends of racing lanes but rather in the sidewalls only. Underwater lights shall have wattage and voltage as listed on the Plans and shall be U.L. Listed for underwater use with stainless steel face ring and heat sensing low water cut-off protection. Lights
to have a 3/4 inch underwater power cord continuous all the way to the junction box in a watertight conduit. The junction box shall be a minimum of 12 inches above water level. Furnish stainless steel housings (niches) for concrete pool shell. Maintain wall thickness on all sides of the niche. Lamp with low water protection shall be installed at 2'-0" below normal water surface to center of fixture.

I. **Rope Anchors:** Install rope anchors uniformly positioned between 1" above and 2" below waterline in the perimeter at end walls at the 5'-0" depth line. Refer to Plans for other possible locations. Rope anchors shall be stainless steel cup anchors with stainless steel cross bar. Welded hooked bars or notches in the gutter wall are not permitted.

J. **Flowmeters:** Unless noted otherwise, furnish and install Signet self-powered MK576 digital meter with flow sensor and pipe saddle. Install on discharge side of each filter/recirculation pump on longest straight run of pipe and following the filter. Wall mount the flow meter read-out as directed by the Engineer within 20 feet of the meter sensor unit at a height 48 to 60 inches. For multiple meter read-out units, wall-mount units side by side. Run sensor wires between meters and read-out unit in ½ inch schedule 80 PVC electrical conduit rectilinear with building walls and secured to walls. Install blue/white Series F-300 impact meter on backwash.

K. **Chemical Feed:** Chemical feed system shall conform to Section 13 11 00.07. Furnish isolation full union ball valves for each separate chemical feed line. Furnish check valves on each line. Provide ejectors for connecting tubing to PVC lines. TUBING SHALL BE PROTECTED INSIDE UNGLUED PVC PIPING SECURED TO WALLS OR LARGE PIPE.

L. **Bonding:** Bond the pool shell reinforcing steel and appurtenances per the National Electrical Code (NEC) Section 680.26 and local electrical code but not less than in locations evenly spaced around the perimeter. Bond all metal steps, ladders, metal play equipment, and light niches, and electrical equipment. Ground and bond pools per ANSI/UL 1563-1995.

M. **Life Lines:** Life lines for pools are required where shown on the plans. Ropes shall be blue and white 3/4-inch diameter twisted strand U.V. stabilized polypropylene secured on each end with chrome plated brass clamp type (screwed together) rope hooks. One end of the rope shall also be furnished with a swivel type snap hook. Floats for lifelines shall be 5" x 9" linear polyethylene treated with U.V. stabilizers and chlorine inhibitors. Floats shall be self locking or furnished with float keepers. Set floats at 3'-0" c-c. Floats are to be half blue-half white either cylindrical or ellipsoidal.

N. **Ladders and Grabrails:** Furnish and install 1.50-inch (O.D.) diameter x 0.120-inch (min.) wall Type 316L stainless steel cross grabrails where shown on the plans. Install grabrails in bronze sockets anchored securely in the deck. The sockets shall be of the bronze wedge type using a tightening hex-nut to securely wedge the riling in the socket or if noted on the Plans, Spectrum or equal compression-style stainless steel excutcheonless sockets. The socket nor rail shall wobble within the setting nor shall the rail be removable without the use of tools. Furnish stainless steel escutcheon covers. Clearances between step treads or ladder rails and nearest adjacent pool walls may not exceed 3-1/2-inches. Provide safety closure kits, Recreonics 45-200 series or equal, for ladders not meeting this requirement. (Note: all stainless steel handrails and grab bars must be “Marine Grade” quality and material.)

O. **Wave Quelling Racing Lane Markers:** For pools with racing or lap lanes furnish and install Kiefer “Wave Eater II” plastic wave quelling disks (6-inch disk diameter) on tensioned 3/16-inch multi-strand stainless “aircraft” cable with standard racing lane configuration using two colors of disks in alternating bands. The final 15-feet of each end of each lane marker will have disks of a single solid color. Furnish super tensioner on one end. Line diameters and lengths are shown on Plans. Colors to be selected by Owner.

P. **Lane Marker Reel:** Unless otherwise noted on the plans to be furnished by the Owner or “By Others”, furnish one or more portable lane marker reels in sufficient quantity to hold all lane markers.

Q. **Gauges:** Refer also to sections for pumps and filters. Each pump is to be supplied with 3-inch filled pressure gage (pump discharge) and combination vacuum/pressure gage (pump suction). Suction gage shall be mounted between the strainer and the pump.

R. **Automatic Level Control:** Furnish and install level controls, static lines and stilling well to control solenoid valve on pool autofill line. Provide air gap on fill lines as required per code. Furnish standard PVC wall fitting with 1-1/2-inch MIP grating fitting at pool end of the static line. Provide electrical to power level controller.

S. **Pool Fill:** If not otherwise shown on the plans furnish pool fill line as follows:

1) If a surge or balancing tank is available, install 2-inch PVC fill line with ball valve to a point 4-inches above tank overflow level to provide required air-gap, or

2) If no surge tank or balancing tank is available, install 2-inch chrome plated brass fill spout at the deck.
discharging over the rim into the pool. End of the fill spout shall be 6-inches above water level.

3) If noted on the Plans, a water line may be extended to a deck-mounted, float-style water leveling device having an internal float valve system. Systems having this technology include Letro “Pool Miser”, Model T40FBK by Pentair, and others. Please provide submittal to Aquatic Consultant for review prior to ordering or installing unit.

Water supply for pool fill must have backflow prevention.

T. Valve Boxes: Install Quazite polymer modified nesting valve boxes with stainless steel hardware. Set on 4 inches gravel flush with deck (or 2 inches above finished earthen surface). Select size so that all valve handles are fully accessible and operable.

U. Life Saving, Cleaning, and First Aid Equipment to be Furnished by Contractor:
   1) C J Spineboard package, Recreonics 12-325. (1 required)
   2) Fiberglass 16-foot Shepherd’s Crook, Recreonics 12-228. (2 required)
   3) Emergency eyeball station, Recreonics 12-033. (1 required)
   4) General Purpose, 24 unit first aid kit, Recreonics 12-013. (1 required)
   5) Pools 7'-0" deep or more: ARC Rescue Tube 111, Recreonics 12-303.
   6) Pool Manager ABC Test Kit, Recreonics 56-178. (1 required)
   7) Portable deck style vacuum cleaning system:
       Maxi Sweep 111 Electric (Recreonics 10-813) 6,240 gph, 225 sf cartridge filter, 1 Hp, 115V, (30 amp) self-priming pump with integral hair and lint strainer. Furnish 14-inch and 21-inch wide flexible vacuum head, 50’ x 1-1/2” heavy duty vacuum hose, and telescopic pole.  (NOTE: Cart-mounted filter pump by Harmsco or equivalent may also be provided.) (1 required)
   8) Extended duty leaf skimmer, Recreonics 10-108. (2 required)
   9) Olympic wall brush, Recreonics 10-160. (2 required)
   10) Stainless steel 18-inch algae brush, Recreonics 10-175. (2 required)
   11) 8-foot stainless steel 1-1/4-inch diameter threaded poles, Recreonics 10-330 (2 required); 2 sets of metal pole hangers for two poles each, Recreonics 10-365.
   12) Aluminum vacuum hose hanger, Recreonics 10-358. (2 required)
   13) Life guard chairs. 2 required (refer to Plans.) Lifeguard chairs shall be 3-step portable chair (Spectrum or equal)
   14) Ring Buoys: Furnish U.S. Coast Guard approved ring buoy with throwing rope. (1 required)

V. Pool Cover: Not used.

W. Timing Devices and Scoreboards: Not required.

X. Coping: The perimeter pool coping shall consist of a white or bone-colored precast concrete coping with a bullnose handhold front edge. The front-to-back coping dimension will be approximately 12-inches. Provide samples to architect for color selection.

3. EXECUTION:

A. Installation: The equipment shall be installed in a neat and orderly fashion. Pipe and conduit shall be run rectilinear with the building. Chemical monitoring loops and solution lines including tubing shall be secured to walls. Penetration through floors, walls or ceilings shall be bored neatly and then sealed. Panels and electronic equipment shall be mounted securely to walls or acrylic or “plexiglass” panels as described in this section. Do not obstruct electrical panels or the required 3'-0” working space required in front of them.

Chemical feed pumps shall be bracket mounted neatly at 40 to 48 inches above finished floor.

Pipe shall be installed so as to cause minimal interference or obstruction to pedestrians and service personnel. Pipe shall not be run along the floor without express written permission of the Engineer.

Pipe and conduit above floor shall be secured from movement by stainless steel or PVC straps to wall or clevis style pipe brackets from ceiling. Use of wire or punch straps to “tie-off” exposed pipe is prohibited.

Other installation requirements may be included in other Sections of the specifications.

B. Testing: All piping installation shall be tested hydrostatically at 40 psi for 6 hours with no drop in pressure. All equipment supplied under this section shall be tested, adjusted and calibrated.

C. Piping: Comply with Section 13 11 00.10, “Swimming Pool Piping”. Contractor shall not route pool piping within the bond beam. All wall penetrations for inlets, static lines, or vacuum lines shall be made using bronze NPT no-leak flanged couplings or PVC glue-on flanges. Pipe shall not be ‘forced-fit’, torqued, or heated to make-fit connections. Furnish PVC or steel pipe stands with saddles for horizontal pipe above floors. NOTE: Prior to installation of any piping, the Pool Contractor shall schedule a “Pre-Plumbing Installation Conference” with the Pool Engineer for the purpose of determining the final layout of all field piping and plumbing in the
D. **Start-Up:** Flush all gutters, skimmers and pipe. Contractor to brush pool down daily after installation of plaster and filling with water. Balance pool and leave the pool water sparkling with no discernable turbidity. Test all valves, fill equipment, pumps and similar devices.

E. **Filling Pool:** Pool to be filled without stopping as soon as plaster subcontractor deems the plaster to be sufficiently set. Fill with hoses with ends wrapped to prevent force of water from damaging plaster. Begin filtering as soon as skimmers or gutters are flooded.

F. **Related Electrical Work:** The electrician is familiarize himself with swimming pool equipment being installed under this Project. He is to furnish and install necessary electrical equipment and devices to properly operate pool equipment including, but not limited to:
   1. Electrical distribution and subpanels
   2. Motor starters and disconnects
   3. Inter-locking circuits to prevent operation of chemical feeds when main circulation pumps are off.
   4. 120 volt weatherproof outlets for plug in devices
   5. Wiring to power solenoid valves
   6. Supporting devices whether or not specifically shown on plans
   7. Conduit and circuits for all equipment shown.

G. **Maintenance Manual:** Furnish to the Engineer two sets of bound (3-ring notebooks) with installation literature, instructions, warranties, product literature and telephone number and address for each subcontractor employed on the project.

H. **Warranty:** Warranty will be 1-year from date of acceptance in writing by Owner against all defects in workmanship and materials except as described below:
   1. Against structural cracks in pool shell for a period of five years from date of final project acceptance.
   2. Against cracking or leaks in filter, main drains, or exposed pipe for five years from date of final project acceptance.
   3. Against rupture or separation of stainless steel perimeter gutter system (if installed) for five years from date of final project acceptance.

4. **QUALITY OF MATERIAL:** The use of the systems described herein or on the plans is to connote a quality of manufacturer and product durability. Other systems may be acceptable but must be approved in writing by the Engineer. The contractor shall submit manufacturer's literature and installation specifications pursuant to the “Submittals and Substitutions” section of this project manual. The Engineer reserves the right to reject any product as "unequal" to that specified for any reason whatsoever and his decision is final.

5. **SUBSTANTIAL COMPLETION:** For purposes of final release of retainages held by the Owner and commencement of the one year warranty, the Engineer will issue a letter of substantial completion when all of the following have been accomplished:
   A. The chief building official is prepared to issue a certificate of occupancy.
   B. The pool water is sparkling clear and balanced.
   C. All electrical, filtration and feed systems are operating properly.
   D. The facility is, in the Engineer's sole opinion, ready to open for public use.
   E. The contractor has completed all work he has obligated himself to do under the Agreement.

6. **PARTIAL COMPLETION:** In the event the contractor cannot obtain substantial completion by the end of the construction period agreed upon in his contract and the Owner feels compelled to begin operating the facility due to seasonal constraints, the Owner may elect to notify the contractor in writing and occupy the premises under the following provisions:
   A. Any damage other than warranted equipment or work failing in normal use caused by Owner or users of the facility are the Owner's responsibility and not the contractor’s.
   B. The contractor is not relieved of any obligation under the construction agreement to complete the work.
   C. Provisions for liquidated damages are specifically not waived.
   D. No warranty provisions shall commence until final and substantial completion is approved in writing by the Engineer.
   E. The Owner must allow the contractor to continue to work even though operating the facility and cooperate with him to complete the project by temporarily closing off areas of the project or restricting hours of operation.
END OF SECTION 13 11 00.01
SECTION 13.11 00.02 POOL PLASTER (EXPOSED AGGREGATE FINISH)

1. GENERAL:
   A. **Scope:** Furnish all labor, materials, equipment, and superintendence for installing an exposed aggregate plaster top coat to gunnite or concrete pool shell. Prepare surfaces to receive plaster, apply coat(s) and clean up removing all surplus material from the site.

   B. **Materials:** Use only commercially manufactured plaster designated by the manufacturer for swimming pool and fountain use. Use only clean sharp sand and aggregates. Acceptable exposed aggregate products are:
      1) Diamond Brite (Southern Grouts and Mortars, 1502 SW 2nd Place, Pompano Beach, FL 33069, (954)943-2288) quartz aggregate and polymer modified cements.
      2) Sunstone Select (Aquavations Group, 300 Granello Avenue, Coral Gables, FL, (305)668-4847).
      3) CPM Ceramic Pool Mix (Silicon Derivatives, 7 San Bartola Drive, St. Augustine, FL 32085, (904)824-1004).
      4) Other alternate products may be allowed, but only if submitted by the Bidder prior to bidding. Approval must be provided by the Owner and design team prior to bidding for any substituted products.

   C. **Preparation:** Allow new concrete to cure for 28 days before applying plaster. The plasterer shall make final inspection of the pool shell prior to plastering and shall notify the pool subcontractor of any visible defects. The pool subcontractor is responsible for providing a sound structural shell. If concrete surfaces were formed or troweled smooth, sand blast or apply a bonding agent compatible with pool plaster to the concrete shell before applying plaster. Apply per manufacturer’s instructions. Use SGM Bond-Kote or equal over old plaster. Remove all paint from painted pools before installing plaster.

   D. **Thickness:** Plaster shall be sufficiently thick to hold water (watertight) and sufficiently thick to hold a smooth, maintainable surface, but not less thickness than 3/8-inch in any location except where feathering to match another surface (tile, etc.) is necessary.
      a. The pool shall not leak. Plaster shall be sufficiently thick to hold water (watertight).
      b. Plasterer shall be responsible for leaks around all plumbing lines that are in contact with plaster and shall properly pack and seal around all lines, light niches, etc., excluding excessive voids.

   E. **Submittals:** Provide submittals for pool plaster, bonding agents and aggregates (if specified) in accordance with the General Provisions and “Submittals and Substitutions” section of these specifications.

2. PLASTER MIX:
   Use only unopened bags of new product as specified under materials. Mix coating materials, to provide consistent color throughout. Do not add admixtures or any other product inconsistent with the plaster materials. Use a mechanical mixer in good operating condition designed for mixing plaster and aggregates.

3. PLASTER FINISH:
   A. Plaster shall follow the general contour of the concrete shell. Absolute minimum thickness shall be 3/8-inch. Slight variations and waves may occur and will be accentuated if the underlying concrete shell is uneven. The plasterer shall use a trowel that is sufficiently long enough to even out most variations. DO NOT over-trowel or trowel burn the surface by hard troweling a dry surface to achieve finish. Fill all voids in concrete surfaces.

   B. Trim tile, tile feature strips, mosaics, plumbing lines, air bars, in-floor cleaners, light niches, etc., shall be set by previous subtrades as evenly and level as possible. The plasterer shall match the plaster to these items in a workmanlike manner. Protect work of previous trades.

   C. Plaster shall be finished smooth.

   D. Where exposed aggregate finishes are specified, grind or wash the surface smooth to reveal the aggregate faces in accordance with manufacturer’s instructions and using recommended equipment.

4. ETCHING, SURFACE SPALLING, SKINNING OR PEELING:
   A. The plasterer shall be responsible for damage due to deficiencies within the plasterer’s control. These include problems from within the plaster mix (cement, aggregate, and admixtures not sufficiently mixed; impurities and foreign objects in the mix (i.e., bugs, leaves, dirt, etc.) and application defects (i.e., trowel marks, foot prints, etc.).

   B. The integrity of the plaster surface shall remain intact (free from surface spalling, skinning, or peeling).
C. Plaster shall not separate or delaminate from the underlying substrata. Voids or hollow areas that have not cracked open or broken loose are considered a failure and shall be repaired.
D. Plasterer shall repair any shrinkage cracks or popoff areas that are reported to him during his warranty period.

5. STAINS / DISCOLORATION IN PLASTER:
   A. Plaster shall be generally a uniform shade of color, subject to normal cement/plaster motting and shading. Extreme variations in color due to mix or mixing technique are unacceptable and discolored batches shall be discarded and not applied.
   B. Plaster is a hand-troweled, cement product. Slight variations in shading (including shadowing, streaking, and minimal discoloration) are a normal occurrence and are not considered a deficiency. Significant variations, i.e., significant in the opinion of the pool consultant, are not acceptable and may require removal at Owner’s option.

6. FILLING:
   A. Allow plaster to air dry before filling begins.
   B. “Bathtub” ring stains or water stains may occur if water is turned off even for a brief period of time during the initial filling of the pool or if water is allowed to run over the newly plastered surface before the water level has reached that spot. Water shall not be stopped until the pool is full. Water shall not be sprayed on or be allowed to run over newly plastered surfaces.
   C. Plaster shall not be wet down during filling. This could cause washout and water marks. Fill hoses shall be placed in the deep end of the pool and shall have the nozzle end covered with a clean soft cloth.
   D. The pool shall be filled within twenty-four (24) hours or other period of time per the plasterer’s recommendations with Engineer’s concurrence. DO NOT PLASTER UNTIL THE POOL CAN BE FILLED AND FILTER EQUIPMENT STARTED.
   E. Brush down after filling twice each day for 3 days and once per day for 2 weeks thereafter. This shall be the responsibility of the pool subcontractor until all turbidity is removed from the pool water.
   F. For plastered surfaces above waterline (zero depth, islands, etc.) moist cure the plaster for at least fourteen (14) days to retard shrinkage cracking and checking.

7. PRECAUTIONS:
   A. Contractor shall erect wind screens as necessary to keep wind-borne debris from marring the fresh plaster surface.
   B. Do not plaster on windy days when winds exceed, on average 20 mph or gusts exceed 30 mph.
   C. Do not plaster when wind-borne debris, smoke, or insects are present regardless of wind conditions.
   D. Do not plaster when rain is falling or forecast to fall before the pool can be filled.
   E. Do not use wheeled type vacuum heads for at least fourteen (14) days after installation nor automatic vacuums for at least twenty-eight (28) days.
   F. Do not plaster while temperatures are at 95 degrees F and above or 35 degrees F or lower. Protect plaster from rapid drying or freezing.

8. MEASUREMENT AND PAYMENT: Pool plastering is considered subsidiary to other swimming pool bid items and no separate measurement or payment is to be made.

9. WARRANTY: In addition to any general warranty by the pool subcontractor or general contractor, the plaster installer warrants his work to be free of workmanship in labor or materials for a period of one year from date pool filling commences. Any defects in plaster work detected during this warranty period shall be communicated directly to the general contractor who shall see to the repair or replacement of plaster by his subcontractors at no expense to the Owner. This warranty shall exist regardless of other warranties expressed by manufacturers of plaster products.

END OF SECTION 13 11 00.02
SECTION 13.11 00.03  
HANDRAILS AND RAILINGS FOR POOLS SPECIFICATIONS

1. GENERAL:
   A. Work Included: Provide metal handrails and railings as shown on the Drawings, as specified herein, and as needed for a complete and proper installation. Not all materials described in this section will be used on this project. This section does not apply to pool-side grab rails or ladders. Refer to Section 13150. This section does not apply to large slide staircases. Refer to Section 13160.
   B. Related Work: Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
   C. Definitions:
      1) Guardrails: Rail system intended to protect elevated platforms; or open excavations or pits; or raised porches or decks. Unless shown otherwise guard rails are 42” to 44” high.
      2) Handrails: Rail system parallel to ramps or parallel to a line drawn through and perpendicular to stair nosing to assist users. Handrails may be required in conjunction with guard rails if ramps or steps are elevated above surrounding grade.
   D. Railings on slides, stairs or ramps exterior to the pool shall consist of posts grouted into sleeves with expansive grout (default) or flange-mounted direct to the concrete with stainless expansion anchor bolts.
   E. Painting:
      1) Do not paint stainless steel.
      2) Touch up galvanized steel with spray-on Cold Zinc.
      3) Refer to Division 9 Section “Painting” for additional instructions.

2. QUALITY ASSURANCE: Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

3. SUBMITTALS:
   A. Comply with pertinent provisions of Division 1.
   B. Product Data: Within 35 calendar days after the Contractor has received the Owner’s Notice to Proceed, submit:
      1) Materials list of items proposed to be provided under this Section.
      2) Manufacturer’s specifications and other data needed to prove compliance with the specified requirements.
      3) Shop Drawings in sufficient detail to show fabrication, installation, anchorage, and interface of the work of this Section with the work of adjacent trades.
      4) Manufacturer’s recommended installation procedures which, when approved by the Engineer, will become the basis for accepting or rejecting actual installation procedures used on the Work.

4. PRODUCTS:
   A. Stainless Steel: (default) Unless otherwise noted on Plans, 316L or 304L stainless steel; 0.145-inch thick wall; 1-1/2-inch diameter.
   B. Galvanized Steel: 1-1/2-inch diameter, Schedule 40 galvanized steel pipe.

5. STAINLESS STEEL PIPE HANDRAILS AND SUPPORTS: If welded steel handrails are called for in the plans, provide pipe, 1-1/2-inch O.D., closed end, welded fabrication with all welds ground smooth.

6. RAILING DESIGN: Guard rails and stair rails shall comply with OSHA standards and ADA for design, strength, height and support. Guard rails shall be 3’-6” clear height including mounting curb or parapets, if any. Stair rails shall be 2’-9” to 3’-0” above and parallel to a line drawn through the nose of each tread. Ramp rails shall be 34 to 36-inches above the ramp and parallel to the ramp. No intermediate rails are required. If not shown curb mounted, guard rails shall have a 4-inch toe board of the same material as the railing.

7. FIELD CONDITIONS: Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

8. INSTALLATION:
A. Install the work of this Section in strict accordance with the manufacturer's recommended installation procedures as approved by the Engineer.

B. Railings shall withstand a load of at least 200 # applied at any direction at any point on the rail without deflection.

C. Railings within pools shall be mounted using bronze wedge anchors or stainless steel anchors as called out on the Plans so that the railing can be removed for pool maintenance. Requires stainless escutcheon cover unless an escutcheon - less socket is specifically shown.

END OF SECTION 13 11 00.03
SECTION 13.11 00.04  CAULKING FOR POOLS AND DECKS

1. WORK INCLUDED: Caulk where shown on Drawings, specified below and as necessary to provide a waterproof swimming pool and deck.

2. MATERIALS:
   A. Oakum and Rope Fiber - hand picked, free of oil and grease.
   B. Primer - as recommended by caulking compound manufacturer.
   C. Foam Plastic - backer rod similar to Sonneborn's pre-mounded polyurethane "Sonofoam".
   D. Polysulfide Polymer Sealant - Thiokol, meeting Fed. Spec. TT-S-00230, liquid, single component (noted "Sealant" on Drawings).
   E. Butyl Caulking - "Weatherban" by 3M Co. (noted "caulking" on Drawings).
   F. Polyurethane Sealant - Tremco Vulkem 116 for immersion or deck service.

3. MANUFACTURERS: Equal products to those listed above as manufactured by 3M Co., G.E. Thiokol Co., DeWitt, Pecora, Tremco, Sonneborne as acceptable. Submit products in writing for approval before installing. Colors to be selected by Engineer

4. PREPARATION AND INSTALLATION:
   A. Clean Joints - All joints shall be carefully cleaned of all dust, oil, grease, water frost, or other materials which would impair or prevent sealing.
   B. Prime Joints - using primer recommended by sealant manufacturer.
   C. Sub-Caulk - back sealant with oakum or yarn (except for fillet joints) for general use. Back control joints, expansion joints and joints requiring sealant with foam plastic.
   D. Weather - Do not caulk during damp or inclement weather. Temperature of air and materials shall be above 40 degrees F.
   E. Filler - Joints and spaces deeper than 3/4" shall be filled with back up material to within 3/4" of surface before caulking.
   F. Back-Up - Back up material shall be compressed to 50% of its original volume at time of installation to provide a positive contact between all surfaces. Thicknesses of back up material shall be adjusted with size of joint.
   G. Application - Apply caulking compound with pressure gun having correct size nozzle to fit into joint. Fill solidly and smooth without voids and thin edges, and in a manner to prevent air entrapment. Finish joint shall show a neat clean bead. Do not overfill or crown joints.
   H. Timing - All caulking shall be done a minimum of 3 weeks in advance of painting.

5. WORKMANSHIP: Use proper size nozzle on caulking gun. Force joint full, and neatly point surface with beading tool and leave smooth and water tight. Remove excess materials and clean adjacent surfaces immediately. Strictly follow printed directions of sealant manufacturer. In general, the depth of sealant joint shall be one-half its width. Carefully control depth with foam plastic and prevent bond with back of joint.

6. GENERAL REQUIREMENTS: Provide at following location (colors as directed by A/E):
   A. Sealant:
      (1) Where noted on Drawings and as required on exterior walls to seal out all moisture and insects.
      (2) Perimeter of penetrations through masonry and concrete such as pipe.
      (3) Underwater joints in pools.
      (4) Perimeter deck joints at pool coping.
      (5) Expansion and construction joints in decks.
   B. Caulking:
      (1) Full bed under thresholds.
      (2) As required to improve appearance of an item where not subjected to water.

7. TYPE OF CAULKING OR SEALANT TO USE: Use Thiokol or Tremco urethane where joint is exposed directly to water with no or little protection and where "sealant" is noted on the Drawings.
   A. Use butyl for general use where joint is well protected from elements or appreciable quantities of moisture.
8. **FIELD CONTROL:**
   A. Cure as recommended by the manufacturer. Protect from foot traffic or rolling equipment.
   B. Visually inspect joints after 30 days.
   C. Replace joints with evidence of bonding failure, excessive shrinkage, cracking, pitting or improper cutting.

9. **CLEAN UP:** Upon completion of the work, all caulking and sealing compounds shall be removed from surrounding areas and all joints checked for water tightness and touched up as required.

   END OF SECTION 13 11 00.04
SECTION 13.11 00.06
IDENTIFYING DEVICES AND SIGNS FOR POOLS

1. GENERAL:
   A. Work Included:
      1) Furnish, install all signs, labels, letters, plaques and identifying devices as specified on attached schedule and shown on the drawings.
      2) Secure approval of Engineer on exact location of signs.
   B. Submittals:
      1) Sample of all plastic/s to be used showing composition, color etc. and text as specified.
      2) Sample of all baked enamel signs and text as specified.
      3) Sample of all other types of material to be used in sign making.
      4) Sample of all mounting devices, screws, chains, adhesive/s, etc. to be used.
      5) Rubbing of any aluminum plaques prior to authorizing casting.
      6) Sample of any plastic wrap around or decal signs.
   C. Product:
      1) Engraved signs as specified in listing.
      2) Silk screened plastic signs as follows:
         a) Recreonics 12-152 18” x 12” Pool Capacity, green letters on white. (2 signs required)
         b) Recreonics 77-989 18” x 24” WARNING - SHALLOW WATER - NO DIVING, red and black lettering on white. (2 signs)
         c) WARNING – CHILDREN SHOULD NOT USE POOL WITHOUT ADULT SUPERVISION SIGN with 2-inch lettering (2 signs)
         d) Pool User Limit sign (2 required)
         e) Signage indicating location of emergency phone location. Additional signage listing the physical address of the facility shall be provided and installed at the emergency phone location (one sign listing the facility address to be mounted at the emergency phone location; two signs indicating the location of the emergency phone)
         f) Custom Fasken Community Center “pool rules” sign will also be required. These signs will be roughly 36” x 48”. Exact wording to be provided by Fasken Community Center staff. Signage will contain Fasken Community Center school logo, contact information, and corporate swimming facility rules. (1 sign required)
         g) Silk screened depth marker signs (if required) for wall, fence, or screen mounting.
      3) Pipe Identification Signage: Within pool mechanical spaces or wherever pool plumbing is exposed identification of pipe must conform to ASME A13.1 with regard to color, letter height and marker size as well as with state and local requirements. Size to match pipe appropriately.
         a) Pipe flow direction: Marking Services, Inc. (800/234-0135) 2-inch wide MS 900 directional arrow type installed around the pipe full circumference at not more than 6'-0" center to center when measured along the pipe.
            Colors:
            | Backwash     | Tape | Arrows |
            | Pool to Pump Suction | Orange | Black |
            | Filtered return to pool | Green | White |
            | Chlorine/chemicals | Red | White |
            | Potable Water Supply | Blue | White |
            | Blower/Air lines | Yellow | Black |
            Tape bands shall overlap at least 1-inch. Clean pipe before installing bands or signs.
         b) Pipe Function: Label pipe as to function with MS-900 self adhesive pipe markers at least every 6'-0” measured along the center of the pipe. Use 1” x 8" sign with ¾” letters.
            | Function (Label) | Background | Letters |
            | Backwash       | Orange     | Black   |
            | Pump Supply    | Green      | White   |
Identifying Devices and Signs For Pools

Fasken Community Center – Laredo, Texas

<table>
<thead>
<tr>
<th>Filtered Return</th>
<th>Blue</th>
<th>White</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Supply</td>
<td>Blue</td>
<td>White</td>
</tr>
<tr>
<td>Air</td>
<td>Yellow</td>
<td>Black</td>
</tr>
<tr>
<td>Hot Water</td>
<td>Gray</td>
<td>Black</td>
</tr>
<tr>
<td>Chlorine Solution</td>
<td>Red</td>
<td>White</td>
</tr>
</tbody>
</table>

Not all signage may be required for this specific project. Furnish list of labels with required submittal.

4) Valve Identification Signage: Valves shall be tagged with Marking Services, Inc. stainless steel valve tags, 1 1/2 inch diameter with blackened letters labeled to match valve numbers on plans. Secure to the valve with Marking Services, Inc. 4 ½” stainless beaded chain #15766.

5) Process Layout Sign: On complicated layout projects and if noted on plans, furnish a 12” x 18” MS-215 Maxter plastic process flow sign. MSI will require CAD drawing which the Engineer will furnish to the Contractor. Mount securely to wall with stainless steel anchors and screws.

6) Equipment Signage: On each “major component” of pool-recirculation system, provide a 1” tall, gray plaque-style sign indicating the name and/or function of the device. “Major components” of the recirculation systems include:
   1. Pool pumps
   2. Pool filters
   3. Chemical monitors/ controllers
   4. Flow meter displays/ readouts
   5. Heaters
   6. Auto-fill standpipes
   7. Backwash funnels/ standpipes
   8. Pump starters/ disconnects
   9. Pool equipment subpanels

   Equipment labels to be mounted:
   1. On pump strainers for all pumps having strainers. If no strainer, mount label on pump motor.
   2. On side of horizontal high rate sand filters, and on top of Pentair TR-series (TR-100C and TT-140C) filters.
   3. On wall beside or above flow meter displays.
   4. On front cover of chemical controllers if possible. If not possible, on wall beside or above controller.
   5. On front of standpipe for all auto-fill and backwash standpipes.
   6. On front cover of all pump starters/ disconnects and pool equipment subpanels.
   7. On side of all pool heaters (near electrical readout).

All labels shall be displayed in a location that is easily readable and in close proximity to the equipment the label is describing.

D. **Execution:**
   1) Mount with stainless screws, permanent adhesive, stainless chains, and/or non-corrosive metal brackets. Adhesives must be rated for -20 degrees to 115 degrees F +/- . All mounting devices must be non-corrosive.
   2) All signs must be installed such that the top of the sign is in a level position.
   3) Use concealed hangers to mount plaques.

E. **Lettering:**
   1) Lettering shall be as large as reasonable to be proportionate to the sign. Final acceptance shall be by the Engineer.
   2) Plaque lettering to be various size letters in Helvetica Medium style.
END OF SECTION 13 11 00.06
1. GENERAL:
   A. Related Documents:
      1) Drawings and general provisions of Contract, including general, supplementary, and special
         conditions and Division 1 specification sections may apply.
      2) Other specification sections especially Section 13 11 00.01 “Swimming Pools” and Section 13 11
         00.10 “Swimming Pool Piping”.
   B. Summary: This section governs furnishing and installing an electronic swimming pool monitoring and
      control system which includes water sampling loops and cells; electronic pH and ORP sensors; sensors
      for one or more of the following (depending on the specific controller and options selected):
      1) Temperature
      2) Langlier Index
      3) Calcium Hardness
      4) Cyanuric Acid (Stabilizer)
      5) Clarity (Turbidity)
      6) Flow rate
      7) Pool water level
      The system shall include a controller with digital alpha-numeric display for each parameter
      monitored. The sensing cell(s) and control cabinet shall be mounted on a clear acrylic board mounted in
      turn to walls or other supporting devices as shown as Plans.
   C. Work Included Under Other Sections:
      1) Electrical circuits to power the system.
      2) Communications wiring between remote sensing devices such as flow meters
      3) Telephone or computer wiring, jacks, cables and terminals for remote reporting, monitoring or
         control, if any.
      4) Power distribution to solenoid valves, pumps, or other devices controlled by the system.

2. MATERIALS:
   A. Pipe: Pipe for chemical sampling and monitoring shall be nominal 3/4 inch and shall conform to ASTM D-
      1785, Type 1, Grade 1, Schedule 40.
   B. Valves: Provide full union PVC ball valves to fully isolate the sampling loop.
   C. Controllers: Provide controller(s) specified on the Plans or in any "job specifics" immediately following
      this Section 10721. Provide all options noted including lockable enclosure with sliding acrylic door. Since
      controllers are a strong Owner preference item, no substitutions will be permitted.
   D. Mounting Board: A minimum 24" x 24" x ½" clear acrylic "plexi-glass" backboard onto which the
      controller and sampling cells are to be firmly mounted. Mount the board onto the designated wall or
      supporting device using rubber spacers to hold the board between 3/8-inch and 1/2-inch off the
      supporting wall.
   E. Hardware: All straps, mounting screws or bolts to be Type 304 or 316 stainless steel. Plastic clips for
      pipe mounting are also acceptable.
   F. Unions: Provide PVC unions on sampling loop either side of the system analyzer to permit easy
      disconnection of parts of the PVC system. In short runs where the connections to the pool plumbing
      system are within reach of the system analyzer, the full union isolation ball valves will suffice.
   G. Strainer: Install clear PVC wye type strainer in the sampling loop before the sampling cell.
   H. Sampling: Install PVC ball valved laboratory pet-cock for sampling manually or for draining the test cells.

3. INSTALLATION:
   A. Install the controller and sensing cells in the location shown on the Plans such that the top of the
      controller is between 54" and 60" above finished floor.
   B. The sampling line branch from the pool recirculation system shall be after filtration but before any
      chemical injectors. The sampling line shall discharge back to the open topped filter. The entire sampling
      loop shall be capable of being isolated from the pool circulation system through the use of an isolating
      PVC ball valve at each connection point to the pool circulation system.
C. Strap sampling lines securely to walls with stainless steel conduit straps or plastic clips. If suspended, suspend with PVC adjustable split clevis ring hangers. Straps or wire are not acceptable. Run lines rectilinear with building walls.

E. **Chemical Control:**
   1) The calcium hypochlorite and acid feed systems shall be controlled by the chemical monitor.
   2) Gas feed systems: The chemical systems supplier shall supply a 120 volt/1 phase solenoid actuated ball valve. The electrician shall wire a plug to plug into a switched outlet on the chemical monitor/controller. (Alternatively, some controllers may have lower voltage contacts or dry contacts requiring lower voltage solenoids to be furnished by the chemical systems supplier or relays to be supplied by electrician.)
   3) Tubing, inductors, ejectors, Venturis or similar appurtenances necessary to get the chemicals into solution are considered required under this section.
   4) Make all adjustments and calibrate per manufacturer’s instructions.

4. **POST INSTALLATION:** **Training:** Arrange, coordinate and train Owner’s designated operators on-site one time.

5. **WARRANTY:** In addition to the written manufacturer’s warranty for the equipment, the pool chemical system’s installer shall warrant the entire chemical monitoring and control system and make all repairs occasioned by defective labor, materials or installation for a period of one (1) year from date of acceptance of the complete pool project, balancing of the pool chemistry and training of Owner’s personnel.

END OF SECTION 13 11 00.07
1. GENERAL:
   A. Conditions of the Contract: The conditions of the Contract (General, Supplementary and other Conditions) and the General Requirements are hereby made a part of this Section.
   B. Scope: This item shall include furnishing all labor, equipment, materials, superintendence and other related services necessary to complete the earthwork indicated on the drawings or specified herein including:
      a. General site grading, filling, borrowing and compacting to achieve the final grades shown.
      b. Excavation for swimming pools, and below-grade vaults.
      c. Construction of base fill for slabs and decking.
   C. Protection: Protect previous work of any subcontractor, existing trees, sidewalks, curbs, pavement, buildings, and utilities on or adjacent to the site not included herein for removal or adjustment.

2. PRODUCTS: Select Fill: Select fill to fill old structure and replace unsuitable sub-grade materials shall be clean sandy clay having a Plasticity Index (P.I.) between 5 and 15 and a Liquid Limit (L.L.) of 40 or less.

3. EXECUTION:
   A. Examination of Site: Prior to commencing work the Contractor shall examine the site and make himself fully aware of the conditions and requirements of the site. He shall make the Engineer aware of any abnormal or questionable soil conditions or the need for additional work not shown on the Drawings or specified herein.
   B. General Requirements: The Contractor shall use equipment specifically designated for the work to be performed. Do not break out curbs for access. Do not park equipment on parking lots outside designated staging areas. Protect all excavations with guard rails.
   C. Backfill of Pool shell and Vaults: Do not allow excavation to stand in water before backfill begins. Remove construction debris and organic material inside excavation prior to backfilling.
      a. Demolition debris shall be spread as to not provide voids. Backfill in nine inch lifts, evenly on all sides of the structure if possible, compacting around the structure mechanically to 95 percent of Standard Proctor Density at +/-3% optimum moisture.
   D. Excess Material: Surplus or unsuitable material shall be hauled away and disposed of by the Contractor.
   G. Subgrade Compaction: The Contractor shall sprinkle and mechanically compact fill under pool, decks, and fill areas within pools to 95% Standard Proctor Density at +/-3% of optimum moisture.
   H. Testing: The Owner may make arrangements and pay for testing with a qualified independent testing laboratory at his own expense according to the following recommended schedules:
      a. Select Fill - Test compaction of each 9 inch lift of 25 foot x 25 foot grid over entire area of fill. Stagger grid for each lift.
      b. Test results shall be furnished to the Contractor. Areas failing compaction test shall be delineated as half the distance to the closest passing test and reworked until the area passes. No further backfilling, earthfill, or paving may proceed until the previous layer has passed compaction testing. Failing areas shall be retested at the Contractor’s expense.
   I. Final Grading: Break up all hard-pan earth or clay surfaces to make them suitable for sodding, seeding, or landscaping. Hand rake all exposed earth surfaces removing all rocks, clods and debris and smoothing the ruts from construction equipment. Taper gradually all transition to match existing, undisturbed terrain.

4. MEASUREMENT AND PAYMENT: Earthwork for aquatic facilities is considered subsidiary to other bid items included in the forms of proposal. No separate measurement or payment will be made for this work. All excavation is considered unclassified.
5. **JOB SPECIFICS:**

Soil Preparation beneath Swimming Pool and Pool Decks: The soils report prepared by O’Conner Engineering & Science, Inc. recommends that all organic material be removed from the existing soils on the site to a minimum distance 3'-0" outside the outer limits of construction.

Where fill material is imported to bring the pool or pool decks to a specific elevation above the elevation of the native soil, the imported fill must be a select fill material meeting the minimum requirements of the soils report.

All native soils shall be thoroughly and completely proof-rolled for weak spots in the subgrade. Where weak spots are encountered, those areas must be repaired and then proof-rolled again. The contractor must repeat the process of repairing the weak soils and proof-rolling the site until all areas beneath the pool, pool decks, and other site structures meet the minimum requirements of the soils report.

Following the proof-rolling activities, the exposed subgrade shall be scarified to a minimum depth of 6-in. (moisture conditioning) and re-compacted. The moisture content of the subgrade shall be maintained at optimum moisture content or to within +3.0% of optimum moisture content until permanently covered.

It is recommended that a licensed geotechnical engineer from O’Conner Engineering & Science be contacted to review the moisture conditioning process as well as the installation of the select fill material and its compaction to ensure it meets the minimum requirements of the geotechnical report.

END OF SECTION 13 11 00.08
SECTION 13.11 00.09  FIBERGLASS HIGH RATE SAND FILTER

1. GENERAL:
   A. The system shall be supplied complete by the manufacturer and shall include: internals, face piping and
      valves, gauge panel with tubing and petcocks, sight glass, air relief connection, bottom drain connection
      with internal strainer, non-corrosive tank supports, and saddle brackets or stands for stacked configurations.
   B. System shall be fabricated and fully assembled at the manufacturer’s plant for pressure testing and
      dimensional verification. System may be knocked down for shipping purposes in sub-assemblies for
      minimum field assembly. Underdrain manifold shall be factory installed and shipped in place, lateral piping
      may be assembled in the field.
   C. Filters shall be approved before delivery and must be equal, in the sole opinion of the Engineer to the unit or
      units shown on the Plans or in the proposal pages. There being a wide range in the quality and cost of
      swimming pool filters, the plans indicate the intent and level of quality for this project. Substitution approval
      should not be presumed. Submittals and substitutions shall be made in accordance with the “Submittals and
      Substitutions” section of this project manual.
   D. Filters for swimming pools shall be listed by NSF under the current NSF-50 standard. Separate NSF approval
      is required for filters in a stacked configuration.
   E. Work Required In Other Sections: If automated filter control systems are specified, the electrical
      subcontractor shall install the necessary relays, starters, and other electrical devices furnished by the filter
      controller manufacturer. In addition he shall install the necessary circuits and power distribution to power the
      controller itself and any electrically powered devices appurtenant to it such as electric valves.
   F. Submittals: Submittals are required for filters, controllers, valves and other appurtenances. Provide warranty
      information and proof of NSF-50 compliance.

2. FILTER SYSTEM CAPACITY: Refer to Plans.

3. PRODUCTS:
   A. Filter Tank: The equipment described herein shall be products of a manufacturer regularly engaged in the
      fabrication of fiberglass pressure vessels for at least 15 years. Minimum standards for construction are as
      follows but higher standards shall govern if a specific filter is named. If so named, it is the Engineer’s intent to
      establish the named filter as a higher minimum standard and quality required on this Project.
      1) The filter tank shall be designed for no less than 50 psi maximum operating pressure. (Fiberglass tanks
         larger than the Pentair Triton TR-140C, or equal, shall also be hydrostatically tested to 75 psi.)
      2) Non-corrosive bases shall be provided for tank support. Access to tank shall be provided by manway.
         Manway seal shall be complete with one piece ¼” neoprene gasket and positioned so that internal
         pressure from filter will augment the seal.
      3) Drain out system shall consist of a minimum 3/4” coupling mounted to the tank bottom. One 3/4” coupling
         will be provided for the air relief connection on top of the tank.
      4) Each filter tank shall be equipped with the necessary connections for the internal and external piping.
         Connections shall be comprised of fiberglass couplings and schedule 80 PVC exterior flanges.
      5) The resin used shall be a commercial grade, premium, corrosion resistant vinyl ester that has been
         evaluated in a laminate by test in accordance with ASTM C-581 in service comparable to the intended
         service and recommended for this service by the resin manufacturer.
      6) Ultraviolet absorbers shall be added to the exterior surface for improved exterior resistance.
      7) Filter shall carry a five (5) year limited, non-prorated warranty. Provide copy of written warranty with
         submittals.
   B. Filter Piping - Internal:
      1) The internal distribution system shall be a horizontal header/lateral arrangement. The headers shall
         be Schedule 120 PVC construction, capped on one end and flanged on the other end. Lateral
         connections shall be spaced no more than 6” on the centers and shall be ½” FPT connections.
      2) Laterals shall consist of 1-1/2” Schedule 30 PVC pipe with machine slotted openings on ¼” centers.
         Machined openings shall be designed to retain all media particles as small as .45mm particle size.
         Molded or drilled openings or retainer screens will not be acceptable. Each lateral shall be fabricated
         complete with a socket cap on one end and male adapter on the other. Both fittings to be solvent welded
to the slotted pipe. Laterals shall be fitted with a rubber O-ring to allow for proper positioning of the machined openings.

3) Upper laterals shall consist of 1-1/2" Schedule 80 PVC pipe with ¼" wide machine slotted openings on 1" centers. Upper laterals shall be designed and sized at the factory so as to provide uniform distribution and unrestricted flow during filter and backwash cycles. Laterals shall be fitted with a rubber O-ring to allow for proper positioning of the machined openings.

4) All hardware in wetted areas shall be stainless steel or non-metallic.

C. Filter Piping - External:
1) External face piping shall be Schedule 80 PVC pipe and fittings. Flanges shall be located so as to allow for easy dismantling of face piping. All fittings shall be solvent cemented. External manifold assemblies are required if shown on Plans.
2) Piping shall be drilled and tapped where necessary to accommodate gauge tubing connectors.
3) All valves 3" and larger shall be PVC body wafer valves. EPDM resilient lined with 416 stainless steel shaft and pin. The disc shall be Nylon 11 coated bronze or cast iron. All bolts and nuts shall be stainless steel with stainless steel washers to be used when secured to PVC flanges.
4) Standard accessory items shall include removable and cleanable sight glass on the back wash discharge line rated for 50 psi with polycarbonate glass, a filter or remote mounted gauge panel with two 4-1/2" diameter pressure gauges for influent and effluent readings, ¼" petcocks, ¼" poly vent tubing with PVC compression adapters and an automatic tank air release valve.

D. Single Lever Linkage: The default filter valve design in the absence of any other specification or Plan notation is for single lever linkage.
1) A clevis and rod linkage shall connect four butterfly valves provided with the face piping. Assembly shall be designed so that filter and backwash cycles can be accomplished by simply raising or lowering the operating handle while the filler pump is in the off position. Clevis sizes may vary with size of face piping order to operate with suitable mechanical advantage.
2) A clevis shall support through-pins which in turn connect to steel rods thereby linking all valves. In addition, an operating handle shall be secured to one clevis by stainless steel pins with the pins held in lateral position using stainless steel cotter pins.
3) Linkage shall be fully adjustable. Hex shaped threaded connector couplings shall be located between each pair of valves for this purpose. Couplings shall be locked into position by the use of two jam nuts with each coupling.
4) Linkage shall be designed so that all valves operate simultaneously eliminating the possibility of water hammer action. Each valve shall be adjustable to provide for accurate positioning and tight shut off.
5) An adjustable rod shall be provided to expand the capability of the single lever linkage. The device shall provide for flow control during system backwashing.
6) The device shall incorporate a sliding bolt mechanism that allows a range of flow from 50% open to fully closed for each valve.
7) All mechanical apparatus should be factory installed to permit complete adjustability and field fine tuning of backwash flow rates.

E. Filter Media:
1) Filter media shall be U.S. Silica Mystic White II, Grade 20, uniformly graded silica material. Media shall be naturally angularly shaped particles of silica quartz. Sand shall have a particle size between .45mm and .55mm (#20). Uniformity coefficient shall not exceed 1.53. Specific gravity to be not less than 2.5. with pH of 7.0.
2) Filter shall contain a minimum sand volume as specified by manufacturer.
3) Furnish sand to the site in original unopened bags.

F. Automated Filter Back Wash Controls: Where called out on the Plans in the proposal, the contractor shall furnish and install a automatic filter back wash control. For purposes of these specifications:
1) “Automatic” shall mean or back wash system initiated by the loss of head across the filter, by a time clock or other unattended method which upon initiation, runs the cycle of back wash, rinse and filter modes by automatically positioning valves and controlling pumps.
2) It shall include a back wash system initiated by push button stop-start by a attendant. Once initiated the controller sequentially, and without operator interference, runs the cycle of backwash, rinse and filter modes by automatically positioning valves and controlling pumps.
3) Filter valves shall be positioned by differential hydraulic pressure, by pneumatic pressure or by electric motor as delineated on the Plans.

4) Where automated filter back wash controls are specified, the system shall be furnished with all components necessary for the automated system to operate. This includes any special wiring, relays, pumps, compressors, circuits or other related appurtenances.

5) The filter back wash controller shall be built in a NEMA 3R corrosion resistant enclosure with either digital display or LED display to indicate the mode the system is in. A switching knob shall allow the operator to:
   a) Operate the back wash “manually” by electronic sequential operation of the valves one at a time.
   b) Operate the system on automatic (or semiautomatic) as specified.

G. **Stacking Frames:** If stacked filters are shown, furnish and install, filter manufacturer’s own stacking frames. Do not fabricate or field construct filter frames.

4. **INSTALLATION:**
   A. Ship filter systems to the site; inspect and protect from damage.
   B. Coordinate pool plumbing systems with foundation installation.
   C. Install filter tanks on level foundations. Plumb vertical cylinder tanks.
   D. Connect pool piping per Section 13 11 00.10.
   E. Carefully load filter media taking precautions not to dislodge laterals or other internals. Hand rake the media surfaces level.
   F. Test all valve assemblies for proper positioning before attaching filters.
   G. Once pumps are in position and recirculation system is ready, set the filter to filter mode, open air release assembly and begin filling tank with water. Operate in the filter mode and check for leaks. Close the air release valve when all air has been evacuated.
   H. After the first back wash cycle is complete, open the filter and check the media surface. There should be no evidence of bypassing along the walls of the shell or scouring from the overhead distributor.

5. **WARRANTIES:** Workmanship is to carry a one (1) year warranty other than the filter shell itself, which shall carry a 5 year limited non-prorated warranty against defects.

6. **CERTIFICATIONS:** Tank, linings, and filter shall be NSF listed at the time of bid for the flow conditions herein specified. Filters for pools and spas shall conform to NSFI/ANSI Standard 50-1996 latest edition.

END OF SECTION 13 11 00.09
SECTION 13.11 00.10

1. GENERAL:
   The Pool Contractor shall furnish and install a swimming pool water filtration and distribution system complete
   with all necessary items including the filtration unit from the pump through the backwash system, including all
   pipe and valves as hereinafter specified, and all accessories. This section also governs suction and discharge
   piping for play features and slides.

2. DESIGN:
   Design of all pipe not specifically sized on the Plans shall be the responsibility of the Pool Contractor in
   accordance with 25 TAC 265 Subchapter K, Texas Department of Health, “Standards for Public Swimming Pool
   and Spa” as amended October 3, 2002. These standards require:
   A. Discharge Piping: Velocity of ten (10') feet per second maximum based on true (not nominal) pipe
      cross-sectional area.
   B. Suction Piping: Velocity of six (6') feet per second maximum based on true (not nominal) pipe cross-
      sectional area.
   C. System Drain: Provide a method to drain the above-ground pipe systems to prevent freezing.

3. FILTER REQUIREMENTS:
   The filter shall be per Section 13 11 00.09 Fiberglass High Rate Sand Filter, or as shown in the plans.

4. SCOPE:
   A. Intent of Drawings: The drawings indicate the general arrangement of the pool plumbing. Details of
      proposed departures due to actual field conditions or other causes shall be submitted to the Engineer for
      approval. The pool contractor shall carefully examine the drawings and shall be responsible for the
      proper fitting and materials and equipment as indicated without substantial alteration. No installation
      shall be made that will provide a cross connection or inter-connection between a distributing supply for
      drinking purposes and the swimming pool that will permit a backflow of water into the water supply.
      Pipe openings shall be closed with caps or plugs during installation. Equipment and pool fittings
      shall be tightly covered and protected against dirt, water, and chemical or mechanical injury. At the
      completion of the work, the fittings, materials and equipment shall be thoroughly cleaned and adjusted for
      proper operation.
      The Pool Contractor shall supply and install all piping, pipe fittings and valves from the pool fittings
      or perimeter converters to the juncture of the filter equipment; all piping, pipe fittings and valves from pool
      main drain outlet line; sampling and chemical lines where indicated; static level lines; all piping and pipe
      fittings within the filter room required and as shown on the plans for pool operation but not “house”
      plumbing for rest rooms, water fountains, water supply or floor drains; all pipe hangers, rods and supports
      and other material to complete the intended scope of work. Pool contractor shall install all pipe, fittings,
      valves, and other appurtenances from the pool outlet, through pumps and return to slides, play features
      and foundations including connections thereto.
      NOTE: Any item of equipment or materials obviously a part of the filter and pool recirculation and
      treatment system and necessary to its operation, but not specifically mentioned in the specifications or
      shown on the drawings shall be furnished and installed by this pool contractor as a part of his work at no
      extra cost.
   B. Workmanship: All materials to be used in this work shall be installed by workmen thoroughly skilled in
      their trade and all work shall present a neat and mechanical appearance when complete. The Engineer
      shall be the sole judge of whether work installed under this contract has met this requirement and the
      pool contractor, at no additional expense to the Owner, shall replace or correct any work not judged
      acceptable by the Engineer.
   C. Layout: Where design of pipe manifolds for pump suction or discharge are not specifically shown, the
      Contractor shall construct the manifolds such that the flow by any route to and from the pump has
      essentially equal head losses to any other possible route. The proposed manifold shall be sketched and
      furnished to the Engineer for approval prior to fabrication. Pipe shall be installed such that it is parallel or
rectilinear to building walls or fenced areas. Angled or forced fit of pipe and fittings or use of “flex” pipe is prohibited.

D. **Heating Pipe:** Heating or torching plastic pipe to bend or shape it is strictly prohibited.

5. **PRODUCTS:**

A. **Piping Materials:**

1) **GUTTER OR SKIMMER PIPING:** Swimming Pool piping which is used for connection of the filter plant to the gutter or skimmers shall be polyvinyl chloride (PVC) plastic pipe, Type 1, Grade 1, Schedule 40 (default) or Schedule 80 ASTM D-1785.

2) **POOL DRAIN PIPING:** The main drain piping for the pool or play feature suction supply shall be polyvinyl chloride (PVC) plastic pipe, Type 1, Grade 1, Schedule 40 (default) or Schedule 80 ASTM D-1785.

3) **FILTER CONNECTION PIPING:** The piping which connects the filter to the filter pump and to the recirculation piping, backwash piping and other drain piping shall be of polyvinyl chloride (PVC) plastic pipe, Type 1, Grade 1, Schedule 40 (default) or Schedule 80.

4) **RETURN PIPING:** Return piping to the pool or play apparatus shall be PVC Type 1, Grade 1, Schedule 40 (default) or Schedule 80 - **EXCEPTION:** Exposed riser pipe to slides shall be Schedule 80.

5) **HEATER CONNECTIONS:** Heater branch line connections between the pool water heater and the pool recirculation piping shall be PVC Type 1, Grade 1, Schedule 40 (default) or Schedule 80 - **EXCEPTION:** The first ten (10') feet of pipe to and from heater connection points shall be CPVC or, alternatively, Type K copper. If the distance from heater connections to main pool circulation line is less than ten (10') feet, the full distance shall comply with this paragraph, terminating at the main pool circulation line.

6) **CHEMICAL SOLUTION AND SAMPLING LINES:** Shall be polyvinyl chloride (PVC) plastic pipe, Type 1, Grade 1, Schedule 40.

7) **FITTINGS FOR PLASTIC PIPE:** Wherever PVC plastic pipe is used, all fittings shall be the same Schedule and of the same manufacturer as PVC pipe used by the pool contractor.

8) **GRAVITY DISCHARGE LINES:** Open ended discharge to gravity drains, including backwash lines, such as filter drains or over flows shall be schedule 40.

9) **HARDWARE:** All flange bolts, nuts, and washers to be stainless steel.

B. **Valves:**

1) **SMALL VALVES:** Valves in PVC lines up to and including two-and one half inches in size shall be full port, full union CPVC, PVDF, or PVC ball valves (depending on line in which they are installed).

2) **LARGER VALVES:** All valves 3" to 12" inclusive shall be PVC body wafer valves, with 416 stainless steel shaft and pin. The disc shall be polypropylene unless otherwise specified or shown, manually actuated valves shall have 10 position latch lock handles. All bolts and nuts shall be stainless steel with stainless steel washers to be used when secured to PVC flanges. Eight (8") inch and larger valves shall be gear operated unless noted otherwise.

3) **VALVE EXTENSION STEM AND KEYS:** Where required, for operation of below water or below grade valves, the pool contractor shall furnish and install valve extension stem and keys manufactured or supplied by the valve manufacturer.

4) **GATE VALVES:** Buried gate valves, 4-inch and larger, where shown on the plans shall be resilient seat non-rising stem AWWA C-500 compliant valves with cast iron or ductile iron body and cast iron or aluminum bronze disk.

C. **Compression Gaskets:** Compression gaskets for cored or sleeved penetrations shall be Link-Seal or approved equal for pipe 4-inch and larger.

D. **No-Leak Flanges:** Any pipe cast into a pool wall or floor (or other necessarily water tight structure such as a surge tank) shall be fitted with a no-leak flange set mid-depth of the wall or floor. The no leak flange can be a glued-on fiberglass or PVC flange or a bronze no leak fitting.

6. **INSTALLATION:**

A. **Handling:** Pipe and accessories shall be handled in such a manner as to insure delivery to the trench in sound, undamaged condition. Old PVC pipe showing signs of UV degradation due to sun exposure may be rejected.
B. **“Pre-Plumbing Installation Conference”:** Prior to laying any piping, the Pool Contractor shall schedule a “Pre-Plumbing Installation Conference” with the Pool Engineer for the purpose of determining the final layout of field piping and plumbing and equipment in the pool equipment area.

C. **Cutting of Pipe:** Shall be done in a neat and workmanlike manner without damage to the pipe. Cutting shall be done by means of mechanical cutter. Remove all burrs. Free ends of pipe shall be square cut.

D. **Placing and Laying:**
   1) **BEFORE INSTALLATION,** pipe shall be inspected for defects. The interior of the pipe shall be thoroughly cleaned of foreign matter and shall be kept clean during laying operation. Pipe shall not be laid in water or when trench or weather conditions are unsuitable for the work. Water shall be kept out of the trench until the pipe is installed. When work is not in progress, open ends of the pipe and fittings shall be securely closed so that no trench water, earthen or other substance will enter the pipes or fittings.
   2) **BACKFILL:** Backfill the pipe with clean earth, free of rocks, clods or vegetative matter. Mechanically tamp backfill in 9-inch loose lifts adding water to achieve density. Refer to Section 02201 of these specifications.
   3) **PIPES PENETRATING WALLS:**
      a) Pipes less than 2-inch diameter may be cast into walls of pits or pools but must have integral PVC no leak flanges mid-depth of the wall.
      b) Pipes 2 1/2-inch diameter or larger cast into wetwells, pool walls, or floors must have no-leak flanges mid-depth of the concrete. For pump pits, basement walls or similar dry installations, core the wall after placement and install pipe through the wall with a water tight compression gasket. Alternatively install a no-leak flanged wall pipe as a sleeve and then install the gasket seal.
      c) For retrofitting pipe, 4 inches and larger, through old pool walls for submerged duty:
         (1) Core hole neatly to a diameter at least 4 inches greater than the pipe outside diameter.
         (2) Insert pipe and install link-seal or equal compression gasket at mid depth of the core hole.
         (3) Around the exterior perimeter of the cored hole, away from the pool water, prime surfaces and install VolClay Rx expansive water stop.
         (4) Pack cored hole on pool side with expansive grout and, when set, strike off flush with pool wall.
         (5) Pack cored hole on exterior side (away from pool) with expansive grout extending the grout a distance from the wall at least equal to the diameter of the core and for a distance of one diameter all the way around the core hole.
      d) For retrofitting pipe 3 inches and smaller through old pool walls for submerged duty:
         (1) Core hole at least 1 inch in diameter greater than the pipe outside diameter.
         (2) Install the pipe centered in the core hole.
         (3) Pack cored hole on pool side with expansive grout and, when set, strike off flush with pool wall.
         (4) Pack cored hole on exterior side (away from pool) with expansive grout extending the grout a distance from the wall at least equal to the diameter of the core and for a distance of one diameter all the way around the core hole.

4) **CONCRETE ENCASEMENT:** All pipe beneath the pool shell shall be encased in concrete. Under the pool shell, pipe shall not encroach into the required thickness of the shell except at connections to drains or other devices. Concrete encasement of under-pool pipe is required unless specifically noted otherwise in the Plans. Refer to Plans. Concrete for encasement shall be of the same strength class as the pool shell. It may be cast before shell floor but shell concrete shall contact completely top surface of encasement concrete. The encasement shall surround the pipe to the thickness of the floor itself.

5) **PIPE GRADES:** Generally unless grades are noted, suction and pressure pipes are not required to be laid on specific gradient. Gravity gutter drains or gravity skimmer lines shall slope toward surge pit or equalization basin at a slope of 1/8-inch per foot or more. Main drains from deep pools shall rise up immediately upon clearing the shell but only enough to flow on gradient to surge pit or equalization basin.
D. **Buried Pipe:** Buried pipe under yard or deck shall have minimum 2'-0" cover. If invert elevations are shown, cover may be much greater than 2'-0". Invert elevations govern.

E. **Pipe Supports:** Pipe in filter rooms may not be run along the floor. Pipe support pipe stands shall be used in filter galleries or other locations where long runs of horizontal pipe are installed without support of walls or equipment. No pipe six inches in diameter or more shall be unsupported for a span greater than 10 times the diameter of the pipe.

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**FLOOR MOUNTED PIPE SUPPORT**

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Height Above Floor</th>
<th>Method of Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>0&quot; - 5&quot;</td>
<td>2&quot; - 8'-0&quot;</td>
<td>a. Uni-strut (FRP only)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b. (1)</td>
</tr>
<tr>
<td>6&quot; - 12&quot;</td>
<td>4&quot; - 2'-0&quot;</td>
<td>a. concrete pedestal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b. pipe stand with cradle (steel)</td>
</tr>
<tr>
<td>6&quot; - 12&quot;</td>
<td>2'-1&quot; - 5'-11&quot;</td>
<td>a. pipe stand with cradle - bolt to floor</td>
</tr>
<tr>
<td>6&quot; - 12&quot;</td>
<td>6'-0&quot; - 10'-0&quot;</td>
<td>a. (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b. frame x-braced against sway Uni-strut</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c. other approved structural steel support</td>
</tr>
</tbody>
</table>

(1) Suspending from ceiling or wall mount required when ceiling or walls are available.

Regardless of material, pipe stands shall be furnished with floor flanges, stainless steel anchor bolts and a curved cradle supporting a length of one pipe diameter and at least one fourth of the circumference of the pipe. Supports 24" in height or less from centerline of pipe to floor may be constructed of cast-in-place concrete cradled as described above. Rubber isolation pads are required against any concrete cradle for the full length and width of the cradle. Two (2") inch and smaller pipe along walls shall be supported with stainless steel brackets or plastic brackets with stainless hardware.

F. **Hanging Pipe Support:** Furnish and install any necessary threaded rod/unistrut cradles and clevis hangers to support pipe from ceilings. Use only stainless steel or FRP rods or fasteners. Galvanized punch straps or wires or other makeshift pipe hangers are not acceptable.

G. **Backwash Piping:** Backwash piping shall not be connected directly to sanitary sewer or sanitary sewer manholes but shall be terminated by the Pool Contractor at least two pipe diameters above the receiving pit or manhole overflow elevation. An approved air gap fitting is acceptable.

H. **Color Coding:** Exposed piping in new pools and spas shall be color decal banded according to the following scheme and labeled as to function and direction of flow. Refer to Section 10440 "Identifying Devices".

I. **Joints:**

1) **SOLVENT-WELDED JOINTS:** Shall be made in accordance with the manufacturer's recommendations. However, the following directions are considered minimum standards. All fittings shall fit easily on the pipe before applying cement. The outer surface area of pipe and inner wall of fitting shall be clean and dry. Thinner is to be applied to the outer surface of the pipe and the inner surface of the fittings. Cement is to be applied to the outer surface of the pipe, or on the male section of the fitting only. When the outside surface area of the pipe end is satisfactorily covered with cement, allow ten (10) seconds open time to elapse before inserting pipe into fittings, turn fitting about the pipe end approximately 1/8 to 1/4 of a turn. Wipe off excess cement at the joint in a neat cover bead. Use only approved cement and thinners for making joints.

   All joints shall remain completely undisturbed for a minimum of ten (10) minutes from time of joining the pipe and fitting. If necessary to apply pressure to a newly made joint, limit to ten (10) percent of rated pipe pressure until four (4) hours after joining.

   Carefully handle all pipe and move as little as possible so that the cement seal shall not be broken before it is completely dry.

   Full working pressure shall not be applied until the joints have set for a twenty-four hour period.
Protect plastic pipe from exposure to aromatic hydrocarbons, halogenated hydrocarbons and most of esters and ketones that attack the material. Protect all pipe from mechanical damage and long exposure to sunlight during storage.

2) Make threaded pipe joints with Permatex #2 compound or approved equal, applied sparingly to the male threads only.

3) All connections between PVC and metal pipes 2-1/2-inch diameter or larger must be flanged, plastic flange to metal flange. DO NOT use threaded connections between plastic and metal pipe except for 2-inch and smaller pipe and where specifically noted otherwise and in which case the PVC pipe shall be Class 200 weight regardless of size.

4) “O” Ring rubber gasket pipe shall not be used in swimming pool applications except for gravity sewer outfall lines, deck or floor drains, or other non-pressure applications approved by the Engineer.

J. Waterstop: Any pipe penetrating a concrete wall or floor of a pool or pump or surge pit shall have a glued-on waterstop positioned mid-depth of the concrete unless a sleeve or Link-Seal gasket is specifically required.

K. Flushing: All pipe lines leading to or from the pool shall be thoroughly flushed clean before the pool is filled and placed in use. All drain boxes, surge tanks or other vessels shall be cleaned of sand, gravel or debris before being placed into service.

L. Winterizing Valve (Unheated, outdoor pool equipment rooms or fenced enclosures): For all pool circulation lines; fountain, slide, or feature lines; backwash lines, auto-fill water supplies; chemical monitoring/solution lines and where freezing of pipe in winter is a concern, the Contractor shall install 3/4-inch fittings with ball valve or pet-cock on each pipe holding residual water when pumps are not in use. The drain valve shall be installed at the lowest point in the line. Pump and strainer drain plugs meet the requirements of this section. Threaded plugs are not acceptable except on pumps, strainers, or filters.

M. Taps: Taps on pipe where required for probes, meters, small pipe connections, or similar equipment shall be made using a glued-on saddle with appropriately sized NPT outlet. Direct tapping of PVC pipe is not permitted.

N. Pressure Testing: Pressure test pool lines to 40 psi and hold for six hours with no drop in pressure and with no additional pumping or air pressure. Repair all leaks and retest until passing.

7. MEASUREMENT AND PAYMENT: No separate payment is made for piping unless specifically shown in the bid proposal form. Piping shall be considered subsidiary to other bid items.

END SECTION 13 11 00.10
SECTION 13.11 00.11  
CONCRETE FOR SWIMMING POOLS AND SPAS

1. GENERAL:
This section shall govern the furnishing of all labor, materials, tools, plant, performing all operations required to install all cast-in-place concrete and reinforcing steel, and completely finishing the concrete items in strict accordance with the requirements of these specifications and the applicable drawings and subject to all conditions of the contract including but not limited to the following:

- Foundations, spread footings, grade beams
- Slabs on grade, walks, concrete decks, play courts
- Structure Walls, pits, concrete shells
- Exterior Steps and Landings, wheelchair ramps
- Retaining Walls, barrier walls
- Drainage structures
- Concrete floors, girders

2. MATERIALS:

A. Reinforcing Steel: Reinforcement shall conform to the requirements of Section 13 11 00.15 of these specifications.

B. Cement: The cement shall be either Type V or Type II blended with ASTM C618, Class F fly ash (that meets the following when tested in accordance with ASTM C1012: Expansion ≤ 0.1% at 18 months) of a standard brand of Portland Cement which shall conform to ASTM Specification C-150. Other concrete mixtures proven to meet requirements with regard to sulfate attack will be considered. The Contractor, if he so elects in order to facilitate his own operations, may use Type III cement. All cement shall be protected against dampness, and no cement will be accepted which has become caked.

C. Water: Water for use in concrete mixtures shall be clean, potable water and shall conform to the provisions of AASHTO Test Method T-26 for quality of water.

D. Coarse Aggregate: The coarse aggregate shall consist of gravel, crushed stone, blast furnace slag or combinations thereof with a wear of not more than forty (40) percent when tested according to AASHTO Method T-96. Aggregate shall conform to the requirements of ASTM C-33.

The maximum size of coarse aggregate shall not be larger than one-fifth (1/5) of the narrowest dimension between forms of the member for which concrete is to be used nor larger than three-fourths (3/4) of the minimum clear spacing between reinforcing bars.

E. Fine Aggregate: The fine aggregate shall consist of sand conforming to ASTM designation C-33. The sand shall not contain more than 1-1/2% clay and shall not show darker than very light amber when tested by the colorimetric method.

The fine aggregate shall conform to the following grading requirements:

- Retained on 3/8" screen 0% by weight
- Retained on 1/4" screen 0 to 5% by weight
- Retained on No. 20 sieve 15 to 50% by weight
- Retained on No. 100 sieve 85% to 100% by weight

F. Admixtures:

<table>
<thead>
<tr>
<th>GENERIC PRODUCT</th>
<th>APPROVED PRODUCTS</th>
<th>REQUIRED USAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Range Water Reducer (Super plasticizer) ASTM C-494 Type F/G</td>
<td>Master builders Rheobuild: 716-Temp.---80 degree F 1000-Temp.---80 degree F</td>
<td>ALL vertical structural walls or other work requiring two sided forming and tightly confined concreting; concrete columns above grade; Concrete drops &gt; 5'-0&quot;</td>
</tr>
<tr>
<td>Air-Entrainer ASTM C-260</td>
<td>Master Builders Micro Air</td>
<td>All concrete</td>
</tr>
<tr>
<td>Accelerator ASTM C-494 Type C</td>
<td>Pozzolith 555-Accelerator Pozzolith 122-HE (chloride) Pozzutec 20 (low temp)</td>
<td>Concrete placed on permanent steel floor and deck systems; bridge deck repair; concrete pavement patching; tilt walls</td>
</tr>
</tbody>
</table>
All concrete shall have air entrainment based on the maximum size coarse aggregate:

<table>
<thead>
<tr>
<th>Max. Size Aggregate</th>
<th>Total Air Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1/2&quot;</td>
<td>4.5% +/-1%</td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>6.0% +/-1%</td>
</tr>
</tbody>
</table>

Install admixtures per manufacturer’s instructions.

3. **CONCRETE QUALITY:** The concrete shall be composed of Portland Cement fine aggregate, coarse aggregate, and water, all as specified herein.

The concrete shall be homogenous, readily placeable and uniformly workable. The minimum cement content, maximum allowable water content, and minimum compressive strength of the various classes shall conform to the following:

<table>
<thead>
<tr>
<th>Class of Concrete</th>
<th>Min. Cement Content Sacks/CY</th>
<th>Max. Content Gal/Sack of Cement</th>
<th>Min. Compressive Strength psi @ 7 days</th>
<th>Min. Compressive Strength psi @ 28 days</th>
<th>Min. Beam Strength psi @ 7 days</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>5.0</td>
<td>6.5</td>
<td>2,000</td>
<td>3,000</td>
<td>550</td>
</tr>
<tr>
<td>B</td>
<td>4.5</td>
<td>7.0</td>
<td>1,700</td>
<td>2,500</td>
<td>330</td>
</tr>
<tr>
<td>C</td>
<td>4.0</td>
<td>8.0</td>
<td>1,300</td>
<td>2,000</td>
<td>600</td>
</tr>
<tr>
<td>S</td>
<td>6.0</td>
<td>5.0</td>
<td>2,500</td>
<td>3,600</td>
<td>600</td>
</tr>
<tr>
<td>P</td>
<td>7.0</td>
<td>4.5</td>
<td>2,000</td>
<td>4,000</td>
<td>650</td>
</tr>
</tbody>
</table>

The dry loose volume of coarse aggregate shall not exceed 0.82 cubic foot per cubic foot of finished concrete except in cases where the voids in the coarse aggregate as determined by standard test methods exceed 48 percent of the total dry loose volume. Where the voids exceed 48 percent of the total dry loose volume, the dry loose volume of coarse aggregate shall not exceed 0.85 cubic foot per cubic foot of finished concrete.

The net amount of water shall be the amount added at the mixer, plus the free water in the aggregate, and minus the absorption of the aggregate based on a thirty-minute absorption period. No allowance will be made for evaporation of water after batching.

A. **Class Requirements:** Unless otherwise specified below or elsewhere in the plans or Special Provisions, all concrete is **Class A**. (Except for pneumatically placed concrete.) The following are maximum slumps and the class of concrete required for various types of construction. (Slump test prior to addition of plasticizer.)

<table>
<thead>
<tr>
<th>Type of Construction</th>
<th>Slump Inches Maximum</th>
<th>Class of Concrete</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foundations</td>
<td>5</td>
<td>A</td>
</tr>
<tr>
<td>Slabs on Grade</td>
<td>4</td>
<td>A</td>
</tr>
<tr>
<td>Walls and Columns</td>
<td>3</td>
<td>A</td>
</tr>
<tr>
<td>Grade Beams, Piers</td>
<td>4</td>
<td>A</td>
</tr>
<tr>
<td>Structural Slabs &amp; Beams</td>
<td>4</td>
<td>S</td>
</tr>
<tr>
<td>Walks, decks</td>
<td>4</td>
<td>A</td>
</tr>
<tr>
<td>Retaining Walls</td>
<td>4</td>
<td>A</td>
</tr>
<tr>
<td>Manhole Fillets; Inlet Inverts</td>
<td>5</td>
<td>C</td>
</tr>
</tbody>
</table>

B. **Characteristics of Mix:** Concrete shall be of such consistency as to insure the required workability and result in compact masses having dense, uniform surfaces. In cases where the characteristics of the aggregates are such that with the maximum allowable amount of water, the consistency requirements cannot be satisfied, additional aggregates, mineral filler or aggregates of a different character may be
furnished to produce the desired results. If these materials are not provided, then the mix design will be modified to insure proper workability by adding additional cement. Concrete temperature shall not be less than 50 degrees F nor more than 90 degrees F.

In general, the consistency of the concrete mixtures shall be such that:

1) The mortar will cling to the coarse aggregate.
2) The aggregates will not segregate in the concrete when it is transported to the place of the deposit.
3) The concrete and mortar will show no free water when removed from the mixer.
4) The surface of the finished concrete will be free from a surface film of "laitance".

Any concrete mix failing to meet the above outlined consistency requirement, although meeting the slump requirements, will be considered unsatisfactory, and the mix shall be changed to correct such unsatisfactory conditions. In cases where the characteristics of the aggregates furnished are such that, with the maximum allowable amount of water, the specified slumps and consistency requirements are not met, aggregates of an improved grading must be furnished and the mix design must be modified to meet the slump and consistency requirements by adding either cement or mineral filler, or both, as may be necessary. In case mineral filler is used, the combined total quantity of mineral filler and fine aggregate passing the 100 mesh sieve shall not exceed twenty (20) percent of the weight of the fine aggregate.

It is the intent of these specifications to secure for every part of the work, and particularly so where the concrete is to be liquid-containing, concrete of homogeneous structure having the required strength and resistance to weathering, which is free of honeycomb, concealed voids or other defects, and which for the various structures and appurtenances shall develop the minimum compressive strengths as indicated in these specifications.

The minimum quantity of cement and mixing water should be used that will safely produce concrete of the strength required, in order to minimize heat of hydration and shrinkage in the concrete.

4. MIXING CONDITIONS: The concrete shall be mixed in quantities required for immediate use, and any concrete which is not in place within thirty (30) minutes after being discharged from the mixer shall not be used. Re-tempering of concrete will not be permitted. Concrete improperly mixed shall not be placed in the structure. Ready-mixed concrete will comply with the following requirements:

Central mixed concrete shall be mixed completely in a stationary mixer and mixed concrete transported to the point of delivery in a truck agitator or in a truck mixer operating at agitator speed.

Shrink-mixed concrete shall be partially mixed in a stationary mixer, and the mixing completed in a truck mixer.

Transit-mixed concrete shall be completely mixed in a truck mixer.

Mixers and agitators shall be operated within the limits of capacity and speed of rotation as designated by the manufacturers.

When a stationary mixer is used for partial mixing of the concrete, the mixing time in the stationary mixer may be reduced to the minimum required to intermingle the ingredients (about 30 seconds).

When a truck mixer is used for complete mixing or to finish partial mixing in a stationary mixer, each batch of concrete shall be mixed not less than 50 nor more than 100 revolutions of the drum or blades at the rate of rotation designated by the manufacturer of equipment as mixing speed. Additional mixing, if any, shall be at the speed designated by the manufacturer of the equipment as agitating speed.

Delivery of concrete to the site of the work and its discharge from the truck mixer, agitator or non-agitating equipment shall be completed within the time limits shown in the following table, after the introduction of the mixing water to the cement and aggregates, unless otherwise authorized by the Engineer.

<table>
<thead>
<tr>
<th>Concrete Temperature (at point of placement)</th>
<th>Maximum Time (No retarding agent) Minutes</th>
<th>Maximum Time¹ (With retarding agent) Minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Agitated Concrete</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All Temperature</td>
<td>30</td>
<td>45</td>
</tr>
<tr>
<td>Agitated Concrete</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Above 90 degrees F.</td>
<td>45</td>
<td>75</td>
</tr>
</tbody>
</table>
Above 75 degrees F through 90 degrees F  
75 degrees F and below

<table>
<thead>
<tr>
<th></th>
<th>Over 95 degrees F</th>
<th>70-95 degrees F</th>
<th>60-70 degrees F</th>
<th>50-60 degrees F</th>
<th>Below 50 degrees F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walls</td>
<td>5 days</td>
<td>1 day</td>
<td>2 days</td>
<td>3 days</td>
<td>Do not remove</td>
</tr>
<tr>
<td>Columns</td>
<td>7 days</td>
<td>2 days</td>
<td>3 days</td>
<td>4 days</td>
<td>forms until site</td>
</tr>
<tr>
<td>Beam</td>
<td>10 days</td>
<td>4 days</td>
<td>5 days</td>
<td>6 days</td>
<td>cured test cylinder</td>
</tr>
<tr>
<td>Structural Slabs Over 5&quot; thick</td>
<td>10 days</td>
<td>5 days</td>
<td>6 days</td>
<td>7 days</td>
<td>develops 50% of required compressive strength</td>
</tr>
</tbody>
</table>

*Where exposed surfaces of concrete can be effectively sealed to prevent loss of water, these times may be reduced to the 70-95 degrees F. time.

5. FORM WORK: The Contractor shall provide forms that will produce correctly aligned concrete. The centering shall be true and rigid, and thoroughly braced both horizontally and diagonally. The forms shall be sufficiently strong to carry the dead weight of the concrete as a liquid without deflection, and tight enough to prevent leakage of mortar.

For exposed interior and exterior concrete surfaces of columns and walls, plywood or other approved forms, thoroughly cleaned and tied together with approved corrosion resistant devices shall be used.

Rigid care shall be exercised in seeing that all poured walls and columns are plumb and true and thoroughly cross-braced to keep them so.

Beveled strips shall be provided in form angles and in corners of column and beam boxes for chamfering of corners where shown on drawings or directed by the Engineer.

The inside of the forms shall be coated with an approved oil or thoroughly wetted. Oil shall be applied before reinforcement is placed.

Temporary openings for cleaning and inspection shall be provided at the base of vertical forms and other places where they are necessary.

Forms may be removed at the following minimum times.

A. FORMING OF CHANNELS: Forming for channels or gutters for pools or decks shall be true to plan dimension with parallel sides and ledges. Channel placed without parallel sides shall be removed and replaced per this specification. The use of polystyrene or polyurethane foam channel forms may be required by the Plans or Special Provisions. If so specified, the Contractor does not have the prerogative of substituting other methods. The foam forms shall be secured on grade so they are not dislodged or buoyed by placement of concrete.

6. DEPOSITING CONCRETE:

A. PRIOR TO PLACEMENT: Before placing concrete, thoroughly clean the forms of wood chips, shavings or other debris. Do not deposit concrete in standing water. Before placing new concrete on or against concrete which has acquired its initial set, retighten forms, roughen hardened surfaces, clean off foreign matter and laitance, and saturate with water. Immediately before depositing new concrete, coat the contact surface with neat cement grout.

B. PLACEMENT: Concrete shall be deposited, when practicable, in its final position without segregation, rehandling, or flowing. When possible, concreting shall be continuous until the section is
Concrete shall be spaded and vibrated with approved mechanical vibrator to maximum subsidence, without segregation, and adjacent to forms and joints. When stoppage of concreting operations occurs for any reason, construction joints shall be placed either horizontally or vertically as needed, provided with keys to resist shear, and dowels to develop bond. Before concreting operations are resumed, the surface of the concrete shall be cut or chipped to remove all laitance and expose the aggregate.

Water accumulating during placing should be removed. Concrete shall not be deposited in such accumulations. Conveying and chuting of concrete shall be done only with equipment which will insure a continuous flow without segregation. Concrete without super plasticizer admixtures shall not be dropped more than five feet without a tremie or "elephant trunk". Super plasticized concrete may be dropped (free fall) from a height of 15 feet or less.

C. **WEATHER PROTECTION:** In threatening weather, which may result in conditions that will adversely affect the quality of the concrete to be placed, the Engineer may order postponement of the work. Where work has been started and changes in weather conditions require protective measures to be used, the Contractor shall furnish adequate shelter to protect the concrete against damage from rainfall or damage due to freezing temperatures. No concrete shall be placed without the approval of the Engineer when air temperature is at or below 40 degrees F. (taken in the shade away from artificial heat) and falling. If authorized by the Engineer, concrete may be placed when the air temperature is at 35 degrees F. and rising.

D. **EXPANSION/ISOLATION OR CONTROL JOINTS:** Expansion/isolation joints shall be of the type and size shown on the plans. Saw joints shall be made in floor slabs wherever noted. The saw joints shall be 1/8 inch in width and 3/4" in depth minimum. The saw shall be carefully guided to produce straight lines without overcut beyond limits prescribed. Sawing shall commence immediately upon final set of the concrete when it can be done without raveling the green slab.

E. **FLOOR COATINGS OR COLOR:** Any areas designated on the plans for colored or coated floors shall be so treated in accordance with other Sections of these specifications and in accordance with the manufacturer’s specifications as approved by the Engineer.

F. **FINISH FOR SIDEWALK, DECKS, AND DRIVES:** Sidewalks, decks, and driveways will receive a light broom finish after leveling with a wooden float unless noted otherwise. Radius all exposed edges of slabs on grade. Unless otherwise shown on Plans, saw one-eighth inch wide by one inch joints on 15-foot centers each way before concrete is 48 hours old.

G. **FINISH FOR SPRAYGROUND SURFACE:** Sprayground to receive a light broom finish after leveling with a wooden float to create paintable surface.

H. **EXPOSED AGGREGATE FINISH:** Exposed aggregate panels may be either raised, recessed or as indicated on the plans with the sides of each panel chamfered as directed by the Engineer. The aggregate used for this finish shall be approved by the Engineer. Unless otherwise noted on the plans, aggregate shall conform to the grading requirements of Grade 2 aggregate except that a minimum of 50 percent shall be retained on the three quarter inch sieve. Gravel of predominantly rounded particles shall be used, except that when required by the plans or approved by the Engineer in writing, crushed stone may be used. The aggregate shall be large enough to remain firmly anchored in the face of the final product. The depth of finish shall be one-fourth of an inch minimum to one-half of an inch maximum, unless otherwise directed by the Engineer or required by the plans.

A surface retarder that penetrates the concrete approximately one-fourth of an inch shall be applied to the forms or concrete surface as an aid in achieving the desired finish. Wood forms may required 2 or 3 coatings to compensate for absorption. Form joints shall be taped or caulked to prevent escape of the retarder during placing operations.

Treated form surfaces shall be protected from sun and rain while exposed to the atmosphere. In case of high humidity, or if rain has dampened the forms prior to placing concrete, a reapplication of the surface retarder may be required to provide uniform coverage of the retarder on the forms.

Adjacent areas of fresh concrete not required exposed aggregate finish shall be protected when the retarder is applied.

The finish shall be obtained by sandblasting, bush hammering, water blasting or other methods, as approved by the Engineer. Horizontal surfaces may be finished by combination of brushing and washing, but only after the concrete has set sufficiently to prevent loosening of the aggregate.
Unless otherwise directed by the Engineer, forms for surfaces requiring exposed aggregate finish shall be removed 12 to 15 hours after concrete placement. The exposed aggregate operation shall be accomplished immediately after form removal. Except for the time required for obtaining the exposed aggregate finish, curing of all surfaces shall be maintained for the minimum 4 day curing time. All surfaces shall be either water cured or may be cured with an approved clear membrane curing compound. If water curing is used, it shall be followed by a clear membrane curing compound which shall meet the requirements of the Item, “Membrane Curing”.

Care shall be taken to ensure proper vibration at all points of concrete placement to prevent honeycomb or segregation of the materials. Vibration shall be done in such a manner as to provide adequate penetration of previously placed concrete lifts. Care shall be taken to prevent contact of the vibrator with the face form.

I. CURING CONCRETE: Unless they are to receive further treatment such as plaster, tile or paint coatings, walks, decks, floors and vertical surfaces shall be sprayed with an approved curing compound to retard evaporation of water if spraying is not objectionable because of subsequent finish. Curing operations shall begin as soon as the concrete has attained initial set. All materials and facilities for curing concrete shall be on hand and ready for use before concrete is placed. Concrete shall be protected from freezing temperatures for a minimum of five days after placement.

J. VAPOR BARRIER: Polyethylene vapor barrier, if shown on the plans, shall be 6 mil thickness, fungi resistant sheets fastened with adhesive backed polyethylene tape. Seal tightly against penetrations. Seal all punctures with tape before placing concrete.

K. TEST ON CONCRETE: One set of three test cylinders may be requested by Owner for compressive strength tests performed by an approved independent testing laboratory (all at the expense of the Owner) for each thirty (30) cubic yard lot or a minimum of one set for each days pour. Slump tests shall be made on each batch tested in accordance with ASTM designation C-143. Each of the test cylinders shall be tested at 7 days and 28 days for compressive strength. The Contractor shall coordinate tests with the Owner’s designated laboratory. The contractor shall code the cylinders and correlate the samples with specific concrete placements in a written log provided to the Engineer.

If the average strength of the laboratory control cylinders for any portion of the structure falls below compressive strength required for the design, the Engineer shall order further standard ASTM test procedures be performed at Contractor's expense upon concrete sections in question. Should these further tests indicate that any concrete does not meet the requirements of these specifications, the concrete shall be removed and replaced with acceptable concrete by the Contractor and at Contractor's expense.

Copies of reports of all tests shall be furnished to the Engineer and Contractor as soon as available. Tests on concrete shall conform to the following applicable ASTM designations:

- ASTM C-173 or C-231 Air Content of Freshly Mixed Concrete.
- ASTM C-172 Standard Method of Sampling Fresh Concrete.
- ASTM C-143 Standard Method of Slump Test.
- ASTM C-39 Standard Method of Test for Compressive Strength of Molded Concrete Cylinders.
- ASTM C-31 Standard Method of Making and Curing Concrete Compression and Flexure Test Specimen in the Field.

L. DISPOSAL OF CONCRETE WASTE: The Contractor shall dispose of unused or unsatisfactory concrete off site. Rinsing concrete trucks and equipment is not allowed on the site.

7. PROTECTION OF THE WORK: Protect the work from freezing, from rainfall, blowing dust or other natural hazards. The Contractor is responsible for protecting from acts of vandalism from the time concrete is placed until the project is completed and accepted by the Owner. Remove any graffiti or other defacing of concrete.

8. MEASUREMENT: The concrete quantities of the various classifications which constitute the completed and accepted structure will not be measured unless otherwise noted in the proposal, but will be considered as a part of the lump sum payment for the item constructed. If noted on the plans or in the Special Provisions measurement will be by the cubic yard in place.
9. **PAYMENT:** All concrete shall be considered as a part of the lump sum price bid for the various items of construction. The lump sum price shall include full compensation for furnishing, hauling, and mixing all concrete materials; placing, curing, and finishing all concrete; all grouting and pointing; furnishing and placing all drains, forms, and falsework, labor, tools, equipment, and incidentals necessary to complete the work.

END OF SECTION 13.11 00.11
SECTION 13.11 00.12  PNEUMATICALLY PLACED CONCRETE FOR SWIMMING POOLS
(SHOTCRETE)

1. GENERAL:
   A. Conditions of the Contract: The conditions of the Contract (General, Supplementary and other Conditions) and the General Requirements are hereby made a part of this Section. Protect the work of others before proceeding with shotcrete installation.
   B. Scope: This section shall govern the furnishing and placing of pneumatically placed concrete "gunite" or "shotcrete" for the pool shell. The term "Gunite" is an old trade name for a sand-cement mixture delivered by a compressed air device. The term "shotcrete" will be used herein and shall apply to the wet-process or the dry-process of pneumatically placed concrete.
   C. Processes: Dry-process shotcrete is not permitted for use on this project. Wet process shotcreting, according to ACI 506R-90 (re-approved 1995) shall be deemed to meet the requirements of this section. In some circumstances, conventional formed and placed concrete may be used with permission of the Engineer in writing. In order to acquire this approval, the contractor must provide details to scale for approval of the engineer showing placement of all joints, water stops, and deviations in the plan dimensions necessary to accommodate poured-in-place methods.
   D. Experience: Crew foreman shall have demonstrated proficiency at all crew positions and a minimum of 3,000 hours as a nozzleman. Pneumatic concrete nozzle operator (gunman) shall have a minimum of 3,000 hours experience in pneumatic concrete installation as a nozzleman.
   E. Conditions: No work shall be done without the permission of the Engineer when the temperature is lower than 40 degrees F. After placement, the concrete shall be protected from freezing or quick drying. Applicable sections of ACI 305 Hot Weather Concreting and ACI 306 Cold Weather Concreting are incorporated into this section by reference. Do not apply shotcrete in standing water or during rain or when rain is forecast before the work can be completed.
   F. Safety: All workmen shall be required to wear appropriate clothing, gloves, boots, eye and head protection on the work site. Protect skin from contact with cement. Contractor shall provide adequate ventilation in confined spaces to remove cement dust or mists.

2. PRODUCTS:
   A. Materials:
      2) Water: Potable fresh water shall be used for mixing as well as for curing. ASTM C94.
      3) Normal Weight Aggregate: conforming to ASTM C 33 meeting the following gradation:

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Per Cent by Weight Passing</th>
</tr>
</thead>
<tbody>
<tr>
<td>½&quot;</td>
<td>100</td>
</tr>
<tr>
<td>3.8&quot;</td>
<td>90-100</td>
</tr>
<tr>
<td>No. 4</td>
<td>70-85</td>
</tr>
<tr>
<td>No. 8</td>
<td>50-70</td>
</tr>
<tr>
<td>No. 16</td>
<td>35-55</td>
</tr>
<tr>
<td>No. 30</td>
<td>20-35</td>
</tr>
<tr>
<td>No. 50</td>
<td>8-20</td>
</tr>
<tr>
<td>No. 100</td>
<td>2-10</td>
</tr>
</tbody>
</table>

   B. Reinforcement: Bar reinforcement shall conform to the requirements of ASTM A615 and to Specification 13 11 00.15 “Metal Reinforcement for Swimming Pools and Pool Decks”. Synthetic or glass fiber reinforcement if called for in Job Specifics or other special provisions to these specifications shall conform to ASTM C1116.
   C. Admixtures:
1) Water reducing admixtures: Conforming to ASTM C1141.
2) Air entraining admixtures: Meeting the requirements of ASTM C 1141.
3) Fly ash or pozzolans (by permission of the engineer only): ASTM C618.

3. EXECUTION:
   A. Proportioning and Mixing: Unless otherwise specified, the pneumatically placed concrete shall be proportioned as follows:
      1) Slump - Maximum 3 inches, minimum 1-1/2 inches at the pump.
      2) Cement - Seven 90 lb. bags per cubic yard (630 lbs. minimum)
      3) Compressive strength at 28 days: 4,000 psi (ASTM C 42).
      4) Air entrainment: 7% measured at the pump +/-1-1/2%

      No water shall be added to the mix after mixing and before using the gun. Mixed material that has stood for 45 minutes without being used shall be rejected and no remixing or tempering will be permitted.

   B. Equipment:
      1) Equipment shall be used that is designed for wet shotcreting.
      2) Guns: Either pneumatic feed guns or positive displacement guns are permitted. Modified dry shotcrete equipment shall not be used.
      3) Compressor: The compressor shall maintain a supply of clean, oil-free air sufficient for delivering shotcrete at 105 scfm at 100 psi at the air ring for positive displacement blowers or as required by the size of the nozzle employed for pneumatic feed guns. Required capacity of compressor and operating pressures are shown in Table 2 for the various nozzle sizes. Steady pressure must be maintained throughout the placing process.

<table>
<thead>
<tr>
<th>Compressor Capacity</th>
<th>Hose Diameter (Inches)</th>
<th>Maximum Size of Nozzle Tip (Inches)</th>
<th>Operating Air Pressure Available (psi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>250 cu. ft. per Min.</td>
<td>1</td>
<td>3/4</td>
<td>40</td>
</tr>
<tr>
<td>315</td>
<td>1-1/4</td>
<td>1</td>
<td>45</td>
</tr>
<tr>
<td>365</td>
<td>1-1/2</td>
<td>1-1/4</td>
<td>55</td>
</tr>
<tr>
<td>500</td>
<td>1-5/8</td>
<td>1-1/2</td>
<td>65</td>
</tr>
<tr>
<td>600</td>
<td>1-3/4</td>
<td>1-5/8</td>
<td>75</td>
</tr>
<tr>
<td>750</td>
<td>2</td>
<td>1-3/4</td>
<td>85</td>
</tr>
</tbody>
</table>

The values shown in Table 2 are based on a hose length of 150 ft. with the nozzle not more than 25 ft. above the delivery equipment. Operating pressures shall be increased approximately 5 psi for each additional 50 ft. of hose and approximately 5 psi for each 25 ft. the nozzle is raised.

4) Mixing equipment: Plant ready-mix delivered in rotating drum mixer trucks is required for this project. On-site mixing is not permitted.

5) Hoses: Material hoses shall be abrasion resistant, non-collapsible, and flexible designed for the operating pressures expected from the compressor. Hoses shall have safety chains or cables at couplings to prevent hose-end whipping if couplings break loose.

6) Nozzles: Nozzles shall be wet-mix nozzle design.

C. Rebound: Rebound or segregated materials in the pool must be removed and not incorporated into the structure.

D. Appurtenances: Contractor shall coordinate the installation of light niches, steps, anchors, sleeves, drains, and other appurtenances. These fixtures shall be set in as the concrete is placed or blocked.

Fasken Community Center Pool & Amenities
Laredo, Texas
01-15-2020

SECTION 13.11 00.12
PNEUMATICALLY PLACED CONCRETE FOR SWIMMING POOLS
in for later installation. Chipping out after the concrete is set shall not be allowed. The back side of all such appurtenances shall be encased or anchored in shotcrete at least the normal depth of the wall or floor thickness.

E. Placing and Finishing:

1) Surface preparation: Prepare surfaces to line and grade. Do not apply shotcrete to frozen surfaces. Before the concrete is placed the pool area shall be compacted uniformly and thoroughly and brought to a uniform moist condition.

2) Reinforcement: Reinforcement shall be supported properly throughout placement of concrete using wire chairs or plastic chairs made for this purpose and tied such that displacement does not occur due to workmen walking on the mat or through gun nozzle pressure.

3) Grade and alignment: Pneumatically placed concrete shall be placed in accordance with the details and to the dimensions shown on the plans. Set taut wire or fine fishing line at the top inside edge of proposed finished wall and intermediate lines as necessary to control vertical faces and meet tolerances. Set taut wire at each grade break and at twenty foot centers each way across floor to insure proper slope and thickness. If wire cannot be used due to shape or changes in slope, set removable depth gage stakes on the floor of the pool for thickness control at no more than 20-foot spacing.

4) Gun application: Hold the nozzle between 2-feet and 6-feet from the receiving surface and rotate in a small circular motion, never back and forth. Direct the nozzle as much as possible at an angle perpendicular to the receiving surface but never more than 45-degrees from the perpendicular. Shooting at an angle increases rebound. Proper consistency shall be controlled at the nozzle valve by the operator and a low water-cement ratio must be maintained. The application of concrete through the nozzle shall be in uniform layers free of sand lenses or other inconsistencies. Areas too dry or too sandy shall be scooped from the pool immediately.

The mixture should be wet enough that it does not cling to the front (gun side) of the reinforcing steel bar but rather clings to the rear of the bar and does not allow voids, shadows or sand pockets behind the bar.

For wall thicknesses greater than 6-inches, begin walls at the bottom, thoroughly encasing the reinforcing steel for the full thickness of the wall and then working up the wall holding the nozzle at 45-degree downward angle or less while maintaining a 45-degree inclined bench. The mix shall be sufficiently dry so that it will not sag or fall from vertical or inclined surfaces or separate in horizontal work.

Shoot corners first to build up shotcrete in the corners and then work away from the corners preventing a buildup of rebound or overspray.

The original surface and each surface which is permitted to harden before applying succeeding layers shall be washed with water and air blast or a stiff hose stream, and loosened material removed. Sand which rebounds and does not fall clear of the work or which collects on horizontal surfaces shall be blown off from time to time to avoid leaving sand pockets. Concrete shall not be applied to a surface containing frost or ice. Where standing or running water is encountered it shall be removed before applying the concrete.

5) Construction joints: When it is necessary to stop work in one area for an extended period of time (e.g., overnight for a large project), stop the shotcrete edge on a one-to-one slope and do not smooth the surface. Shooting may resume the next day on the sloped edge.

6) Waterstops: Where flexible waterstops are required on the plans, secure the edges of the waterstop with wire to the reinforcing steel cage so that the waterstop cannot be deflected over by the force of the shotcrete gun.

7) Finishes: The placed concrete shall be struck off with a screed or float to an even line, grade and smooth radius. The surfaces of the pneumatically placed concrete shall be given a coarse brush finish to insure proper plaster bonding before the concrete has obtained its initial set.
If pool is to receive paint finish, the final surface must be smooth and without voids. Shoot a fairly wet 1/4-inch flash coat with sand aggregate and no coarse aggregate applied at low volume from 8-feet to 12-feet away from the surface. Use a rubber float to finish the surface.

F. Tolerances:
1) Floors: Floors shall be placed to the depths, lines and dimensions shown on the plans plus or minus 1-inch. Floors shown to be planar shall not vary more than (+/-)1/4-inch from a 10-foot straight edge.
2) Walls: Tolerances for pool dimensions shall be maintained as follows.

<table>
<thead>
<tr>
<th></th>
<th>Course Length</th>
<th>Top 36&quot; below water end walls</th>
<th>Variance between length all lanes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Club Level (Default)</td>
<td>+/-1&quot;</td>
<td>No more than ½&quot; from plumb</td>
<td>+/- ½&quot;</td>
</tr>
<tr>
<td>Competition Level (If noted)</td>
<td>+ ½&quot;</td>
<td>No more than 1/4&quot; from plumb</td>
<td>+ ¼&quot;</td>
</tr>
<tr>
<td>Playground or playpools (free form)</td>
<td>Plan: +/- 2&quot; variation from plan dimension in any direction.</td>
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Walls: Not more than 10° from vertical.

Accessible Ramps; zero depth entries Slopes may not exceed 1:12; landings not more than 1/4" per foot slope.

Steps/stairs Not more than ½" from riser height shown on plans; treads must be level side to side and front to back within 1/4"

Diving wells There shall be no incursion into the required diving well envelope at all.

NOTE: In laying out pool concrete dimensions allow 3/8-inch for plaster thickness on each end if plaster finish is specified.

G. Curing: Immediately following the finishing operation, the shell shall be cured by frequent moisture application using misting spray nozzles for a period of not less than 7 days from completion of concrete placement. Maintain an air temperature over the surface of 40 degrees F. or higher during curing. Soaker hoses, wet mats or misters are acceptable for this purpose. Curing compounds which could interfere with the bonding of paint, plaster or other finishes may not be used.

H. Testing: The Contractor shall prepare 24-inch square by 5-1/2-inch deep plywood backed forms in which the concrete placement crews shall “shoot” concrete representative of the mix being placed into the pool shell. Test slabs for pneumatically placed concrete shall be shot with the same air pressure and nozzle tips as the pneumatically placed concrete. One slab shall be cast at the end of the first hour and then one more slab every three (3) hours of shooting thereafter each day of the operation. Concrete slabs shall be allowed to set for 24 hours and then transported to the laboratory. The Contractor shall code mark the individual slabs and correlate in a log the location in the pool which each coded slab represents. This log shall be forwarded to the Engineer following the concrete placement.

The Contractor shall have the slabs picked up by its testing laboratory which, in turn, shall moisture cure the slabs and cut cores from the slabs. Test two cores each for compressive strength at 7, 14, and 28 days (a total of six (6) breaks per test slab) in accordance with ASTM testing procedures. Keep the slab for an additional 60 days after the last set of cylinders are broken.
I. Acceptable Testing Results: The average of all concrete cores tested from any one test slab shall have a minimum compressive strength of 4,000 psi at 28 days. Should the average of 28-day old core breaks fall more than five (5) percent below the 4,000 psi required at 28 days, the Contractor, at his own expense, shall core that part of the in-place shell represented by the failing cores and identified by the Engineer in accordance with ASTM C42. One core shall be cut and tested for each 500 square foot of pool bottom slab area affected but not less than four (4) cores. The cores shall be taken in locations including floors and walls directed by the Engineer distributed across the area of the pool. If these field cores break at an average compressive strength of 4,000 psi (even though the cores have aged more than 28 days since placement) they shall be presumed to meet strength requirements herein.

4. REMEDIATION: Pools or portions of the pool including wall, steps, floors and ramps, failing to meet compressive strengths, finishes, or dimensional requirements specified shall be removed to the limits determined by the Engineer and replaced, all at the expense of the Contractor. No additional compensation will be due the Contractor for lost time or other incidental damage to tile, pipe, skimmers, gutters or other appurtenances caused by the tear out and replacement.

5. MEASUREMENT: The concrete quantities of the various classifications which constitute the completed and accepted structure will not be measured unless otherwise noted in the proposal, but will be considered as a part of the lump sum payment for the item constructed. If noted on the plans or in the Special Provisions measurement will be by the cubic yard in place.

6. PAYMENT: All concrete shall be considered as a part of the lump sum price bid for the various items of construction. The lump sum price shall include full compensation for furnishing, hauling, and mixing all concrete materials; placing, curing, and finishing all concrete; all grouting and pointing; furnishing and placing all drains, forms, and falsework, labor, tools, equipment, and incidentals necessary to complete the work.

END SECTION 13 11 00.12
SECTION 13.11 00.13 — TRENCH DRAINS FOR POOLS AND DECKS

1. GENERAL:
   A. Conditions of the Contract: The conditions of the contract (General, Supplementary, and other Conditions) and the General Requirements are hereby made part of this section.
   B. Scope: This item shall include furnishing all labor, equipment, materials, superintendence, and other related services necessary to complete the trench drains, cast-in-place or pre-fabricated, indicated on the drawings or specified herein including deck and area drains, trench drains for pool perimeters or zero depth entries:
      1) Prepare grade and set anchors to receive trench box.
      2) Run all buried plumbing lines and fittings as per plans.
      3) Furnish and install the required trench drains and appurtenances including all shipping, handling, off-loading, erecting and testing per manufacturer’s specific written instructions.
   C. Protection: Protect all completed work. Store and protect all equipment in original shipping containers. Seal over drain grating during deck coating and painting operations. Clean cement or paint from completed drains. Clean all debris from drain channel and flush pipes.
   D. Submittals: Submit samples of grating. Submit manufacturer’s literature on prefabricated drains or drain block forms.

2. PRODUCTS:
   A. Materials: Prefabricated Drains - The perimeter deck drain shall be NDS (888/825-4716) “Spee-D” Channel Drain extruded plastic U-shaped channel, interlocking sections with end caps, complete with continuous plastic top heel-proof grating with anchoring and locking devices. Grating color shall be selected by Owner and/or Architect. (BID NOTE: This item will only be required as part of the project if the bid for the Paddock Evacuator system is not accepted.)
   B. Lines: Refer to plans for size and type. Conform to Section 13 11 00.10 Swimming Pool Piping for pool piping.
   C. Grating (pool perimeter and zero depth entry): Segmented, white PVC as manufactured by Neptune Benson, Daldorado, or other approved manufacturer in the width shown on the detailed drawings. The default grating shall be “parallel” style with grate members running with the length of the trench. (Known acceptable parallel grating systems are “Silent Flow” grating by Daldorado, and “Super Grip” grating by Neptune Benson. Colored grating may be required for pool(s). Provide color chart for owner/designer review and selection.

3. EXECUTION:
   A. Coordination: Coordinate installation with other trades.
   B. Prefabricated Drains: Manufacturer shall furnish drawings and written instructions. Contractor shall abide by written instructions of the manufacturer. Grade is crucial; allow no bird baths or hollows. Use installation chairs or brackets to brace the channel on line and grade during concrete deck installation. Note that flotation can occur if the channels are not adequately prevented from floating. Finish deck neatly to the edge of the preformed drain and remove excess concrete. The concrete deck shall match perfectly along both sides of the full length of the drain trench. Slope grating to match pool or deck cross slopes.
   C. Cast-In-Place Drains: Cast-in-place drains shall be built to the dimensions shown on the plans. Grates shall fit snugly in the trench with no projecting edges above or below surrounding surfaces. Grates shall be secured such that they are not removable without tools. If specified or shown on the Plans, polyurethane or polystyrene form blocks shall be used to form channels. These are available from Grate Technologies or ABT Polydrain and others. Secure form blocks on line and grade and prevent flotation.
   D. Linings (Cast-In-Place Trench Drains): Paint two coats Thoro-Seal concrete over all exposed walls and floors of trenches.

4. WARRANTY:
The manufacturer shall provide a one year unconditional warranty against all defects in workmanship and materials for a period of one year from shipment in the manufacture of these components. This warranty is in addition to the Contractor’s warranty provided under this contract.

END OF SECTION 13 11 00.13
SECTION 13.11 00.15  METAL REINFORCEMENT FOR SWIMMING POOLS AND POOL DECKS

1. GENERAL:
   This section shall govern the quality and type of metal reinforcement furnished for construction of concrete structures, concrete flatwork and decks only as indicated on the Plans and its placement in the work.

2. MATERIALS:
   Reinforcing bars shall conform to the requirements of these Specifications: ASTM A615, Grade 40 or 60 open hearth, basic oxygen, or electric furnace new billet steel or ASTM A617, Grade 40 or 60 axle steel. Epoxy coating is not permitted.

   Welded wire fabric or cold-drawn wire for concrete reinforcement shall conform to the requirements of Standard Specifications for Cold-Drawn Steel Wire for Concrete Reinforcement (ASTM A-82 or A-496) or Standard Specifications for Welded Steel Wire Fabric for Concrete Reinforcement (ASTM A-185 or A-497).

   Rolled welded wire fabric may not be used in this project. Flat panels of welded wire mesh may be used with permission of the Engineer or where shown on plans.

   Reinforcement shall be bent and placed according to the latest A.C.I. requirements and methods.

   No. 4 or smaller diameter bars may be bent in the field. Larger bars shall be shop bent.

3. SUBMITTALS:
   Bar schedules will not be reviewed. Submit mill certification of conformance to ASTM requirements. Submit bar-chair sample or specifications.

4. PLACING OF REINFORCEMENT:
   A. Metal reinforcement, at the time concrete is placed, shall be free from rust, scale, or other coating that will destroy or reduce the bond. All bars shall be bent cold. Straightening or rebending shall not be allowed which will injure reinforcement. Bars with kinks or bends not shown on the plans shall not be used.

   B. Metal reinforcement shall be accurately placed and adequately secured in position by nylon or metal chairs and spacers. In no case shall the clear distance between bars be less than 1", nor less than 1-1/3 times the maximum size of the coarse aggregate. All metal chairs, wire and spacers shall be galvanized. Bricks, rock, or broken concrete may not be used.

   C. Splices shall have a length of not less than thirty (30) times the normal size of diameter of the reinforcement, except in the cases of welded splices, and shall be well distributed or else located at points of low tensile stress. No splices other than welded splices will be permitted at points where the section is not sufficient to provide a minimum distance of two inches between the splice and the nearest adjacent bar or the surface of the concrete. The bars shall be rigidly clamped or wired at all splices in a manner approved by the Engineer.

   D. The reinforcement of footings and other principal structural members in which the concrete is deposited against the ground shall have not less than 2" of concrete between the steel and the ground contact surface. If concrete surfaces, after removal of the forms, are to be exposed to the weather or be in contact with the ground, the reinforcement shall be protected with not less than 2" of concrete over bars more than 5/8" in diameter and 1 1/2" over bars 5/8" or less in diameter.

   CONCRETE PROTECTION FOR REINFORCEMENT SHALL IN ALL CASES BE AT LEAST 2 INCHES.

   E. Bend bars around corners in structural walls and footings. Do not splice bars at right angles in corners but rather lap splice 5 feet or more from corners if dimensions permit.

   F. No concrete shall be deposited until the Engineer has inspected the placing of the reinforcement and given permission to place concrete.

   G. Contractor shall, prior to placing concrete, wire brush all bars until they are free of rust, scale or mud. Secure all bars with adequate bar ties and prevent movement of reinforcing during placement of concrete.

   H. Provide safety bar caps for all reinforcing steel temporarily left in a vertical or near vertical position where impaling is a possibility.

5. MEASUREMENT AND PAYMENT:
   Metal reinforcement will not be measured for payment. Payment for furnishing, bending, fabricating and placing reinforcing steel, including all labor, tools and incidentals necessary to complete the work, shall be included in the unit price bid for concrete of the class specified. Payment will not be made for unauthorized work.
END OF SECTION 13 11 00.15
SECTION 13.11 00.17 SPECIAL QUALIFICATIONS FOR SWIMMING POOL CONTRACTORS

1. General: This section shall govern the qualification of swimming pool contractors or subcontractors and the procedures and requirements for such qualification. No prime contractor shall, in his proposal for the contract being bid, consider the bid of, or name, or otherwise award any pool subcontract for the construction of swimming pools, aquatic features or similar work to a corporation, partnership, sole proprietorship not previously approved under this section. The Owner shall review the qualifications of each proposing pool contractor/subcontractor with that contractor's/subcontractor's bid for the project.

Any swimming pool construction firm desiring to be qualified under the terms herein must submit with their bid for the project, the application form included at the end of this section.

The proposing firm shall be responsible for verifying receipt of the application form by the Owner or Owner’s Purchasing Agent at the time bids are being received. Failure of the Owner or Owner's Purchasing Agent to receive a transmitted application form will not be just cause for default approval or for any claim against the Owner or Owner’s Purchasing Agent, or a member of the Owner's Design Team.

TO BE CONSIDERED, FORMS OF APPLICATION MUST BE IN THE OFFICE OF THE OWNER OR OWNER’S PURCHASING AGENT AT OR BEFORE THE TIME OF BID OPENING. FORMS RECEIVED AFTER THAT DATE, WILL NOT BE ACCEPTED OR ACTED UPON FOR THIS PROJECT. THE APPLICATION FORM SUBMITTED APPLIES TO ONLY THE PROJECT THE CONTRACTOR/SUBCONTRACTOR IS BIDDING ON, AND IS NOT VALID FOR ANY OTHER PROJECT.

2. Definitions:
   A. Swimming Pool Contractor (SPC): Swimming pool contractors are contractors acting under a general contract directly between the pool contractor and the owner to build a swimming pool, water park, aquatic features or similar work. A swimming pool contractor for the purposes of this definition has primary responsibility directly to the owner and is not subject to any other contract for construction of other improvements.
   B. Swimming Pool Subcontractor (SPS): Swimming pool subcontractors act to complete their work under a general contract between a prime contractor and an owner, which prime contract is for work that includes other work in addition to the construction of swimming pools or water play areas. They are not primarily responsible for completion of the whole contract but rather only a portion of the work involving swimming pool, water park, aquatic features or similar work. Their responsibility is to the prime contractor who shall directly oversee their performance and who shall coordinate with other subcontractors.

3. Quality Assurance: A prime contractor may not, unless himself qualified hereunder, propose to subcontract the various elements of pool facility construction thereby acting in effect as his own pool subcontractor. For purposes of this section, a single contracting or subcontracting entity or person considered the pool contractor or subcontractor (and therefore subject to the provisions herein) shall perform the following work or subcontract to another to perform under the direction of the pool contractor/subcontractor.
   A. Demolition of existing pool shell, pool plumbing, pool equipment, or other associated pool-related components.
   B. Excavation of the pool shell
   C. Installation of pool drain lines, supply lines, or feature supply lines or related pool plumbing.
   D. Installation of pool reinforcing steel
   E. Installation of concrete for pool shells, copings or decks.
   F. Furnishing and installing of pool equipment including gutters, skimmers, drain fittings, filters, pumps, valves, chemical or heating systems, or play features.
4. **Experience:** The pool contractor/subcontractor shall be experienced in the construction of aquatic features and facilities and shall have completed a minimum of three other facilities similar to the project herein under proposal. Similar shall mean in size, dollar value, and features installed in gaining the experience. To be credited, experience shall be gained while performing a contract under the name of the entity herein proposing and shall not be related experience gained in the employ of another contractor.

5. **Bonding:** A pool subcontractor shall be required under the terms of his subcontract with the general contractor to provide surety bonds for Performance, Labor and Materials, and Maintenance in the amount of 100 per cent of the subcontract amount, and such bonds shall name the general contractor as obligee of the bonds in the event of default by the pool subcontractor. Bond surety companies shall
a) be listed on U.S. Treasury Circular 570, most recent release,
b) be A rated (A- or higher) by Best

c) be licensed to issue bonds in the state in which project is located
d) total of obligations shall not exceed the treasury limit imposed on the company as listed in Circular 570.

Evidence of compliance with this section must be provided before any partial payment is made for pool construction items.

6. **Insurance:** A pool subcontractor shall be required under the terms of his subcontract with the general contractor to provide, in his own name, commercial liability insurance, workmen's compensation, and other insurance of the same classes to minimal limits as follows:
   a) Commercial General Liability: $2,000,000 combined single limit bodily injury/prop damage
   b) Automobile Commercial Liability: $500,000/$500,000 Bodily Injury
      $100,000/$100,000 property damage
   c) Workmen's Compensation: Statutory
   d) Employers Liability: $500,000 each accident
      $500,000 disease policy limit
      $500,000 disease each employee

Evidence of compliance with this section in the form of a copy of the subcontractors agreement and an insurance certificate must be provided before any partial payment is made for pool construction items. The Owner shall be listed on the certificate as an additional insured and must be notified 30 days prior to any cancellation of any policy listed on the certificate.

7. **Financial strength:** The pool contractor/subcontractors attention is directed to the fact that the pool contractor/subcontractor will be required to pay all expenses incident to the deposit, fabrication, shipping, delivery and unloading of pool filtration or chemical equipment, pumps, or special fountain and play equipment, if any, for this project without an advance of funds from the Owner. No partial payments will be considered for such equipment until it is delivered to the project site AND evidence is provided as to the amount of the PAID invoice from all manufacturer/suppliers.

8. **Evaluation of Qualifications:** The pool consultant, in qualifying bidders, may consider all information in the application or from any other reliable source; client history whether listed or not listed in the application; contractor's history of satisfactory and on time completion of projects; contractor's past record with pool consultant or other design professionals; current work load; current litigation to which the applicant is party; capacity to bond and insure the project.

9. **Rejection of Application:** The application of any prospective contractor/subcontractor may be rejected in the sole opinion of the pool consultant and the contractor/subcontractor shall have no recourse against the consultant for failing to pre-qualify the applicant. In submitting an application, prospective contractor/subcontractors agree that the decision of the pool consultant is final. However, additional information may be supplied in writing should the applicant feel the information will be pertinent to any appeal of the consultant's decision.

10. **Conditional Approval:** The pool consultant reserves all rights and privileges to approve or disapprove an application or to limit approval of a prospective contractor/subcontractor to a specific job or range of project sizes or scope.

End of Section 13 11 00.17
APPLICATION FOR QUALIFICATION OF
POOL CONTRACTORS/SUBCONTRACTORS

Date:

Legal Name of Pool Contractor/Subcontractor:

Address:

Telephone No.: Fax. No.:

E-mail address: Federal Taxpayer Identification No. (EIN):

Bonding Company and Name and Address of Resident Surety:

Bond Company Best Rating (must be A- or better):

Contractor’s Bonding Capacity (single project limit):

Contractor’s Bonding Capacity (aggregate):

Name and address of Commercial General Liability Insurance Company:

No. Years in Business Under This Name?:

Type of Business (corporation, partnership, etc.)

If in business under this name less than 5 years, previous company name:

List Officers (if corporation), Partners (if partnership) or Owners of the company:

Have you ever defaulted within the last ten (10) years on a construction contract? If yes, please give details and final disposition of contract.
## Pool Construction Experience

(To be qualified for various types and sizes of jobs, list variety of examples adequately expressing your experience.) Attach additional sheets as needed.

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<tr>
<th>Project Name and Description</th>
<th>Owner and Owner’s Address</th>
<th>Architect/Engineer/Pool Consultant Name &amp; address</th>
<th>Approximate $ value to nearest $50K</th>
<th>Year Completed</th>
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List your last five (5) pool projects in excess of $250,000 construction costs:

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<th>Owner and Owners Address</th>
<th>Architect/Engineer/Pool Consultant Name &amp; address</th>
<th>Approximate $ value to nearest $50K</th>
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In signing this form I acknowledge that the foregoing is a truthful representation of the qualifications of my company.

Authorized Signature: [Signature]

Typed or Printed Name: [Name]

Date: [Date]
PART 1 - GENERAL

1.1 WORK COVERED BY CONTRACT DOCUMENTS

A. The following Summary of Work is intended as an aid to achieve an understanding of the various elements of work included in the project, as is not intended to be all-inclusive. Detailed descriptions of work and requirements are given in drawings and specifications.

B. Plumbing Contract Documents were prepared for the Project by:

Trinity MEP Engineering, LLC
3533 Moreland Dr. Ste. A
Weslaco, Texas 78596
Phone Number: (956) 973-0500
Contact Person: Leonardo Munoz, P.E.

C. General Scope of Work:

1. Install systems and equipment as shown on the contract documents. Refer to drawings for schedule of equipment that will be installed. After installing equipment, connect all water, sewer, and/or power to fixtures.

2. Provide all materials and labor associated with a complete operational installation of new systems including, but not limited to:
   - Fixtures for facility
   - Piping for Sanitary Sewer and Vent Systems
   - Piping for Domestic water and Hot Water Systems.

1.2 COORDINATION

A. All plumbing work shall be done under sub-contract to a General Contractor. Plumbing Contractor shall coordinate all work through General Contractor, even in areas where only plumbing work is to take place.

B. Coordination between all trades shall take place on a regular basis to avoid conflicts between disciplines and equipment clearances.

C. Work shall take place with minimal disruption to Owner’s operations in areas surrounding the new building.
D. Cooperate fully with other contractors so that work under those contracts may be carried out smoothly, without interfering with or delaying work under this Contract.

E. Fully coordinate with electrical contractor for providing power to plumbing equipment.

1.3 UTILITIES

1. Coordinate with power, water, telephone, cable and gas utilities to locate all utilities prior to digging in any area.

2. Obtain any approvals required from utilities to relocate utilities.

3. Cost of relocating or bypassing utilities indicated on drawings shall be included in Base Bid.

1.4 CONTRACTOR USE OF PREMISES

A. Use of the Site: Limit use of the premises to work in areas indicated. Confine operations to areas within contract limits indicated. Do not disturb portions of the site beyond the areas in which the Work is indicated.

1. Owner Occupancy: Allow for Owner occupancy and use by the public.

2. Driveways and Entrances: Keep driveways and entrances serving the premises, clear and available to the Owner, the Owner's employees, and emergency vehicles at all time. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

B. Site Safety: Take every precaution to ensure the site does not present a threat to the safety of occupants and/or workers. Minimal safety requirements include, but are not limited to the following:

1. Temporary fencing around construction areas.

2. Yellow caution tape and construction barricades along open trenches during the day. Trenches shall be covered at night and warning lights provided on construction barricades.

3. Temporary fencing around equipment while site work is in progress.

1.5 SUBMITTALS

1. All equipment and fixtures shall be provided with a submittal.

2. To extradite the submittal process more efficiently, DO NOT piece-meal the submittals. Submit entire plumbing or in a bound enclosure. This will eliminate delays in the submittal process.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:

1. Common requirements and procedures for plumbing systems.

2. Responsibility for proper operation of electrically powered equipment furnished under this Division.

3. Furnish and install sealants relating to installation of systems installed under this Division.

4. Furnish and install Firestop Penetration Systems for plumbing systems penetrations as described in Contract Documents.

B. Products Furnished But Not Installed Under This Section:

1. Sleeves, inserts, supports, and equipment for plumbing systems installed under other Sections.

1.2 SUBMITTALS

A. Action Submittals:

1. Product Data:

   a. Manufacturer’s catalog data for each manufactured item.

      1) Provide section in submittal for each type of item of equipment. Include Manufacturer’s catalog data of each manufactured item and enough information to show compliance with Contract Document requirements. Literature shall show capacities and size of equipment used and be marked indicating each specific item with applicable data underlined.

      2) Include name, address, and phone number of each supplier.

B. Informational Submittals:

1. Qualification Statement:

   a. Plumbing Subcontractor:

      1) Provide Qualification documentation if requested by Architect or Owner.

   b. Installer:
1) Provide Qualification documentation if requested by Architect or Owner.

C. Closeout Submittals:

1. Include following in Operations And Maintenance Manual specified in Section 01 7800:

   a. Operations and Maintenance Data (Modify and add to requirements of Section 01 7800):

      1) At beginning of PLUMBING section of Operations And Maintenance Manual, provide master index showing items included:

         a) Provide name, address, and phone number of Architect, Architect's Mechanical Engineer, General Contractor, and Plumbing subcontractor.

         b) Identify maintenance instructions by using same equipment identification used in Contract Drawings. Maintenance instructions shall include:

            (1) List of plumbing equipment used indicating name, model, serial number, and nameplate data of each item together with number and name associated with each system item.

            (2) Manufacturer's maintenance instructions for each piece of plumbing equipment installed in Project. Instructions shall include name of vendor, installation instructions, parts numbers and lists, operation instructions of equipment, and maintenance instructions.

         c) Provide operating instructions to include:

            (1) General description of fire protection system.

            (2) Step by step procedure to follow for shutting down system or putting system into operation.

   b. Warranty Documentation:

      1) Include copies of warranties required in individual Sections of Division 22.

1.3 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:

1. Perform work in accordance with applicable provisions of Plumbing Codes applicable to Project. Provide materials and labor necessary to comply with rules, regulations, and ordinances.

2. In case of differences between building codes, laws, local ordinances, utility company regulations, and Contract Documents, the most stringent shall govern. Notify Architect in writing of such differences before performing work affected by such differences.

3. Identification:
a. Motor and equipment name plates as well as applicable UL / ULC and AGA / CGA labels shall be in place when Project is turned over to Owner.

B. Qualifications.

1. Plumbing Subcontractor:
   a. Company specializing in performing work of this section.
      1) Minimum five (5) years experience in plumbing installations.
      2) Minimum five (5) satisfactorily completed installations in past three (3) years of projects similar in size, scope, and complexity required for this project before bidding.
   b. Upon request, submit documentation.

2. Installer:
   a. Licensed for area of Project.
   b. Designate one (1) individual as project foremen who shall be on site at all times during installation and experienced with installation procedures required for this project.
   c. Upon request, submit documentation.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
   1. Accept valves on site in shipping containers with labeling in place.
   2. Provide temporary protective coating on cast iron and steel valves.
   3. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

B. Storage And Handling Requirements:
   1. In addition to requirements specified within, stored material shall be readily accessible for inspection by Architect/engineer until installed.
   2. Store items subject to moisture damage in dry, heated spaces.

1.5 WARRANTY

A. Manufacturer Warranty:
   1. Provide certificates of warranty for each piece of equipment made out in favor of Owner.

B. Special Warranty:
1. Guarantee plumbing systems to be free from noise in operation that may develop from failure to construct system in accordance with Contract Documents.

2. If plumbing sub-contractor with offices located more than 150 miles (240 km) from Project site is used, provide service / warranty work agreement for warranty period with local plumbing sub-contractor approved by Architect. Include copy of service / warranty agreement in warranty section of Operation And Maintenance Manual.

PART 2 - PRODUCTS

2.1 COMPONENTS

A. Components shall bear Manufacturer’s name and trade name. Equipment and materials of same general type shall be of same make throughout work to provide uniform appearance, operation, and maintenance.

B. Pipe And Pipe Fittings:

1. Weld-O-Let and Screw-O-Let fittings are acceptable.

2. Use domestic made pipe and pipe fittings on Project, except non-domestic made cast iron pipe and fittings by MATCO-NORCA are acceptable.

C. Sleeves:

1. General:
   a. Two sizes larger than bare pipe or insulation on insulated pipe.

2. In Concrete And Masonry:
   a. Sleeves through outside walls, interior shear walls, and footings shall be schedule 80 black steel pipe with welded plate.

3. In Framing And Suspended Floor Slabs:
   a. Standard weight galvanized iron pipe, Schedule 40 PVC, or 14 ga (2 mm) galvanized sheet metal.

D. Valves:

1. Valves of same type shall be of same manufacturer.

PART 3 - EXECUTION

3.1 INSTALLERS

A. Acceptable Installers:
3.2 Meet Quality Assurance Installer Qualifications as specified in Part 1 of this specification.

3.3 EXAMINATION

A. Drawings:

1. Plumbing Drawings show general arrangement of piping, equipment, etc. Follow as closely as actual building construction and work of other trades will permit.

2. Consider Architectural and Structural Drawings part of this work insofar as these drawings furnish information relating to design and construction of building. These drawings take precedence over Plumbing Drawings.

3. Because of small scale of Drawings, it is not possible to indicate all offsets, fittings, and accessories that may be required. Investigate structural and finish conditions affecting this work and arrange work accordingly, providing such fittings, valves, and accessories required to meet conditions.

B. Verification Of Conditions:

1. Examine premises to understand conditions that may affect performance of work of this Division before submitting proposals for this work. Examine adjoining work on which plumbing work is dependent for efficiency and report work that requires correction.

2. Ensure that items to be furnished fit space available. Make necessary field measurements to ascertain space requirements including those for connections and furnish and install equipment of size and shape so final installation shall suit true intent and meaning of Contract Documents. If approval is received by Addendum or Change Order to use other than originally specified items, be responsible for specified capacities and for ensuring that items to be furnished will fit space available.

3. Check that slots and openings provided under other Divisions through floors, walls, ceilings, and roofs are properly located. Perform cutting and patching caused by neglecting to coordinate with Divisions providing slots and openings at no additional cost to Owner.

3.4 No subsequent allowance for time or money will be considered for any consequence related to failure to examine site conditions.

3.5 PREPARATION

A. Demolition Requirements:

B. Changes Due To Equipment Selection:

1. Where equipment specified or otherwise approved requires different arrangement or connections from that shown in Contract Documents, submit drawings showing proposed installations.

2. If proposed changes are approved, install equipment to operate properly and in harmony with intent of Contract Documents. Make incidental changes in piping, ductwork, supports, installation, wiring, heaters, panelboards, and as otherwise necessary.
3. Provide additional motors, valves, controllers, fittings, and other equipment required for proper operation of systems resulting from selection of equipment.

4. Be responsible for proper location of rough-in and connections provided under other Divisions.

### 3.6 INSTALLATION

**A. Interface With Other Work:**

1. Furnish exact location of electrical connections and complete information on motor controls to installer of electrical system.

2. Furnish sleeves, inserts, supports, and equipment that are to be installed by others in sufficient time to be incorporated into construction as work proceeds. Locate these items and confirm that they are properly installed.

3. Furnish inserts for attaching hangers that are to be cast in concrete floor construction at time floors are poured.

**B. Cut carefully to minimize necessity for repairs to previously installed or existing work. Do not cut beams, columns, or trusses.**

**C. Locating Equipment:**

1. Arrange pipes and equipment to permit ready access to valves, cocks, unions, traps, and to clear openings of doors and access panels.

2. Adjust locations of pipes, equipment, and fixtures to accommodate work to interferences anticipated and encountered.

3. Install plumbing work to permit removal of equipment and parts of equipment requiring periodic replacement or maintenance without damage to or interference with other parts of equipment or structure.

4. Determine exact route and location of each pipe before fabrication.

   **a. Right-Of-Way:**

   1) Lines that pitch shall have right-of-way over those that do not pitch. For example, plumbing drains shall normally have right-of-way.

   2) Lines whose elevations cannot be changed shall have right-of-way over lines whose elevations can be changed.

   **b. Offsets, Transitions, and Changes in Direction:**

   1) Make offsets, transitions, and changes in direction in pipes as required to maintain proper head room and pitch of sloping lines whether or not indicated on Drawings.
2) Furnish and install all traps, air vents, sanitary vents, and devices as required to effect these offsets, transitions, and changes in direction.

D. Penetration Firestops:

1. Install Penetration Firestop System appropriate for penetration at plumbing systems penetrations through walls, ceilings, roofs, and top plates of walls.

E. Sealants:

1. Seal openings through building exterior caused by penetrations of elements of plumbing systems.
2. Furnish and install acoustical sealant to seal penetrations through acoustically insulated walls and ceilings.

F. Furnish and install complete system of piping, valved as indicated or as necessary to completely control entire apparatus:

1. Pipe drawings are diagrammatic and indicate general location and connections. Piping may have to be offset, lowered, or raised as required or directed at site. This does not relieve this Division from responsibility for proper installation of plumbing systems.

2. Arrange piping to not interfere with removal of other equipment, ducts, or devices, or block access to doors, windows, or access openings:
   a. Arrange so as to facilitate removal of tube bundles.
   b. Provide accessible flanges or ground joint unions, as applicable for type of piping specified, at connections to equipment and on bypasses.
      1) Make connections of dissimilar metals with di-electric unions.
      2) Install valves and unions ahead of traps and strainers. Provide unions on both sides of traps.
   c. Do not use reducing bushings, bull head tees, close nipples, or running couplings. Street elbows are allowed only on potable water pipe 3/4 inch (19 mm) in diameter and smaller.
   d. Install piping systems so they may be easily drained
   e. Install piping to insure noiseless circulation.
   f. Place valves and specialties to permit easy operation and access. Valves shall be regulated, packed, and glands adjusted at completion of work before final acceptance.

3. Do not install piping in shear walls.

4. Cut piping accurately to measurements established at site. Remove burr and cutting slag from pipes.
5. Work piping into place without springing or forcing. Make piping connections to pumps and other equipment without strain at piping connection. Remove bolts in flanged connections or disconnect piping to demonstrate that piping has been so connected, if requested.

6. Make changes in direction with proper fittings.

7. Expansion of Thermoplastic Pipe:
   a. Provide for expansion in every 30 feet of straight run.
   b. Provide 12 inch offset below roof line in each vent line penetrating roof.

8. Expansion of PEX Pipe: Allow for expansion and contraction of PEX pipe as recommended by Pipe Manufacturer.

G. Sleeves:
   1. Do not place sleeves around soil, waste, vent, or roof drain lines passing through concrete slabs on grade (unless noted on plans).
   2. Provide sleeves around pipes passing through concrete or masonry floors, walls, partitions, or structural members. Seal sleeves with specified sealants. Follow Pipe Manufacturer’s recommendations for PEX pipe (if used) penetrations through studs and floor slabs.
   3. Sleeves through floors shall extend 1/4 inch above floor finish in mechanical equipment rooms above basement floor. In other rooms, sleeves shall be flush with floor.
   4. Sleeves through floors and foundation walls shall be watertight.

H. Escutcheons:
   1. Provide spring clamp plates where pipes run through walls, floors, or ceilings and are exposed in finished locations of building. Plates shall be chrome plated heavy brass of plain pattern and shall be set tight on pipe and to building surface.

3.7 REPAIR / RESTORATION

A. Each Section of this Division shall bear expense of cutting, patching, repairing, and replacing of work of other Sections required because of its fault, error, tardiness, or because of damage done by it:

   1. Patch and repair walls, floors, ceilings, and roofs with materials of same quality and appearance as adjacent surfaces unless otherwise shown.

   2. Surface finishes shall exactly match existing finishes of same materials.

3.8 FIELD QUALITY CONTROL

A. Field Tests:
1. Perform tests on plumbing piping systems. Furnish devices required for testing purposes.

B. Non-Conforming Work:

1. Replace material or workmanship proven defective with sound material at no additional cost to Owner.

2. Repeat tests on new material, if requested.

3.9 CLEANING

A. Remove dirt, grease, and other foreign matter from each length of piping before installation:

1. After each section of piping used for movement of water or steam is installed, flush with clean water, except where specified otherwise.

2. Arrange temporary flushing connections for each section of piping and arrange for flushing total piping system.

3. Provide temporary cross connections and water supply for flushing and drainage and remove after completion of work.

B. Clean exposed piping, equipment, and fixtures. Remove stickers from fixtures and adjust flush valves.

3.10 CLOSEOUT ACTIVITIES

A. Instruction of Owner:

1. Instruct building maintenance personnel in operation and maintenance of plumbing systems utilizing Operation And Maintenance Manual when so doing.

2. Conduct instruction period after Substantial Completion inspection when systems are properly working and before final payment is made.

3.11 PROTECTION

A. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system. Cap or plug open ends of pipes and equipment to keep dirt and other foreign materials out of system. Do not use plugs of rags, wool, cotton waste, or similar materials.

END OF SECTION
SECTION 22 05 29
HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY
A. Includes But Not Limited To:
   1. Common hanger and support requirements and procedures for plumbing systems.
B. Products Installed But Not Furnished Under This Section:
   1. Paint identification for gas piping used in HVAC equipment.

1.2 SUBMITTALS
A. Action Submittals:
   1. Product Data:
      a. Manufacturer's catalog data for each manufactured item.

PART 2 - PRODUCTS

2.1 ASSEMBLIES
A. Manufacturers:
   1. Manufacturer Contact List:
      a. Anvil International,
      b. Cooper B-Line,
      c. Unistrut, Wayne,
B. Materials:
   1. Hangers, Rods, And Inserts
      a. Galvanized and UL approved for service intended.
      b. Support horizontal piping from hangers or on roller assemblies with channel supports, except where trapeze type hangers are explicitly shown on Drawings. Hangers shall have double nuts.
         1) Support insulated pipes 2 inches in diameter and smaller with adjustable swivel ring hanger with insulation protection shield. Gauge and length of shield shall be in accordance with Anvil design data.
         2) Type Two Acceptable Products:
            (1) Swivel Ring Hanger: Anvil Fig. 69.
            (2) Insulation Protection Shield: Anvil Fig. 167.
            (3) Equals by Cooper B-Line.
      3) Support insulated pipes 2-1/2 inches in diameter and larger with clevis hanger or roller assembly with an insulation protection shield. Gauge and length of shield shall be according to Anvil design data.
         a) Type Two Acceptable Products:
(1) Clevis Hanger: Anvil Fig. 260.
(2) Roller Assembly: Anvil Fig. 171.
(3) Insulation Protection Shield: Anvil Fig. 167.
(4) Equals by Cooper B-Line.

4) Support uninsulated copper pipe 2 inches in diameter and smaller from swivel ring hanger, copper plated and otherwise fully suitable for use with copper tubing. Support non-copper uninsulated pipes from swivel ring hanger.
   a) Type Two Acceptable Products:
      (1) Swivel Ring Hanger For Copper Pipe: Anvil Fig. CT-69.
      (2) Swivel Ring Hanger For Other Pipe: Anvil Fig. 69.
      (3) Equals by Cooper B-Line.

5) Support uninsulated copper pipe 2-1/2 inches in diameter and larger from clevis hanger, copper plated hangers and otherwise fully suitable for use with copper tubing. Support non-copper uninsulated pipes from clevis hanger.
   a) Type Two Acceptable Products:
      (1) Clevis Hanger For Copper Pipe: Anvil Fig. CT-65.
      (2) Clevis Hanger For Other Pipe: Anvil Fig. 260.
      (3) Equals by Cooper B-Line.

c. Support rods for single pipe shall be in accordance with following table:

<table>
<thead>
<tr>
<th>Rod Diameter</th>
<th>Pipe Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8 inch</td>
<td>2 inches and smaller</td>
</tr>
<tr>
<td>1/2 inch</td>
<td>2-1/2 to 3-1/2 inches</td>
</tr>
<tr>
<td>5/8 inch</td>
<td>4 to 5 inches</td>
</tr>
<tr>
<td>3/4 inch</td>
<td>6 inches</td>
</tr>
<tr>
<td>7/8 inch</td>
<td>8 to 12 inches</td>
</tr>
</tbody>
</table>

d. Support rods for multiple pipe supported on steel angle trapeze hangers shall be in accordance with following table:
1) Size trapeze angles so bending stress is less than 10,000 psi

e. Riser Clamps For Vertical Piping:
   1) Type Two Acceptable Products:
      a) Anvil Fig. 261.
      b) Equals by Cooper B-Line.

f. Concrete Inserts:
   1) Individual Inserts:
      a) Suitable for special nuts size 3/8 inch through 7/8 inch with yoke to receive concrete reinforcing rods, and with malleable iron lugs for attaching to forms.
      b) Type Two Acceptable Products:
         (1) Anvil Fig. 282.
         (2) Equals by Cooper B-Line.

   2) Continuous Inserts:
      a) Class Two Quality Standard: Equal to Unistrut P-3200 series.

g. Steel Deck Bracket:
   1) Class Two Quality Standard: Equal to Unistrut P1000 with clamp nut, minimum 6 inch length.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Interface With Other Work: If project contains concrete structural system.
   1. Furnish inserts for attaching hangers that are to be cast in concrete floor construction at time floors are poured.

B. Piping:
   1. Properly support piping and make adequate provisions for expansion, contraction, slope, and anchorage.
      a. Except for underground pipe, suspend piping from roof trusses or clamp to vertical walls using Unistrut and clamps. Do not hang pipe from other pipe, equipment, or ductwork. Laying of piping on any building element is not allowed.
b. Supports For Horizontal Piping:
   1) Support metal piping at **96 inches** on center maximum for pipe **1-1/4 inches** or larger and **72 inches** on center maximum for pipe **1-1/8 inch** or less.
   2) Support thermoplastic pipe at **48 inches** on center maximum.
   3) Support PEX pipe at **32 inches** minimum on center.
   4) Provide support at each elbow. Install additional support as required.

c. Supports for Vertical Piping:
   1) Place riser clamps at each floor or ceiling level.
   2) Securely support clamps by structural members, which in turn are supported directly from building structure.
   3) Provide clamps as necessary to brace pipe to wall.

d. If Structural concrete systems are used: Install supports from inserts cast into concrete floor system, including concrete joists and floor slabs. Where inserts cannot be used, provide expansion shields and support hangers from angles held in place by expansion bolts, never directly from expansion bolt itself. Provide calculations necessary to determine number of expansion bolts required to equal capacity of cast-in-place insert.

e. Attach Unistrut to structural steel roof supporting structure. Spacing and support as described above.

f. Insulate hangers for copper pipe from piping by means of at least two layers of Scotch 33 plastic tape.

2. Gas piping Identification:
   a. Apply paint identification for gas piping used with HVAC equipment as specified in Section 23 0553.

END OF SECTION
PART1- GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:

1. Furnish and install insulation on hot and cold water lines, fittings, valves, and accessories as described in Contract Documents.

2. Furnish and install insulation on roof drain piping as described in Contract Documents.

B. Related Requirements:

1. Section 22 1116: ‘Domestic Water Piping’.

2. Section 22 1400: ‘Facility Storm Drainage’ (if provided on plans)

1.2 SUBMITTALS

A. Informational Submittals:

1. Identify thermal conductivity, thickness, and jackets (both factory and field applied, if any), for each type of product indicated.

1.3 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: As determined by testing materials identical to those specified in this Section according to ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and sealer and cement material containers with appropriate markings of applicable testing and inspecting agency.

1. Insulation Installed Indoors: Flame-spread rating of 25 or less, and smoke-developed rating of 50 or less.

2. Insulation Installed Outdoors: Flame-spread rating of 75 or less, and smoke-developed rating of 150 or less.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Ship insulation materials in containers marked by manufacturer with appropriate ASTM specification designation, type and grade, and maximum use temperature.
1.5 COORDINATION

A. Coordinate size and location of supports, hangers, and insulation shields specified Section "Hangers and Supports."

B. Coordinate clearance requirements with piping Installer for insulation application.

C. Coordinate installation and testing of steam or electric heat tracing.

1.6 SCHEDULING

A. Schedule insulation application after testing piping systems and, where required, after installing and testing heat-trace tape. Insulation application may begin on segments of piping that have satisfactory test results.

PART 2 - PRODUCTS

2.1 COMPONENTS

A. Manufacturers:

   1. Manufacturer Contact List:


<table>
<thead>
<tr>
<th>Service Water Temperature</th>
<th>Pipe Sizes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 1-1/4 In</td>
<td>1-1/2 to 2 In</td>
</tr>
<tr>
<td>170 - 180 Deg F</td>
<td>One In</td>
</tr>
<tr>
<td>140 - 160 Deg F</td>
<td>1/2 In</td>
</tr>
<tr>
<td>45 - 130 Deg F</td>
<td>1/2 In</td>
</tr>
</tbody>
</table>

j. CertainTeed Manson.

k. Knauf FiberGlass GmbH.

l. Owens-Corning Fiberglas Corp.

m. Schuller International, Inc.

n. RBX Corporation; Insul-Sheet 1800 and Insul-Tube 180.

o. Armstrong World Industries, Inc.

p. Rubatex Corp.

B. Materials:

1. Above Grade Metal Piping:
   a. Insulation For Piping:
      1) Snap-on glass fiber or melamine foam pipe insulation, or heavy density pipe insulation with factory vapor jacket.
      2) Insulation Thickness:
      3) Performance Standards: Fiberglas ASJ by Owens-Corning.
      4) Type One Acceptable Manufacturers:
         a) Childers Products.
         b) Knauf.
         c) Manson.
         d) Owens-Corning.
         e) Johns-Manville.
         f) Equal as approved by Architect before bidding. See Section 01 6200.

   b. Fitting, Valve, And Accessory Covers:
      1) PVC.
      3) Type One Acceptable Manufacturers:
         a) Knauf.
b) Speedline.

c) Johns-Manville.

d) Equal as approved by Architect before bidding. See Section 01 6200.

2. Below Grade Metal Piping:

   a. Insulation:

      1) 1/2 inch (13 mm) thick.

      2) Category Four Acceptable Products. See Section 01 6200 for definition of Categories:

         a) SS Tubolit by Armacell.

         b) ImcoLock by Imcoa.

         c) Nomalock or Therma-Cel by Nomaco.

   b. Joint Sealant:

      1) Category Four Acceptable Products. See Section 01 6200 for definition of Categories:

         a) Armacell 520.

         b) Nomaco K-Flex R-373.

3. Pex Piping, Above And Below Grade:

   a. Insulation:

      1) 1/2 inch (13 mm) thick.

      2) Category Four Acceptable Products. See Section 01 6200 for definition of Categories:

         a) SS Tubolit

         b) by Armacell.

         c) ImcoLock by Imcoa.

         d) Nomalock or Therma-Cel by Nomaco.

   b. Joint Sealant:

      1) Category Four Acceptable Products. See Section 01 6200 for definition of Categories:

         a) Armacell 520.

         b) Nomaco K-Flex R-373.
4. PP-R Piping, Above And Below Grade:
   a. Insulation:
      1) 1/2 inch (13 mm) thick.
      2) Category Four Acceptable Products. See Section 01 6200 for definition of Categories:
         a) SS Tubolit by Armacell.
         b) ImcoLock by Imcoa.
         c) Nomalock or Therma-Cel by Nomaco.
   b. Joint Sealant:
      1) Category Four Acceptable Products. See Section 01 6200 for definition of Categories:
         a) Armacell 520.
         b) Nomaco K-Flex R-373.

5. PVC or ABS Piping, Above And Below Grade - Facility Storm Drain:
   a. Insulation:
      1) 1/2 inch (13 mm) thick.
      2) Category Four Acceptable Products. See Section 01 6200 for definition of Categories:
         a) SS Tubolit by Armacell.
         b) ImcoLock by Imcoa.
         c) Nomalock or Therma-Cel by Nomaco.
   b. Joint Sealant:
      1) Category Four Acceptable Products. See Section 01 6200 for definition of Categories:
         a) Armacell 520.
         b) Nomaco K-Flex R-373.

PART 3 - EXECUTION

3.1 APPLICATION

A. Above Grade Piping:
1. Apply insulation to clean, dry piping with joints tightly butted.

2. Install insulation in manner to facilitate removal for repairs. Place sections or blocks so least possible damage to insulation will result from inspection or repairs of piping or equipment.

3. Piping up to 1-1/4 inch Diameter:
   a. Adhere ‘factory applied vapor barrier jacket lap’ smoothly and securely at longitudinal laps with white vapor barrier adhesive.
   b. Adhere 3 inch wide self-sealing butt joint strips over end joints.

4. Piping 1-1/2 inches Diameter And Larger:
   a. Use broken-joint construction in application of two-layer covering.
   b. Fill cracks and depressions with insulating cement mixed to thick plastic paste.
      1) Apply by hand in several layers to make up total specified thickness.
      2) Final layer shall have smooth uniform finish before application of covering.

5. Fittings, Valves, And Accessories:
   a. Do not apply insulation over flanged joints or victaulic couplings until piping has been brought up to operating temperature and flange bolts have been fully tightened. Insulate valves so wheel, stem, and packing nut are exposed.
   b. Insulate with same type and thickness of insulation as pipe, with ends of insulation tucked snugly into throat of fitting and edges adjacent to pipe insulation tufted and tucked in.
   c. Piping Up To 1-1/4 Inch Diameter:
      1) Cover insulation with one piece fitting cover secured by stapling or taping ends to adjacent pipe covering.
      2) Alternate Method:
         a) Insulate fittings, valves, and accessories with one inch of insulating cement and vapor seal with two 1/8 inch wet coats of vapor barrier mastic reinforced with glass fabric extending 2 inches onto adjacent insulation.
   d. Piping 1-1/2 inches To 2 Inches:
      1) Insulate with hydraulic setting insulating cement or equal, to thickness equal to adjoining pipe insulation.
      2) Apply final coat of fitting mastic over insulating cement.
   e. Piping 2-1/2 inch And Larger:
1) Insulate with segments of molded insulation securely wired in place and coated with skim coat of insulating cement.

2) Apply fitting mastic, fitting tape and finish with final coat of fitting mastic.

6. Pipe Hangers:
   a. Do not allow pipes to come in contact with hangers.
   b. Pipe Shield:
      1) Provide schedule 40 PVC by 6 inch long at each clevis and/or unistrut type hanger.
      2) Provide 16 ga by 6 inch long galvanized shields at each pipe hanger to protect pipe insulation from crushing by clevis hanger.
      3) Provide 22 ga by 6 inch long galvanized shield at each pipe hanger to protect insulation from crushing by Unistrut type hanger.
   c. At Pipe Hangers:
      1) Provide rigid calcium silicate insulation (100 psi compressive strength) at least 2 inches beyond shield.

7. Protect insulation wherever leak from valve stem or other source might drip on insulated surface, with aluminum cover or shield rolled up at edges and sufficiently large in area and of shape that dripping will not splash on surrounding insulation.

B. Below Grade Piping:
   1. Slip underground pipe insulation onto pipe and seal butt joints.
   2. Where slip-on technique is not possible, slit insulation, apply to pipe, and seal seams and joints.

3.2 EXAMINATION
   A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.
   B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 PREPARATION
   A. Surface Preparation: Clean and dry pipe and fitting surfaces. Remove materials that will adversely affect insulation application.

3.4 GENERAL APPLICATION REQUIREMENTS
   A. Apply insulation materials, accessories, and finishes according to the manufacturer's written instructions; with smooth, straight, and even surfaces; free of voids throughout the length of piping, including fittings, valves, and specialties.
B. Refer to schedules at the end of this Section for materials, forms, jackets, and thicknesses required for each piping system.

C. Use accessories compatible with insulation materials and suitable for the service. Use accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Apply insulation with longitudinal seams at top and bottom of horizontal pipe runs.

E. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.

F. Seal joints and seams with vapor-retarder mastic on insulation indicated to receive a vapor retarder.

G. Keep insulation materials dry during application and finishing.

H. Apply insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by the insulation material manufacturer.

I. Apply insulation with the least number of joints practical.

J. Apply insulation over fittings, valves, and specialties, with continuous thermal and vapor-retarder integrity, unless otherwise indicated. Refer to special instructions for applying insulation over fittings, valves, and specialties.

K. Hangers and Anchors: Where vapor retarder is indicated, seal penetrations in insulation at hangers, supports, anchors, and other projections with vapor-retarder mastic.

1. Apply insulation continuously through hangers and around anchor attachments. Insulation around hanger or pipe clamp will not be acceptable.

2. For insulation application where vapor retarders are indicated, extend insulation on anchor legs at least 12 inches (300 mm) from point of attachment to pipe and taper insulation ends. Seal tapered ends with a compound recommended by the insulation material manufacturer to maintain vapor retarder.

3. Install insert materials and apply insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by the insulation material manufacturer.

4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect the jacket from tear or puncture by the hanger, support, and shield.

L. Insulation Terminations: For insulation application where vapor retarders are indicated, taper insulation ends. Seal tapered ends with a compound recommended by the insulation material manufacturer to maintain vapor retarder.

M. Apply adhesives and mastics at the manufacturer’s recommended coverage rate.

N. Apply insulation with integral jackets as follows:

1. Pull jacket tight and smooth.
2. Circumferential Joints: Cover with 3-inch- (75-mm-) wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip and spaced 4 inches (100 mm) o.c.

3. Longitudinal Seams: Overlap jacket seams at least 1-1/2 inches (40 mm). Apply insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 4 inches (100 mm) o.c.

   a. Exception: Do not staple longitudinal laps on insulation having a vapor retarder.

4. Vapor-Retarder Mastics: Where vapor retarders are indicated, apply mastic on seams and joints and at ends adjacent to flanges, unions, valves, and fittings.

5. At penetrations in jackets for thermometers and pressure gages, fill and seal voids with vapor-retarder mastic.

O. Roof Penetrations: Apply insulation for interior applications to a point even with top of roof flashing.

   1. Seal penetrations with vapor-retarder mastic.

   2. Apply insulation for exterior applications tightly joined to interior insulation ends.

   3. Extend metal jacket of exterior insulation outside roof flashing at least 2 inches (50 mm) below top of roof flashing.

   4. Seal metal jacket to roof flashing with vapor-retarder mastic.

P. Exterior Wall Penetrations: For penetrations of below-grade exterior walls, terminate insulation flush with mechanical sleeve seal. Seal terminations with vapor-retarder mastic.

Q. Interior Wall and Partition Penetrations: Apply insulation continuously through walls and floors.

R. Fire-Rated Wall and Partition Penetrations: Apply insulation continuously through penetrations of fire-rated walls and partitions.

   1. Firestopping and fire-resistive joint sealers are specified in Section "Firestopping."

3.5 MINERAL-FIBER INSULATION APPLICATION

A. Apply insulation to straight pipes and tubes as follows:

   1. Secure each layer of preformed pipe insulation to pipe with wire, tape, or bands without deforming insulation materials.

   2. Where vapor retarders are indicated, seal longitudinal seams and end joints with vapor-retarder mastic. Apply vapor retarder to ends of insulation at intervals of 15 to 20 feet (4.5 to 6 m) to form a vapor retarder between pipe insulation segments.

   3. For insulation with factory-applied jackets, secure laps with outward clinched staples at 6 inches (150 mm) o.c.
4. For insulation with factory-applied jackets with vapor retarders, do not staple longitudinal tabs but secure tabs with additional adhesive as recommended by the insulation material manufacturer and seal with vapor-retarder mastic.

3.6 Apply insulation to flanges as follows:

1. Apply preformed pipe insulation to outer diameter of pipe flange.

2. Make width of insulation segment the same as overall width of the flange and bolts, plus twice the thickness of the pipe insulation.

3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.

4. Apply canvas jacket material with manufacturer's recommended adhesive, overlapping seams at least 1 inch (25 mm), and seal joints with vapor-retarder mastic.

B. Apply insulation to fittings and elbows as follows:

1. Apply premolded insulation sections of the same material as straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.

2. When premolded insulation elbows and fittings are not available, apply mitered sections of pipe insulation, or glass-fiber blanket insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire, tape, or bands.

3. Cover fittings with standard PVC fitting covers.

C. Apply insulation to valves and specialties as follows:

1. Apply premolded segments of cellular-glass insulation or glass-fiber blanket insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation. For check valves, arrange insulation for access to strainer basket without disturbing insulation.

2. Apply insulation to flanges as specified for flange insulation application.


4. For larger sizes where PVC fitting covers are not available, seal insulation with canvas jacket and sealing compound recommended by the insulation material manufacturer.

3.7 CLOSED-CELL PHENOLIC-FOAM INSULATION APPLICATION

A. Apply insulation to straight pipes and tubes as follows:

1. Secure each layer of insulation to pipe with wire, tape, or bands without deforming insulation materials.

2. Where vapor retarders are indicated, seal longitudinal seams and end joints with vapor-retarder mastic.
3. For insulation with factory-applied jackets, secure laps with outward clinched staples at 6 inches o.c.

4. For insulation with factory-applied jackets with vapor retarders, do not staple longitudinal tabs but secure with additional adhesive as recommended by the insulation material manufacturer and seal with vapor-retarder mastic.

B. Apply insulation to flanges as follows:

1. Apply preformed pipe insulation to outer diameter of pipe flange.

2. Make width of insulation segment the same as overall width of the flange and bolts, plus twice the thickness of the pipe insulation.

3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of block insulation of the same thickness as pipe insulation.

4. Apply canvas jacket material with manufacturer’s recommended adhesive, overlapping seams at least 1 inch (25 mm), and seal joints with vapor-retarder mastic.

C. Apply insulation to fittings and elbows as follows:

1. Apply premolded insulation sections of the same material as straight segments of pipe insulation when available. Secure according to manufacturers written instructions.

2. When premolded sections of insulation are not available, apply mitered sections of phenolic-foam insulation. Secure insulation materials with wire, tape, or bands.

3. Cover fittings with heavy PVC fitting covers. Overlap PVC covers on pipe insulation jackets at least 1 inch (25 mm) at each end. Secure fitting covers with manufacturer’s attachments and accessories. Seal seams with tape and vapor-retarder mastic.

D. Apply insulation to valves and specialties as follows:

1. Apply premolded insulation sections of the same material as straight segments of pipe insulation when available. Secure according to manufacturer’s written instructions.

2. When premolded sections of insulation are not available, apply mitered sections of phenolic-foam insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation. For check valves, arrange insulation for access to strainer basket without distributing insulation.

3. Apply insulation to flanges as specified for flange insulation application.

4. Use preformed heavy PVC fitting covers for valve sizes where available. Secure fitting covers with manufacturer’s attachments and accessories. Seal seams with tape and vapor-retarder mastic.

5. For larger sizes where PVC fitting covers are not available, seal insulation with canvas jacket and sealing compound recommended by the insulation material manufacturer.
3.8 FLEXIBLE ELASTOMERIC THERMAL INSULATION APPLICATION

A. Apply insulation to straight pipes and tubes as follows:

1. Follow manufacturer's written instructions for applying insulation.

2. Seal longitudinal seams and end joints with manufacturer's recommended adhesive. Cement to avoid openings in insulation that will allow passage of air to the pipe surface.

B. Apply insulation to flanges as follows:

1. Apply pipe insulation to outer diameter of pipe flange.

2. Make width of insulation segment the same as overall width of the flange and bolts, plus twice the thickness of the pipe insulation.

3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of the same thickness as pipe insulation.

4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive. Cement to avoid openings in insulation that will allow passage of air to the pipe surface.

C. Apply insulation to fittings and elbows as follows:

1. Apply mitered sections of pipe insulation.

2. Secure insulation materials and seal seams with manufacturer's recommended adhesive. Cement to avoid openings in insulation that will allow passage of air to the pipe surface.

D. Apply insulation to valves and specialties as follows:

1. Apply preformed valve covers manufactured of the same material as pipe insulation and attached according to the manufacturer's written instructions.

2. Apply cut segments of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation. For check valves, fabricate removable sections of insulation arranged to allow access to strainer basket.

3. Apply insulation to flanges as specified for flange insulation application.

4. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive. Cement to avoid openings in insulation that will allow passage of air to the pipe surface.

3.9 FIELD-APPLIED JACKET APPLICATION

A. Apply glass-cloth jacket, where indicated, directly over bare insulation or insulation with factory-applied jackets.

1. Apply jacket smooth and tight to surface with 2-inch (50-mm) overlap at seams and joints.

2. Embed glass cloth between two 0.062-inch- (1.6-mm-) thick coats of jacket manufacturer's recommended adhesive.
3. Completely encapsulate insulation with jacket, leaving no exposed raw insulation.

B. Foil and Paper Jackets: Apply foil and paper jackets where indicated.

1. Draw jacket material smooth and tight.
2. Apply lap or joint strips with the same material as jacket.
3. Secure jacket to insulation with manufacturer's recommended adhesive.
4. Apply jackets with 1-1/2-inch (40-mm) laps at longitudinal seams and 3-inch- (75-mm-) wide joint strips at end joints.
5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-retarder mastic.

C. Apply metal jacket where indicated, with 2-inch (50-mm) overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches (300 mm) o.c. and at end joints.

3.10 PIPING SYSTEM APPLICATIONS

A. Insulation materials and thicknesses are specified in schedules at the end of this Section.

B. Items Not Insulated: Unless otherwise indicated, do not apply insulation to the following systems, materials, and equipment:

1. Flexible connectors.
2. Fire-suppression piping.
3. Drainage piping located in crawl spaces, unless otherwise indicated.
4. Below-grade piping, unless otherwise indicated.
5. Chrome-plated pipes and fittings, unless potential for personnel injury.
6. Air chambers, unions, strainers, check valves, plug valves, and flow regulators.

3.11 INTERIOR INSULATION APPLICATION SCHEDULE

A. Service: Domestic water piping.

1. Operating Temperature: 60 to 80 deg F
2. Insulation Material: Mineral Fiber
3. Insulation Thickness: 1” thick.
5. Vapor Retarder Required: Yes.
6. Finish: None.

B. Service: Domestic hot and recirculated hot water.
1. Operating Temperature: 60 to 140 deg F (15 to 60 deg C).
2. Insulation Material: Mineral fiber
3. Insulation Thickness: 1" thick
5. Vapor Retarder Required: No
6. Finish: None.

C. Service: Condensate and equipment drain piping.
1. Operating Temperature: 40 to 60 deg F
2. Insulation Material: Flexible elastomeric, only on first ten feet of pipe from trap.
3. Insulation Thickness: 3/4”
5. Vapor Retarder Required: No.
6. Finish: Two coats of the insulation manufacturer's recommended protective coating.

D. Service: Refrigerant suction and hot-gas piping.
1. Operating Temperature: 35 to 50 deg F
2. Insulation Material: Flexible elastomeric.
3. Insulation Thickness: 1” thick.
5. Vapor Retarder Required: Yes.
6. Finish: None.

E. Service: For obtaining fire/smoke rating in return air plenum (calbes, PE, PB, PP, ABS, PVC, CPVC, etc).
1. Operating Temperature: 35 to 90 deg F
2. Insulation Material: 3M Fire Barrier Plenum Wrap 5 A or equal.
3. Insulation Thickness: larger of 1” or mfr’s recommendations.
4. Field-Applied Jacket: scrim reinforced foil
5. Vapor Retarder Required: None.
6. Finish: None.

3.12 EXTERIOR INSULATION APPLICATION SCHEDULE

A. Service: Domestic water.
   1. Operating Temperature: 60 to 140 deg F (15 to 60 deg C).
   2. Insulation Material: Mineral fiber.
   3. Insulation Thickness: Apply the following insulation thicknesses: 1”
   5. Vapor Retarder Required: Yes.
   6. Finish: None.

B. Service: Refrigerant suction.
   1. Operating Temperature: 35 to 50 deg F (2 to 10 deg C).
   2. Insulation Material: Flexible elastomeric.
   3. Insulation Thickness: Apply the following insulation thicknesses: ½”
   4. Field-Applied Jacket: Aluminum
   5. Vapor Retarder Required: Yes.
   6. Finish: None.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

B. Includes But Not Limited To:
   1. Perform excavating and backfilling required by work of this Section.
   2. Furnish and install potable water piping complete with necessary valves, connections, and accessories inside building and connect with outside utility lines 5 feet from building perimeter as described in Contract Documents.

1.2 PERFORMANCE REQUIREMENTS

B. Provide components and installation capable of producing domestic water piping systems with the following minimum working-pressure ratings, unless otherwise indicated:
   1. Domestic Water Distribution Piping: 125 psig..

1.3 SUBMITTALS

B. Action Submittals:
   1. Product Data: For pipe, tube, fittings, and couplings.
   2. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

C. Informational Submittals:
   1. Test And Evaluation Reports:
      b. Written report of sterilization test.

D. Shop Drawings:
   b. Piping Layout:
      1) Provide as-built drawings at end of project.

1.4 QUALITY ASSURANCE

B. Regulatory Agency Sustainability Approvals:
   1. Meet NSF International Standards for materials or products that come into contact with drinking water, drinking water treatment chemicals, or both for chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems.

C. Piping materials shall bear label, stamp, or other markings of specified testing agency.


E. Comply with NSF 61, "Drinking Water System Components-Health Effects; Sections 1 through 9," for potable domestic water piping and components.

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DOMESTIC WATER PIPING
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PART 2 - PRODUCTS

2.1 SYSTEMS

A. Manufacturers:
   1. Manufacturer Contact List:
      b. Aquatherm, Inc.,
      c. Cash Acme,
      d. Cla-Val Company,
      e. Conbraco Industries Inc,
      f. Hammond Valve,
      g. Handy & Harmon Products Div,
      h. Honeywell Inc,
      i. Leonard Valve Co,
      j. Milwaukee Valve Co,
      k. Nibco Inc,
      l. Rehau,
      m. Sloan Valve Co,
      n. Spence Engineering Co,
      o. Symmons Industries, Braintree,
      p. Uponor Inc,
      q. Viega ProPress, Wic
      r. Watts Regulator Co,
      s. Wilkins (Zurn Wilkins),
      t. Zurn PEX, Inc.

B. Materials:
   1. Design Criteria:
      b. All drinking water products, components, and materials above and below grade used in drinking water systems must meet NSF International Standards for Lead Free.
      c. No CPVC allowed.
   2. Pipe:
      b. Copper:
         3) Above-Grade:
            a) Meet requirements of ASTM B88, Type K & L.
            b) Hard Copper Tube: ASTM B 88, Types K and L, water tube, drawn tempered.
            c) Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.
            d) Bronze Flanges: ASME B16.24, Class 150, with solder-joint end. Furnish Class 300 flanges if required to match piping.
            e) Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces and solder-joint or threaded ends.
            f) Copper, Grooved-End Fittings: ASTM B 75 (ASTM B 75M) copper tube or ASTM B 584 bronze castings.
            g) Copper-Tubing, Keyed Couplings: Copper-tube dimensions and design similar to AWWA C606. Include ferrous housing sections, gasket suitable for hot water, and bolts and nuts.
4) Below-Grade:
   a) Meet requirements of ASTM B88, Type K. 3/4 inch minimum under slabs.
   b) 2 inches And Smaller: Annealed soft drawn.
   c) 2-1/2 inches And Larger: Hard Drawn.
5) Fittings:
   a) For Copper Pipe: Wrought copper.

3. Connections For Copper Pipe:
   b. Above-Grade:
      3) Sweat copper type with 95/5 or 96/4 Tin-Antimony solder, Bridgit solder, or Silvabrite
         100 solder. Use only lead-free solder.
   c. Below Grade:
      3) Brazed using following type rods:
         a) Copper to Copper Connections:
            2) AWS Classification BCuP-4 Copper Phosphorus (6 percent silver).
            3) AWS Classification BCuP-5 Copper Phosphorus (15 percent silver).
        4) Copper to Brass or Copper to Steel Connections: AWS Classification BAg-5 Silver (45
           percent silver).
       5) Do not use rods containing Cadmium.
       6) Brazing Flux:
          a) Approved Products:
             1) Stay-Silv white brazing flux by Harris Product Group.
             2) High quality silver solder flux by Handy & Harmon.
    7) Joints under slabs acceptable only if allowed by local codes.

4. Ball Valves:
   b. Use ball valves exclusively unless otherwise specified. Ball valves shall be by single
      manufacturer from approved list below.
   c. Valves shall be two-piece, full port for 150 psi SWP.
      3) Operate with flow in either direction, suitable for throttling and tight shut-off.
      4) Body: Bronze, 150 psig wsp at 350 deg F and 400 psig wog.
      5) Seat: Bubble tight at 100 psig under water.
   d. Class One Quality Standard: Nibco T585 or S585.
      3) Equal by Conbraco 'Apollo,' Hammond, Milwaukee, or Watts.

5. Combination Pressure Reducing Valve / Strainer:
   b. Integral stainless steel strainer, or separate "Y" strainer installed upstream of pressure
      reducing valve.
   c. Built-in thermal expansion bypass check valve.
   d. Class One Quality Standard: Watts LFU5B:
      3) Equal by Cash Acme, Cla-Val Hi Capacity, Conbraco 36C, Honeywell-Braukmann,
         Spence Hi Capacity, Watts, or Wilkins. See Section 01 6200.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Below Grade:
   1. Install piping under slabs without joints where possible.
   2. Insulate water piping buried within building perimeter.
   3. Bury water piping 6 inches minimum below bottom of slab and encase in 2 inches minimum of sand.

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B. Locate cold water lines a minimum of 6 inches from hot water line.

3.2 FIELD QUALITY CONTROL

A. Field Tests:
   1. Before pipes are covered, test systems in presence of Architect/Engineer at 125 psig hydrostatic pressure for four (4) hours and show no leaks.
   2. Disconnect equipment not suitable for 125 psig pressure from piping system during test period.

3.3 ADJUSTING

A. Adjust balancing valves in hot-water-circulation return piping to provide adequate flow.
   1. Manually adjust ball-type balancing valves in hot-water-circulation return piping to provide flow of hot water in each branch.
   2. Adjust calibrated balancing valves to flows indicated.

3.4 CLEANING

A. Clean and disinfect potable domestic water piping as follows:
   1. Purge new piping and parts of existing domestic water piping that have been altered, extended, or repaired before using.
   2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction or, if methods are not prescribed, procedures described in either AWWA C651 or AWWA C652 or as described below:
      b. Flush piping system with clean, potable water until dirty water does not appear at outlets.
      c. Fill and isolate system according to either of the following:
         3) Fill system or part thereof with water/chlorine solution with at least 50 ppm (50 mg/L) of chlorine. Isolate with valves and allow to stand for 24 hours.
         4) Fill system or part thereof with water/chlorine solution with at least 200 ppm (200 mg/L) of chlorine. Isolate and allow to stand for three hours.
      d. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
      e. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedures if biological examination shows contamination.

B. Prepare and submit reports of purging and disinfecting activities.

C. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

D. Water system will not be accepted until negative bacteriological test is made on water taken from system. Repeat dosing as necessary until such negative test is accomplished.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:

2. Washer-supply outlets.
3. Key-operation hydrants.
4. Trap seal primer valves.
5. Drain valves.
6. Miscellaneous piping specialties.
7. Sleeve penetration systems.
8. Flashing materials.

1.2 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:

1. Meet NSF International Standards for materials or products that come into contact with drinking water, drinking water treatment chemicals, or both for chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems.

PART 2 - PRODUCTS

2.1 BALANCING VALVES

A. Calibrated Balancing Valves: Adjustable, with two readout ports and memory setting indicator. Include manufacturer's standard hoses, fittings, valves, differential pressure meter, and carrying case.

B. Manufacturers:

1. Armstrong Pumps, Inc.
3. ITT Industries; Bell & Gossett Div.
4. Taco, Inc.


6. 2” and Smaller: Bronze body with brass ball, adjustment knob, calibrated nameplate, and threaded or solder-joint ends.

7. 2” and Smaller: Bronze, Y-pattern body with adjustment knob and threaded ends.

8. 2.5” and Larger: Cast-iron, Y-pattern body with bronze disc and flanged or grooved ends.

C. B. Memory-Stop Balancing Valves, NPS 2 (DN 50) and smaller: MSS SP-110, ball valve, rated for 400-psig (2760-kPa) minimum CWP. Include two-piece, copper-alloy body with full-port, chrome-plated brass ball, replaceable seats and seals, threaded or solder-joint ends, and vinyl-covered steel handle with memory-stop device.

D. Manufacturers:
   1. Conbraco Industries, Inc.
   2. Crane Co., Crane Valve Group; Crane Valves.
   4. NIBCO INC.
   5. Red-White Valve Corp.

2.2 STRAINERS

A. Strainers: Y-pattern, unless otherwise indicated, and full size of connecting piping. Include ASTM A 666, Type 304, stainless-steel screens with 3/64-inch (1.2-mm) round perforations, unless otherwise indicated.

   1. Pressure Rating: 125-psig (860-kPa) minimum steam working pressure, unless otherwise indicated.

   2. NPS 2 (DN 50) and Smaller: Bronze body, with female threaded ends.

   3. NPS 2-1/2 (DN 65) and Larger: Cast-iron body, with interior AWWA C550 or FDA-approved, epoxy coating and flanged ends.

2.3 OUTLET BOXES

A. Manufacturers:

   1. Acorn Engineering Company.

   2. Gray, Guy Manufacturing Co., Inc.


B. General: Recessed-mounting outlet boxes with supply fittings complying with ASME A112.18.1M. Include box with faceplate, services indicated for equipment connections, and wood-blocking reinforcement.
C. Clothes Washer Outlet Boxes: With hot- and cold-water hose connections, drain, and the following:

1. Box and Faceplate: [Stainless steel] [Enameled or epoxy-painted steel].
2. Shutoff Fitting: Two hose bibbs.
3. Supply Fittings: Two NPS 1/2 (DN 15) gate, globe, or ball valves and NPS 1/2 (DN 15) copper, water tubing.
4. Drain: NPS 2 (DN 50) standpipe, P-trap, and direct waste connection to drainage piping.
5. Inlet Hoses: Two ASTM D 3571, 60-inch- (1500-mm-) long, rubber household clothes washer inlet hoses with female hose-thread couplings.
6. Drain Hose: One 48-inch- (1200-mm-) long, rubber household clothes washer drain hose with hooked end.

D. Icemaker Outlet Boxes: With hose connection and the following:

1. Box and Faceplate: Stainless steel.
2. Shutoff Fitting: Hose bibb.
3. Supply Fitting: NPS 1/2 (DN 15) gate, globe, or ball valve and NPS 1/2 (DN 15) copper, water tubing.

2.4 KEY-OPERATION HYDRANTS

A. Manufacturers:

1. Josam Co.
3. Woodford Manufacturing Co.

B. General: ASME A112.21.3M, key-operation hydrant with pressure rating of 125 psig.

1. Inlet: 3/4 “ or NPS 1” threaded or solder joint.
3. Operating Keys: One with each key-operation hydrant.

C. Moderate-Climate, Concealed-Outlet Wall Hydrants: ASSE 1019, self-drainable with flush-mounting box with cover, integral nonremovable hose-connection vacuum breaker, and concealed outlet.

1. Classification: Type A, for automatic draining with hose removed or Type B, for automatic draining with hose removed or with hose attached and nozzle closed.

D. Hot and Cold, Nonfreeze Concealed-Outlet Wall Hydrants: With deep flush-mounting box with cover; hot- and cold-water casings and operating rods to match wall thickness; concealed outlet; wall clamps; and
factory- or field-installed, nonremovable and manual drain-type, hose-connection vacuum breaker complying with ASSE 1011.

2.5 ROOF HYDRANTS

A. Design Criteria:

1. Provide dual check backflow preventer.
2. Non-freeze.
3. Drain port - connect to drain

2.6 TRAP SEAL PRIMER VALVES

A. Supply-Type Trap Seal Primer Valves: ASSE 1018, water-supply-fed type, with the following characteristics:

B. Manufacturers:

1. Josam Co.
2. MIFAB Manufacturing, Inc.
3. Precision Plumbing Products, Inc.
5. 125-psig (860-kPa) minimum working pressure.
6. Bronze body with atmospheric-vented drain chamber.
7. Inlet and Outlet Connections: NPS 1/2 (DN 15) threaded, union, or solder joint.
8. Gravity Drain Outlet Connection: NPS 1/2 (DN 15) threaded or solder joint.
9. Finish: Chrome plated, or rough bronze for units used with pipe or tube that is not chrome finished.

2.7 MISCELLANEOUS PIPING SPECIALTIES

A. Water Hammer Arresters: ASSE 1010 or PDI-WH 201, metal-bellows type with pressurized metal cushioning chamber. Sizes indicated are based on ASSE 1010 or PDI-WH 201, Sizes A through F.

B. Manufacturers:

1. Josam Co.
3. Tyler Pipe; Wade Div.
C. Hose Bibbs: Bronze body with replaceable seat disc complying with ASME A112.18.1M for compression-type faucets. Include NPS 1/2 or NPS 3/4 (DN 15 or DN 20) threaded or solder-joint inlet, of design suitable for pressure of at least 125 psig (860 kPa); integral [or field-installed,] nonremovable, drainable hose-connection vacuum breaker; and garden-hose threads complying with ASME B1.20.7 on outlet.

D. Roof Flashing Assemblies: Manufactured assembly made of [4-lb/sq. ft. (20-kg/sq. m), 0.0625-inch- (1.6-mm-)] [6-lb/sq. ft. (30-kg/sq. m), 0.0938-inch- (2.4-mm-)] thick, lead flashing collar and skirt extending at least [6 inches (150 mm)] [8 inches (200 mm)] [10 inches (250 mm)] from pipe with galvanized steel boot reinforcement, and counterflash.

E. Floor-Drain Inlet Fittings: Cast iron, with threaded inlet and threaded or spigot outlet, and trap seal primer valve connection.

F. Fixed Air-Gap Fittings: Manufactured cast-iron or bronze drainage fitting with semiopen top with threads or device to secure drainage inlet piping in top and bottom spigot or threaded outlet larger than top inlet. Include design complying with ASME A112.1.2 that will provide fixed air gap between installed inlet and outlet piping.

G. Stack Flashing Fittings: Counterflash-type, cast-iron fitting, with bottom recess for terminating roof membrane, and with threaded or hub top for extending vent pipe.

H. Vent Caps: Cast-iron body with threaded or hub inlet and vandal-proof design. Include vented hood and set-screws to secure to vent pipe.

I. Vent Terminals: Commercially manufactured, shop- or field-fabricated, frost-proof assembly constructed of galvanized steel, copper, or lead-coated copper. Size to provide 1-inch (25-mm) enclosed air space between outside of pipe and inside of flashing collar extension, with counterflash.

J. Expansion Joints: ASME A112.21.2M, assembly with cast-iron body with bronze sleeve, packing gland, and packing; of size and end types corresponding to connected piping.

2.8 SLEEVE PENETRATION SYSTEMS

A. Manufacturers:
   1. ProSet Systems, Inc.

B. Description: UL 1479, through-penetration firestop assembly consisting of sleeve and stack fitting with firestopping plug.
   1. Sleeve: Molded PVC plastic, of length to match slab thickness and with integral nailing flange on one end for installation in cast-in-place concrete slabs.
   3. Special Coating: Include corrosion-resistant interior coating on fittings for plastic chemical waste and vent stacks.
2.9 FLASHING MATERIALS

A. Lead Sheet: ASTM B 749, Type L51121, copper bearing, with the following minimum weights and thicknesses, unless otherwise indicated:

1. General Use: 4-lb/sq. ft. (20-kg/sq. m), 0.0625-inch (1.6-mm) thickness.
2. Vent Pipe Flashing: 3-lb/sq. ft. (15-kg/sq. m), 0.0469-inch (1.2-mm) thickness.
3. Burning: 6-lb/sq. ft. (30-kg/sq. m), 0.0938-inch (2.4-mm) thickness.

B. Elastic Membrane Sheet: ASTM D 4068, flexible, chlorinated polyethylene, 40-mil (1.01-mm) minimum thickness.

C. Fasteners: Metal compatible with material and substrate being fastened.

D. Metal Accessories: Sheet metal strips, clamps, anchoring devices, and similar accessory units required for installation; matching or compatible with material being installed.

E. Solder: ASTM B 32, lead-free alloy.

F. Bituminous Coating: SSPC-Paint 12, solvent-type, bituminous mastic.
   1. Not required to meet NSF International Standards for Lead Free.
   2. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      1) Jay R. Smith: 5907.
      2) Prier: P-RH2.
      3) Woodford: RHY2-MS.

3. Water Hammer Arrestors:
   1. Design Criteria:
      2) Nesting type, air pre-charged bellows with casing.
      3) Bellows constructed of stabilized 18-8 stainless steel.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install pressure regulators with inlet and outlet shutoff valves and balance valve bypass. Install pressure gages on inlet and outlet.

B. Install strainers on supply side of each control valve, pressure regulator, and solenoid valve.

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C. Install trap seal primer valves with outlet piping pitched down toward drain trap a minimum of 1 percent and connect to floor-drain body, trap, or inlet fitting. Adjust valve for proper flow.

D. Install backwater valves in building drain piping. For interior installation, provide cleanout deck plate flush with floor and centered over backwater valve cover, and of adequate size to remove valve cover for servicing.

E. Install expansion joints on vertical risers, stacks, and conductors if indicated.

### 3.2 CONNECTIONS

A. Install piping adjacent to equipment to allow service and maintenance.

B. Ground equipment.

C. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

D. Connect plumbing specialties and devices that require power.

### 3.3 FLASHING INSTALLATION

A. Fabricate flashing from single piece unless large pans, sumps, or other drainage shapes are required. Join flashing according to the following if required:

   1. Lead Sheets: Burn joints of lead sheets 6-lb/sq. ft. (30-kg/sq. m), 0.0938-inch (2.4-mm) thickness or thicker. Solder joints of lead sheets 4-lb/sq. ft. (20-kg/sq. m), 0.0625-inch (1.6-mm) thickness or thinner.

B. Install sheet flashing on pipes, sleeves, and specialties passing through or embedded in floors and roofs with waterproof membrane.

   1. Pipe Flashing: Sleeve type, matching pipe size, with minimum length of 10 inches (250 mm), and skirt or flange extending at least 8 inches (200 mm) around pipe.

   2. Sleeve Flashing: Flat sheet, with skirt or flange extending at least 8 inches (200 mm) around sleeve.

   3. Embedded Specialty Flashing: Flat sheet, with skirt or flange extending at least 8 inches (200 mm) around specialty.

C. Set flashing on floors and roofs in solid coating of bituminous cement.

D. Secure flashing into sleeve and specialty clamping ring or device.

E. Install flashing for piping passing through roofs with counterflashing or commercially made flashing fittings, according to "Sheet Metal Flashing and Trim."

F. Extend flashing up vent pipe passing through roofs and turn down into pipe, or secure flashing into cast-iron sleeve having calking recess.

### 3.4 FIELD QUALITY CONTROL
A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect field-assembled trap seal primer systems and their installation, including piping and electrical connections. Report results in writing.

1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.

2. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation. Remove malfunctioning units, replace with new units, and retest.

3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:

1. Furnish and install soil, waste, and vent piping systems within building and connect with outside utility lines 5 feet out from building where applicable.

2. Perform excavation and backfill required by work of this Section.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Pre-Cover Observation.

1. Contact Architect/Engineer prior to covering any section of pipe.

2. All piping all be under pressure during observation.

1.3 REFERENCES

A. Reference Standards:

1. International Code Council:

   a. ICC IPC-2012, 'International Plumbing Code'.

1.4 PERFORMANCE REQUIREMENTS

A. Provide components and installation capable of producing piping systems with the following minimum working-pressure ratings, unless otherwise indicated:


1.5 SUBMITTALS

A. Product Data: For pipe, tube, fittings, and couplings.

B. Shop Drawings: For solvent drainage system, include plans, elevations, sections, and details.

C. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

1.6 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.
PART 2 - PRODUCTS

2.1 PVC PIPING

A. PVC Pipe: ASTM D 2665, solid-wall drain, waste, and vent.
   1. PVC Socket Fittings: ASTM D 2665, socket type, made to ASTM D 3311, drain, waste, and vent patterns.

B. PVC Special Fittings: ASTM F 409, drainage-pattern tube and tubular fittings with ends as required for application.

C. Plenum Vent Lines: In areas of building with a return air plenum.
   1. Approved Types:
      a. Service weight, single-hub or no-hub type cast iron soil pipe meeting requirements of ASTM A74.
      b. Vent lines 2-1/2 inches or smaller may be Schedule 40 galvanized steel.
      c. Joint Material:
         1) Single-Hub: Rubber gaskets meeting requirements of ASTM C564.
         2) No-Hub Pipe: Neoprene gaskets with stainless steel cinch bands.
      d. Fittings:
      e. Cast Iron Pipe: Hub and spigot, except fittings for no-hub pipe shall be no-hub, and meet requirements of ASTM A74.
         1) Joint Material: Rubber gaskets meeting requirements of ASTM C564.
         2) Galvanized Pipe: Screwed Durham tarred drainage type.

2.2 EXECUTION

2.3 PIPING INSTALLATION

A. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers.

B. Install cast-iron sleeve with water stop and mechanical sleeve seal at each service pipe penetration through foundation wall. Select number of interlocking rubber links required to make installation watertight.

C. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends. Sanitary tees and short-sweep ¼ bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical. Use long-turn, double Y-branch and 1/8- bend fittings if 2
fixture are installed back to back or side by side with common drain pipe. Straight tees, elbows, and crosses may be used on vent lines. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.

D. Lay buried building drainage piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.

E. Re-verify building drainage piping slope before covering pipe in trench if left uncovered over a 24 hour period of subjected to exterior water. If slope of piping has changed, provide new shoring material to maintain original slope after trench has been covered.

F. Install soil and waste drainage and vent piping at the code required minimum slopes, unless otherwise indicated:

G. Install engineered soil and waste drainage and vent piping systems in locations indicated and as follows:
   3. Reduced-Size Venting: Comply with standards of authorities having jurisdiction.

H. Sleeves are not required for cast-iron soil piping passing through concrete slabs-on-grade if slab is without membrane waterproofing.

I. Install PVC soil and waste drainage and vent piping according to ASTM D 2665.

J. Install underground PVC soil and waste drainage piping according to ASTM D 2321.

K. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

2.4 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.

C. Connect drainage and vent piping to the following:
   1. Plumbing Fixtures: Connect drainage piping in sizes indicated, but not smaller than required by plumbing code. Refer to Section “Plumbing Fixtures.”
   2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.
3. Plumbing Specialties: Connect drainage and vent piping in sizes indicated, but not smaller than required by plumbing code.

4. Equipment: Connect drainage piping as indicated. Provide shutoff valve, if indicated, and union for each connection. Use flanges instead of unions for connections NPS 2-1/2 (DN 65) and larger.

2.5 FIELD QUALITY CONTROL

A. Field Tests:

1. Conduct tests for leaks and defective work. Notify Architect before testing.

2. Thermoplastic Pipe System:

   a. Before backfilling and compacting of trenches, fill waste and vent system with water to roof level or 10 feet minimum, and show no leaks for two hours. Correct leaks and defective work.

   b. After backfilling and compacting of trenches is complete but before placing floor slab, re-test as specified above. Uncover pipe and correct leaks and defective work. Re-backfill and compact and re-test.

B. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.

   1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.

   2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

C. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.

D. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

E. Test sanitary drainage and vent piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:

   1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.

   2. Leave uncovered and unconcealed new, altered, extended, or replaced drainage and vent piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.

   3. Roughing-in Plumbing Test Procedure: Test drainage and vent piping, except outside leaders, on completion of roughing-in. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water (30 kPa). From 15 minutes before inspection starts to completion of inspection, water level must not drop. Inspect joints for leaks.
4. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping system equal to pressure of 1-inch wg (250 Pa). Use U-tube or manometer inserted in trap of water closet to measure this pressure. Air pressure must remain constant without introducing additional air throughout period of inspection. Inspect plumbing fixture connections for gas and water leaks.

5. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.

6. Prepare reports for tests and required corrective action.

2.6 CLEANING

A. Clean interior of piping. Remove dirt and debris as work progresses.

B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.

C. Place plugs in ends of uncompleted piping at end of day and when work stops.

END OF SECTION
SECTION 22 13 19
SANITARY WASTE PIPING SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

A. Products Furnished But Not Installed Under this Section as described in Contract Documents.
   1. Cleanouts.
   2. Floor drains.

1.2 PERFORMANCE REQUIREMENTS

A. Provide components and installation capable of producing piping systems with following minimum working-pressure ratings, unless otherwise indicated:
   2. Storm Drainage Piping: 10-foot head of water.

1.3 SUBMITTALS

A. Product Data: Include rated capacities and shipping, installed, and operating weights. Indicate materials, finishes, dimensions, required clearances, and methods of assembly of components; and piping and wiring connections for the following:
   1. Cleanouts, floor drains, and roof drains.
   2. Roof flashing assemblies.
   3. Grease interceptors (if applicable)
   4. Sleeve penetration systems.

PART 2 - PRODUCTS

2.1 SLEEVE PENETRATION SYSTEMS

A. Manufacturers:
   1. ProSet Systems, Inc.

B. Description: UL 1479, through-penetration firestop assembly consisting of sleeve and stack fitting with firestopping plug.
   1. Sleeve: Molded PVC plastic, of length to match slab thickness and with integral nailing flange on one end for installation in cast-in-place concrete slabs.

   a. Special Coating: Include corrosion-resistant interior coating on fittings for plastic chemical waste and vent stacks.

2.2 FLASHING MATERIALS

   A. Lead Sheet: ASTM B 749, Type L51121, copper bearing, with the following minimum weights and thicknesses, unless otherwise indicated:

      1. General Use: 4-lb/sq. ft. (20-kg/sq. m), 0.0625-inch (1.6-mm) thickness.
      2. Vent Pipe Flashing: 3-lb/sq. ft. (15-kg/sq. m), 0.0469-inch (1.2-mm) thickness.
      3. Burning: 6-lb/sq. ft. (30-kg/sq. m), 0.0938-inch (2.4-mm) thickness.

   B. Elastic Membrane Sheet: ASTM D 4068, flexible, chlorinated polyethylene, 40-mil (1.01-mm) minimum thickness.

   C. Fasteners: Metal compatible with material and substrate being fastened.

   D. Metal Accessories: Sheet metal strips, clamps, anchoring devices, and similar accessory units required for installation; matching or compatible with material being installed.

   E. Solder: ASTM B 32, lead-free alloy.

   F. Bituminous Coating: SSPC-Paint 12, solvent-type, bituminous mastic.

2.3 CLEANOUTS

   A. Cleanouts: Comply with [ASME A112.36.2M] [ASME A112.3.1] <Insert other>.

      1. Application: [Floor cleanout] [Wall cleanout] [For installation in exposed piping].
      2. Products:

         a. Josam Co.
         b. Mifab
         d. Tyler Pipe, Wade Div.

2.4 FLOOR DRAINS

   A. Floor Drains.

      1. Products:
a. Josam Co.
b. Mifab
d. Tyler Pipe, Wade Div.
e. Zurn Industries, Inc.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install trap seal primer valves with outlet piping pitched down toward drain trap a minimum of 1 percent and connect to floor-drain body, trap, or inlet fitting. Adjust valve for proper flow.

B. Install backwater valves in building drain piping. For interior installation, provide cleanout deck plate flush with floor and centered over backwater valve cover, and of adequate size to remove valve cover for servicing.

C. Install expansion joints on vertical risers, stacks, and conductors if indicated.

D. Install cleanouts in aboveground piping and building drain piping according to the following, unless otherwise indicated:

1. Size same as drainage piping up to NPS 4 (DN 100). Use NPS 4 (DN 100) for larger drainage piping unless larger cleanout is indicated.

2. Locate at each change in direction of piping greater than 45 degrees.

3. Locate at minimum intervals of 50 feet (15 m) for piping NPS 4 (DN 100) and smaller and 100 feet (30 m) for larger piping.

4. Locate at base of each vertical soil and waste stack.

E. Install cleanout deck plates with top flush with finished floor, for floor cleanouts for piping below floors.

F. Install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall, for cleanouts located in concealed piping.

G. Install flashing flange and clamping device with each stack and cleanout passing through floors with waterproof membrane.

H. Install vent flashing sleeves on stacks passing through roof. Secure over stack flashing according to manufacturer's written instructions.

I. Install frost-proof vent caps on each vent pipe passing through roof. Maintain 1-inch (25-mm) clearance between vent pipe and roof substrate.

J. Install floor drains at low points of surface areas to be drained. Set grates of drains flush with finished floor, unless otherwise indicated.
1. Position floor drains for easy access and maintenance.

2. Set floor drains below elevation of surrounding finished floor to allow floor drainage. Set with grates depressed according to the following drainage area radii:
   a. Radius, 30 Inches (750 mm) or Less: Equivalent to 1 percent slope, but not less than 1/4-inch (6.35-mm) total depression.
   b. Radius, 30 to 60 Inches (750 to 1500 mm): Equivalent to 1 percent slope.
   c. Radius, 60 Inches (1500 mm) or Larger: Equivalent to 1 percent slope, but not greater than 1-inch (25-mm) total depression.

3. Install floor-drain flashing collar or flange so no leakage occurs between drain and adjoining flooring. Maintain integrity of waterproof membranes where penetrated.

4. Install individual traps for floor drains connected to sanitary building drain, unless otherwise indicated.

K. Install roof drains at low points of roof areas according to roof membrane manufacturer's written installation instructions.
   1. Install roof-drain flashing collar or flange so no leakage occurs between drain and adjoining roofing. Maintain integrity of waterproof membranes where penetrated.

2. Position roof drains for easy access and maintenance.

L. Install interceptors, including trapping, venting, and flow-control fitting, according to authorities having jurisdiction and with clear space for servicing.
   1. Flush with In-Ground Installation: Set unit and extension, if required, with cover flush with finished grade.

2. Install cleanout immediately downstream from interceptors not having integral cleanout on outlet.

M. Fasten wall-hanging plumbing specialties securely to supports attached to building substrate if supports are specified and to building wall construction if no support is indicated.

N. Fasten recessed-type plumbing specialties to reinforcement built into walls.

O. Install wood-blocking reinforcement for wall-mounting and recessed-type plumbing specialties.

P. Install escutcheons at wall, floor, and ceiling penetrations in exposed finished locations and within cabinets and millwork. Use deep-pattern escutcheons if required to conceal protruding pipe fittings.

3.2 CONNECTIONS

   A. Install piping adjacent to equipment to allow service and maintenance.

   B. Ground equipment.

   C. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
D. Connect plumbing specialties and devices that require power according to Division Sections.

E. Interceptor Connections: Connect piping, flow-control fittings, and accessories.
   1. Grease Interceptors: Connect inlet and outlet to unit, and flow-control fitting and vent to unit inlet piping.

3.3 FLASHING INSTALLATION

A. Fabricate flashing from single piece unless large pans, sumps, or other drainage shapes are required. Join flashing according to the following if required:
   1. Lead Sheets: Burn joints of lead sheets 6-lb/sq. ft. (30-kg/sq. m), 0.0938-inch (2.4-mm) thickness or thicker. Solder joints of lead sheets 4-lb/sq. ft. (20-kg/sq. m), 0.0625-inch (1.6-mm) thickness or thinner.

B. Install sheet flashing on pipes, sleeves, and specialties passing through or embedded in floors and roofs with waterproof membrane.
   1. Pipe Flashing: Sleeve type, matching pipe size, with minimum length of 10 inches (250 mm), and skirt or flange extending at least 8 inches (200 mm) around pipe.
   2. Sleeve Flashing: Flat sheet, with skirt or flange extending at least 8 inches (200 mm) around sleeve.
   3. Embedded Specialty Flashing: Flat sheet, with skirt or flange extending at least 8 inches (200 mm) around specialty.

C. Set flashing on floors and roofs in solid coating of bituminous cement.

D. Secure flashing into sleeve and specialty clamping ring or device.

E. Install flashing for piping passing through roofs with counterflashing or commercially made flashing fittings.

F. Extend flashing up vent pipe passing through roofs and turn down into pipe, or secure flashing into cast-iron sleeve having calking recess.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect field-assembled trap seal primer systems and their installation, including piping and electrical connections. Report results in writing.
   1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
   2. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation. Remove malfunctioning units, replace with new units, and retest.
   3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
3.5 PROTECTION

A. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.

B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:

1. Furnish and install electric water heater as specified in Contract Documents.

B. Related Requirements:

1. Section 22 0501: 'Common Plumbing Requirements'.
2. Section 22 1116: 'Domestic Water Piping'.

1.2 REFERENCES

A. Reference Standard:

1. NSF International Standard / American National Standards Institute:
   a. NSF/ANSI 61-2012, 'Drinking Water System Components - Health Effects'.
   b. NSF/ANSI 372-2011, 'Drinking Water System Components - Lead Content'.

B. SUBMITTALS

C. Closeout Submittals:

1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
   a. Operations and Maintenance Data:
      1) Maintenance and operational instructions.
   b. Warranty Documentation:
      1) Final, executed copy of Warranty.
   c. Record Documentation:
      1) Manufacturers documentation:
         a) Manufacturer's literature or cut sheet.
1.3 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:

1. Meet NSF International Standards for materials or products that come into contact with drinking water, drinking water treatment chemicals, or both for chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems.


1.4 WARRANTY

A. Special Warranty:

1. Three-year non-prorated warranty on water heaters of 20 gallon capacity and larger.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

A. Manufacturers:

1. Manufacturer Contact List:

   a. A O Smith Water Products Co,
   b. Bradford-White Corp, Ambler,.
   c. Rheem / Ruud Water Heater Div
   d. Ruud Manufacturing Co.,
   e. State Industries Inc,

B. Materials:

1. Design Criteria:

   a. All (wetted) drinking water products, components, and materials used in drinking water systems must meet NSF International Standards for Lead Free.

   b. All water heaters require 'Tempered Water Temperature Control' (mixing valves) as specified in Section 22 1116.

2. 30 Gallon to 50 Gallon Regular Height:

   a. Glass lined storage tank pressure tested and rated for 125 psi (862 kPa) working pressure.

   b. Water heaters shall each have ASME rated temperature-pressure relief valve rated at MBH input of heater minimum set to relieve at 120 psi (827 kPa).

   c. 9 Kw.
d. **3 inches (75 mm)** minimum glass fiber or polyurethane foam insulation.

e. Complete with two stage thermostat, magnesium anode, electric sheath rod type heating element, and high limit control.

f. Heater shall be pre-wired and entire unit bear UL label.

g. Manufactures

1) American:

2) A O Smith:

3) Bradford White:

4) Rheem

5) State Industries: SB6-40.

2.2 **ACCESSORIES**

A. Anchoring Components:

1. **One inch (25 mm) by 18 ga (1.2 mm)** galvanized steel straps.

2. No. 10 by **2-1/2 inch (64 mm)** screws.

B. Thermal Expansion Absorbers:

1. Bladder type for use with potable water systems.

C. Type One Acceptable Products.


b. Equal as approved by Architect before bidding.

PART 3 - EXECUTION

3.1 **INSTALLATION**

A. Install temperature-pressure relief valve on hot water heater and pipe discharge to directly above funnel of floor drain.

3.2 **ADJUSTING**

A. Set discharge water temperature at **140 deg F (60 deg C)**. Final hot water temperature shall be **110 deg F (43 deg C)** after mixing valve. If no mixing valve set discharge temperature at **110 deg F (43 deg C)**.

END OF SECTION
SECTION 22 42 00
COMMERCIAL PLUMBING FIXTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes plumbing fixtures and related components.

1.3 DEFINITIONS

A. Accessible Fixture: Plumbing fixture that can be approached, entered, and used by people with disabilities.

B. Fitting: Device that controls flow of water into or out of plumbing fixture. Fittings specified in this Section include supplies and stops, faucets and spouts, shower heads and tub spouts, drains and tailpieces, and traps and waste pipes. Piping and general-duty valves are included where indicated.

1.4 SUBMITTALS

A. Product Data: Include selected fixture and trim, fittings, accessories, appliances, appurtenances, equipment, and supports and indicate materials and finishes, dimensions, construction details, and flow-control rates for each type of fixture indicated.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain plumbing fixtures, faucets, and other components of each category through one source from a single manufacturer.

1. Exception: If fixtures, faucets, or other components are not available from a single manufacturer, obtain similar products from other manufacturers specified for that category.


D. NSF Standard: Comply with NSF 61, "Drinking Water System Components--Health Effects," for fixture materials that will be in contact with potable water.

E. TAS: Texas Accessibility Standards.

1.6 COORDINATION

B. Fasken Community Center Pool & Amenities
City of Laredo
Trinity Engineering
12-18-2019

22 42 00
COMMERCIAL PLUMBING FIXTURES
1 of 7
A. Coordinate roughing-in and final plumbing fixture locations, and verify that fixtures can be installed to comply with original design and referenced standards.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. For fixture descriptions in other Part 2 articles where the subparagraph titles "Products," and "Manufacturers" introduce a list of manufacturers and their products or manufacturers only, the following requirements apply for product selection:

1. Products: Subject to compliance with requirements, provide one of the products specified in other Part 2 articles.

2.2 LAVATORY FAUCETS

A. Lavatory Faucet: Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture holes and outlet with spout and fixture receptor.

1. Products:
   b. Eljer.
   c. Kohler.

2.3 SINK FAUCETS

A. Sink Faucet: Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture holes and outlet with spout and fixture receptor.

1. Manufacturers:
   b. Eljer
   c. Kohler

2.4 TOILET SEATS

A. Toilet Seat: Solid plastic.

1. Manufacturers:
   a. Bemis.
   b. Beneke.
   c. Centoco.
d. Church.

2.5 PROTECTIVE SHIELDING GUARDS

A. Protective Shielding Guard, Manufactured, plastic enclosure for covering for hot- and cold-water supplies and trap and drain piping and complying with ADA requirements.

1. Manufacturers:
   a. Engineered Brass Co.
   b. Plumerex
   c. Truebro.

2.6 FIXTURE SUPPORTS

A. Water-Closet Support: Water-closet combination carrier designed for accessible and standard mounting heights. Include single or double, vertical or horizontal, hub-and-spigot or hubless waste fitting as required for piping arrangement; faceplates; couplings with gaskets; feet; and fixture bolts and hardware matching fixture. Include additional extension coupling, faceplate, and feet for installation in wide pipe space.

1. Manufacturers:
   a. Mifab
   b. Josam.
   c. Wade.
   d. Zurn

B. Urinal Support: Not required

C. Lavatory Support: Not required

D. Sink Support: Type II, sink carrier with hanger plate, bearing studs, and tie rod. Include steel uprights with feet.

1. Manufacturers:
   a. Josam.
   b. J.R. Smith
   c. Zurn.

2.7 WATER CLOSETS

A. Water Closets: Accessible, wall-hanging, back-outlet, vitreous-china fixture designed for flushometer valve operation.
1. Products:


4. TOTO USA, Inc.

B. Water Closets: Ligature Resistant Institutional Combination Lavatory/Toilet

1. Products:

   a. ACORN

   b. All others shall be submitted for pre-approval prior to bid date.

2.8 LAVATORIES, SINKS

A. Lavatories: Accessible, counter top, vitreous-china fixture.

1. Products:

   a. American Standard, Inc.

   b. Kohler Co.

   c. Toto

   d. CRANE

2.9 SINKS

A. Sinks: Commercial, counter-mounting, stainless-steel fixture.

1. Products:

   a. Elkay Manufacturing Co.

   b. Just Manufacturing Co.

2.10 SERVICE SINKS

A. Service/Mop Sinks: Floor-mounting, enameled, sink with front apron, raised back, and coated, wire rim guard.

1. Products:

   a. Commercial Enameling Co.

   b. Kohler Co.

   c. Fiat
PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in for water soil and for waste piping systems and supports to verify actual locations and sizes of piping connections and that locations and types of supports match those indicated, before plumbing fixture installation. Use manufacturer's roughing-in data if roughing-in data are not indicated.

B. Examine walls, floors, and cabinets for suitable conditions where fixtures are to be installed.

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

3.2 FIXTURE INSTALLATION

A. Assemble fixtures, trim, fittings, and other components according to manufacturers' written instructions.

B. For wall-hanging fixtures, install off-floor supports affixed to building substrate.
   1. Use carrier supports with waste fitting and seal for back-outlet fixtures.
   2. Use chair-type carrier supports with rectangular steel uprights for accessible fixtures.

C. Install back-outlet, wall-hanging fixtures onto waste fitting seals and attach to supports.

D. Install floor-mounting fixtures on closet flanges or other attachments to piping or building substrate.

E. Install wall-hanging fixtures with tubular waste piping attached to supports.

F. Install floor-mounting, back-outlet water closets attached to building floor substrate and wall bracket and onto waste fitting seals.

G. Install counter-mounting fixtures in and attached to casework.

H. Install fixtures level and plumb according to manufacturers' written instructions and roughing-in drawings.

I. Install water-supply piping with stop on each supply to each fixture to be connected to water distribution piping. Attach supplies to supports or substrate within pipe spaces behind fixtures. Install stops in locations where they can be easily reached for operation.
   1. Exception: Use ball, gate, or globe valve if stops are not specified with fixture. Refer to Division 15 Section "Valves" for general-duty valves.

J. Install trap and tubular waste piping on drain outlet of each fixture to be directly connected to sanitary drainage system.

K. Install tubular waste piping on drain outlet of each fixture to be indirectly connected to drainage system.

L. Install flushometer valves for accessible water closets and urinals with handle mounted on wide side of compartment. Install other actuators in locations that are easy for people with disabilities to reach.

M. Install toilet seats on water closets.
N. Install faucet-spout fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.

O. Install water-supply, flow-control fittings with specified flow rates in fixture supplies at stop valves.

P. Install faucet, flow-control fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.

Q. Install traps on fixture outlets.

R. Install escutcheons at piping wall ceiling penetrations in exposed, finished locations and within cabinets and millwork. Use deep-pattern escutcheons if required to conceal protruding fittings. Refer to Division 15 Section "Basic Mechanical Materials and Methods" for escutcheons.

S. Seal joints between fixtures and walls, floors, and counters using sanitary-type, one-part, mildew-resistant, silicone sealant. Match sealant color to fixture color. Refer to Division 7 Section "Joint Sealants" for sealant and installation requirements.

3.3 CONNECTIONS

A. Piping installation requirements are specified in other Division 15 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect water supplies from water distribution piping to fixtures.

C. Connect drain piping from fixtures to drainage piping.

D. Supply and Waste Connections to Plumbing Fixtures: Connect fixtures with water supplies, stops, risers, traps, and waste piping. Use size fittings required to match fixtures. Connect to plumbing piping.

E. Supply and Waste Connections to Fixtures and Equipment Specified in Other Sections: Connect fixtures and equipment with water supplies, stops, risers, traps, and waste piping specified. Use size fittings required to match fixtures and equipment. Connect to plumbing piping.

F. Ground equipment.

1. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.4 FIELD QUALITY CONTROL

A. Verify that installed fixtures are categories and types specified for locations where installed.

B. Check that fixtures are complete with trim, faucets, fittings, and other specified components.

C. Inspect installed fixtures for damage. Replace damaged fixtures and components.

D. Test installed fixtures after water systems are pressurized for proper operation. Replace malfunctioning fixtures and components, then retest. Repeat procedure until units operate properly.
3.5 ADJUSTING

A. Operate and adjust faucets and controls. Replace damaged and malfunctioning fixtures, fittings, and controls.

B. Adjust water pressure at faucets, shower valves, and flushometer valves to produce proper flow and stream.

C. Replace washers and seals of leaking and dripping faucets and stops.

3.6 CLEANING

A. Clean fixtures, faucets, and other fittings with manufacturers’ recommended cleaning methods and materials. Do the following:

   1. Remove faucet spouts and strainers, remove sediment and debris, and reinstall strainers and spouts.

   2. Remove sediment and debris from drains.

3.7 PROTECTION

A. Provide protective covering for installed fixtures and fittings.

B. Do not allow use of fixtures for temporary facilities unless approved in writing by Owner.

END OF SECTION
SECTION 26 00 00
ELECTRICAL

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. The following Summary of Work is intended as an aid to achieve an understanding of the various
elements of work included in the project, as is not intended to be all-inclusive. Detailed
descriptions of work and requirements are given in drawings and specifications.
B. General Scope of Work:
   1. Providing new panels, feeders, conduits, disconnect, fire alarm, rough-in for telephone and
data system, and new light fixtures.

1.4 COORDINATION

A. All electrical work shall be done under sub-contract to a General Contractor. Electrical
Contractor shall coordinate all work through General Contractor, even in areas where only
electrical work is to take place.
B. Work shall take place with minimal disruption to Owner's operations in areas surrounding the
new building.
C. Cooperate fully with other contractors so that work under those contracts may be carried out
smoothly, without interfering with or delaying work under this Contract.
D. Fully coordinate with mechanical contractor for providing power to mechanical equipment.

1.5 UTILITIES

1. Coordinate with power company and provide conduit, and trenching from transformer to
power source. Coordinate with water, telephone, cable and gas utilities to locate all utilities
prior to digging in any area.
2. Obtain any approvals required from utilities to relocate utilities.
3. Cost of relocating or bypassing utilities indicated on drawings shall be included in Base
Bid.

1.6 CONTRACTOR USE OF PREMISES

A. Use of the Site: Limit use of the premises to work in areas indicated. Confine operations to areas
within contract limits indicated. Do not disturb portions of the site beyond the areas in which the
Work is indicated.

1. Driveways and Entrances: Keep driveways and entrances serving the premises, clear and
available to the Owner, the Owner's employees, and emergency vehicles at all time. Do not
use these areas for parking or storage of materials. Schedule deliveries to minimize space
and time requirements for storage of materials and equipment on-site.

B. Site Safety: Take every precaution to ensure the site does not present a threat to the safety of
occupants and/or workers. Minimal safety requirements include, but are not limited to the
following:
1. Temporary fencing around construction areas.
2. Yellow caution tape and construction barricades along open trenches during the day. Trenches shall be covered at night and warning lights provided on construction barricades.
3. Temporary fencing around equipment while site work is in progress.

1.7 SUBMITTALS
1. To extradite the submittal process more efficiently, do not piece-meal the submittals. Submit entire electrical in a bound enclosure. This will eliminate delays in the submittal process. Unbound submittals shall be returned without review. Submit 10 copies minimum.

END OF SECTION
PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

A. The General Provisions, Supplemental General Provisions, Special Provisions, Specification Sections and all relevant documents shall form a part of this Section of the Specifications, and shall be incorporated in this Section and each Section 260000 hereinafter as if repeated verbatim herein. All conditions imposed by these documents shall be applicable to all portions of the work under this Section. Certain specific paragraphs of said references may be referred to hereinafter in this Section. These references are intended to point out specific items to the Contractor, but in no way relieve him of the responsibility of reading and complying with all relevant parts of the entire Specification.

B. The Contractor shall examine and coordinate with all Contract Drawings and Specifications, and all Addenda issued. Failure to comply shall not relieve him of responsibility. The omission of details of other portions of the work from this Section shall not be used as a basis for a request for additional compensation.

C. The specific features and details for other portions of the work related to the construction in progress or to the adjacent building shall be determined by examination at the site.

1.2 SCOPE OF WORK

A. The requirements contained in this Section apply to all work performed under these Specifications.

B. The work covered by this Section of the Specifications comprises the furnishing of labor, material, equipment, transportation, tools and services, and performing operations required for, and reasonably incidental to, the installation of the work in accordance with the applicable Contract Documents, and subject to the terms and conditions of the Contract.

C. Refer to other Sections of the Specifications for related work.

1.3 DEFINITION OF "CONTRACTOR"

A. Where the word "Contractor" is used under any Section of this Section of the Specifications, it shall mean the Contractor engaged to execute the work included under that Section, even though this Contractor may be technically described as a Subcontractor, or an authorized representative.

B. If the Contractor, engaged to execute a portion of the work, employs a Subcontractor to perform some of that work, he shall be completely responsible for the proper execution of this Subcontractor’s work, in full conformity with the Contract Documents.

1.4 RESPONSIBILITY OF THE CONTRACTOR
A. The Contractor shall be responsible for all work of every description in connection with this Section of the Specifications. The Contractor shall specifically and distinctly assume, and does so assume, all risk for damage or injury from whatever cause to property or person used or employed on or in connection with this work and of all damages or injury to any person or property wherever located, resulting from an action or operation under the Contract in connection with the work, and undertake the responsibility to defend the Owner against all claims on account of any such damage or injury.

B. The Contractor will be held responsible for the satisfactory execution and completion of the work in accordance with the true intent of the Contract Documents. The Contractor shall provide without extra charge all incidental items required as part of the work, even though it may not be specifically indicated. If the Contractor has reason for objecting to the use of any material, equipment, device or method of construction as indicated, the Contractor shall make report of such objections to the Owner's Representative, obtain proper approval and adjustment to the Contract, and shall proceed with the work.

1.5 TERMINOLOGY

A. Whenever the words “furnish”, “provide”, “furnish and install”, “provide and install”, and similar phrases occur, it is the intent that the materials, equipment and devices described be furnished, installed and connected under this Section, complete for operation, unless specifically noted to the contrary.

B. It is also the intent, unless specifically noted to the contrary, that all materials, equipment and devices described and specified under this Section of the Specifications be similarly furnished, installed and connected under this Section, whether or not a phrase as described in the preceding paragraph has been actually included.

C. Whenever the words “Owner’s Representative” occurs, it is intended to refer to the Architect, Engineer and/or specific Owner’s Representative responsible for or capable of providing the necessary direction pertaining to the referenced issue.

1.6 ORDINANCES, PERMITS AND CODES

A. It shall be the Contractor’s duty to perform the work and provide the materials covered by these specifications in conformance with all ordinances and regulations of all authorities having jurisdiction.

B. All work herein shall conform to all applicable laws, ordinances and regulations of the local utility companies.

C. The Contractor shall obtain and pay for all permit and connection fees as required for the complete installation of the specified systems, equipment, devices and materials.

D. The Contractor shall obtain permits, plan checks, inspections and approvals applicable to the work as required by the regulatory authorities. Fees and costs of any nature whatsoever incidental to these permits, inspections and approvals shall be assumed and paid by the Contractor. The pro-rata costs, if any, for utilities serving this property will be paid for by the Owner and shall not be included as part of this Contract.

E. The work shall be in accordance with, but shall not be limited to, the requirements of:

1. National Fire Protection Association

B. Fasken Community Center Pool & Amenities
City of Laredo
Trinity Engineering
12-18-2019
2 National Electrical Code  
3 National Safety Code  
4 State of Texas Safety Code  
5 Local City Building Codes  
6 State of Texas Building Codes  

F. Codes and standards referred to are minimum standards. Where the requirements of the Drawings or Specifications exceed those of the codes and regulations, the Drawings and Specifications govern.

1.7 MATERIALS, EQUIPMENT AND DEVICE DESCRIPTION

A. Materials, equipment and devices shall be of the best quality customarily applied in quality commercial practice, and shall be the products of reputable manufacturers. Each major component shall bear a nameplate giving the name and address of the manufacturer, and the catalog number or designation of the component.

B. Materials, equipment and devices furnished under this Section of the Specifications shall be essentially the standard product of the specified manufacturer, or where allowed, an alternate manufacturer. Where two or more units of the same kind or class of a specific item are required, these shall be the products of a single manufacturer; however, the component parts of the item need not be the products of one manufacturer.

C. In describing the various materials, equipment and devices, in general each item will be described singularly, even though there may be a multiplicity of identical items. Also, where the description is only general in nature, exact sizes, duties, space arrangements, horsepower requirements and other data shall be determined by reference to the Contract Documents.

D. Space allocations for materials, equipment and devices have been made on the basis of present and known future requirements and the dimensions of items of equipment or devices of a particular manufacturer whether indicated or not. The Contractor shall verify that all materials, equipment and devices proposed for use on this project are within the constraints of the allocated space.

1.8 QUALITY ASSURANCE

A. Materials, equipment and devices shall be new and of the quality specified, and shall be free from defects at the time of installation. Materials, equipment and devices damaged in shipment or otherwise damaged or found defective prior to acceptance by the Owner shall not be repaired at the job site, but shall be replaced with new materials, equipment or devices identical with those damaged, unless specifically approved otherwise by the Owner's Representative.

B. Wherever a UL standard has been established for a particular type of material, equipment or device, each item of such material, equipment or device provided on this project shall meet the requirements of the UL standard in every way, and shall be UL listed and labeled.

1.9 REFERENCE STANDARDS

A. Materials, equipment, devices and workmanship shall comply with applicable local, county, state and national codes, laws and ordinances, utility company regulations and industry standards.
B. In case of differences between building codes, state laws, local ordinances, industry standards, utility company regulations and the Contract Documents, the most stringent shall govern. The Contractor shall promptly notify the Owner's Representative in writing of any such difference. Should the Contractor perform any work that does not comply with local codes, laws and ordinances, industry standards or other governing regulations, the work shall be corrected of noncompliance deficiencies with the Contractor bearing all costs.

C. In addition to the aforementioned ordinances, industry standards published by the following organizations shall apply:

- AABM - American Association of Battery Manufacturers
- ADA - American’s with Disabilities Act
- AIA - American Institute of Architects
- ANSI - American National Standards Institute
- ASTM - American Society for Testing and Materials
- CBM - Certified Ballast Manufacturers Association
- ETL - Electrical Testing Laboratories
- FM - Factory Mutual
- ICEA - Insulated Cable Engineers Associated
- IEEE - Institute of Electrical and Electronic Engineers
- IES - Illuminating Engineering Society
- IRI - Industrial Risk Insurance
- NBS - National Bureau of Standards
- NEC - National Electrical Code
- NECA - National Electrical Contractors Association
- NEMA - National Electrical Manufacturers Association
- NESC - National Electrical Safety Code
- NETA - National Electrical Testing Association
- NFPA - National Fire Protection Association
- UL - Underwriters Laboratories

1.10 DRAWINGS AND SPECIFICATIONS

A. The interrelation of the Drawings (including the schedules) and the Specifications are as follows:

1. The Drawings establish quantities, locations, dimensions and details of materials, equipment and devices. The schedules on the Drawings indicate the capacities, characteristics and components.

2. The Specifications provide written requirements for the quality, standard and nature of the materials, equipment, devices and construction systems.

B. The Drawings and Specifications shall be considered as being compatible; therefore, the work called for by one and not by the other shall be furnished and installed as though called for by both. Resolution of conflicts between Drawings and Specifications shall be as follows:

1. If the Drawings and Specifications disagree in themselves, or with each other, the
Contractor's pricing shall be based on furnishing and installing the most expensive combination of quality and quantity of work indicated for a complete operable system. Contractor is responsible to notifying the Architect and Engineer. In the event of this type of disagreement, the resolution shall be determined by the Owner's Representative. The contractor shall assume for an operable system at the most expensive combination as per the latest National Electrical Code. The contractor shall review all drawings and specifications prior to bid date.

2 The Contractor shall be responsible for bringing any conflicts in the Drawings and the Specifications to the attention of the Owner's Representative immediately, prior to bid date.

3 In general, if there is conflict between the Drawings and Specifications, the Drawings shall govern the Specifications.

4 Where the Specifications do not fully agree with schedules on the Drawings, the schedules shall govern. Actual numerical dimensions indicated on the Drawings govern scale measurements and large scale details govern small scale drawings.

5 Materials, equipment and devices called for on the Drawings and not indicated herein, shall be completely provided and installed as though it were fully described herein.

6 Materials, equipment and devices called for herein shall be completely provided and installed, whether or not it is fully detailed, scheduled or indicated on the Drawings.

C. The Contractor shall examine the Drawings and Specifications of the other portions of the work for fixtures and finishes in connection with this work. The Contractor shall carefully examine the Drawings to determine the general construction conditions, and shall familiarize himself with all limitations caused by such conditions.

D. When discrepancies exist between scale and dimension, or between the Drawings of the various portions of the work, they shall be called to the attention of the Owner's Representative for further instruction, whose instructions shall be final and binding and work promptly resumed without any additional cost to the Owner.

E. Review the construction details of the building(s) as illustrated on the Drawings of the other portions of the work, i.e., architectural, structural, civil, landscape, etc., and be guided thereby. Route conduits and set all boxes as required by the pace of the general construction.

F. The Drawings diagrammatically show the sizes and locations of the various equipment and devices, and the sizes of the major interconnecting wires, without showing exact details as to elevations, offsets, control wiring and other installation requirements. Carefully layout the work at the site to conform to the architectural and structural conditions, to avoid obstructions and to permit proper grading of pipe associated with other portions of the work. In cooperation with other Contractors, determine the exact location of equipment and devices and connections thereto by reference to the submittals and rough-in drawings, and by measurements at the site. Make minor relocations necessitated by the conditions at the site, or directed by the Owner's Representative, without additional cost to the Owner.

G. The Drawings and Specifications are intended to describe and illustrate systems which will not interfere with the structure of the building(s), fit into the available spaces, and insure complete and satisfactory operating installations. Prepare installation drawings as required for all critical areas illustrating the installation of the work in this Section as related to the work of all other Sections and correct all interferences with the other portions of the work or with the building structures before the work proceeds.

H. The Drawings do not indicate the existing electrical installations other than to identify modifications or extensions thereto. Visit the site and ascertain the conditions to be met and the
work to be accomplished in removing and modifying the existing work, and in installing the new
work. Failure to comply with this shall not constitute grounds for any additional payment in
connection with removing or modifying any part of the existing installation or installing any new
or temporary work under this Section.

1.11 SUBMITTALS

A. Submit product data and shop drawings in accordance with the Specifications.
B. Process product data and shop drawings to insure that the proposed materials, equipment and
devices conform to the requirements of the Contract Documents, and that there are no
omissions or duplications. Provide layouts, fabrication information and data for systems,
materials, equipment and devices proposed for the project.
C. Submittals shall be provided for review and approval on all systems, equipment, devices and
materials proposed for use on this project. Submittals shall include, but not be limited to, the
following:
1. Lighting and Appliance Panelboards
2. Disconnect Switches
3. Circuit Breakers and Fuses
4. Materials: conduit, conductors, connectors, supports, etc.
5. Lighting Fixtures, Lamps and Control Systems/Devices
6. Wiring Devices
7. Transformers
8. Distribution Panelboards
9. Motor Control Center
10. As indicated on each submittal section
D. The product data shall not consist of manufacturer's catalogs or cut sheets that contain no
indication of the exact item offered. The submission on individual items shall designate the
exact item offered.
E. Do not submit detailed quantitative listings of materials, equipment and devices. It is the
Contractor's responsibility to provide proper sizes and quantities to conform to Contract
Documents.
F. Assemble submittals on related items procured from a single manufacturer in bound brochures
or other suitable package form, rather than submitting a multiplicity of loose sheets.
G. Prepare shop drawings whenever equipment proposed varies in physical size and arrangement
from that indicated thus causing rearrangement of equipment space, where tight spaces require
extreme coordination between this work and other work, where called for elsewhere in these
Specifications and where specifically requested by the Owner's Representative. Shop drawings
shall be prepared at a scale of not less than 1/4 inch equals 1 foot.
H. The Contractor shall sign the submittal as an indication of compliance with the Contract
Documents. If there are any deviations from the Contract Documents, he shall so indicate on
the submittal. Any deviations not so indicated shall be cause for rejection and removal of the
non-complying equipment at the Contractor's expense.

1.12 SUBSTITUTIONS
A. Where a single manufacturer is mentioned by trade name or manufacturer's name, unless specifically noted otherwise, it is the only manufacturer that will be accepted.

B. Where multiple manufacturers are listed, none other than those manufacturers will be accepted.

C. Manufacturers not listed will be considered for substitution prior to bid only. The substitute manufacturer shall submit a complete copy of the appropriate technical specification section minimum seven (7) business days prior to bid with each sub-paragraph noted with the comment, "compliance", "deviation", "alternate" or "not applicable". In the case of non-primary, vendor-supplied items, the name of the sub-vendor supplying said item, including model number, shall be indicated.

   1. By noting the term "compliance" or "C", it shall be understood that the manufacturer is in full compliance with the item specified and will provide exactly the same with no deviations.

   2. By noting the term "deviation" or "D", it shall be understood that the manufacturer prefers to provide a different component in lieu of that specified. Manufacturer shall indicate all deviations.

   3. By noting the term "alternate" or "A", it shall be understood that the manufacturer proposes to provide the same operating function but prefers to do it in a different manner. An alternate shall be fully described as to what the manufacturer proposes to provide.

   4. By noting the term "not applicable" or "N/A", it shall be understood that the specified item is not applicable to the project.

D. It shall be understood that space allocations have been made on the basis of present and known future requirements and the dimensions of items of equipment or devices of a particular manufacturer whether indicated or not. If any item of equipment or device is offered in substitution which differs substantially in dimension or configuration from that indicated on the Drawings or specifications, provide as part of the submittal 1/4 inch equals 1 foot scaled drawings showing that the substitute can be installed in the space available without interfering with other portions of the work or with access for operations and maintenance in the completed project.

E. Where substitute equipment or devices requiring different arrangement or connections from that indicated is accepted by the Owner's Representative, install the equipment or devices to operate properly and in harmony with the intent of the Contract Documents, making all incidental changes in piping, ductwork or wiring resulting from the equipment or device selection without any additional cost to the Owner. The Contractor shall pay all additional costs incurred by other portions of the work in connection with the substituted equipment or device.

F. The Owner's Representative reserves the right to call for samples of any item of material, equipment or device offered in substitution, together with a sample of the specific item when, in their opinion, the quality of the item and/or the appearance is involved, and it is deemed that an evaluation of the item may be better made by visual inspection.

G. When any request for a substitution of material, equipment or device is submitted and rejected, the item named in the Contract Documents shall be furnished. Repetitive submittal of substitutions for the same item will not be considered.

1.13 INSTALLATION DRAWINGS

A. Prepare installation drawings for coordinating the work of this Section with the work of other Sections, to illustrate its concealment in finished spaces, to avoid obstructions, and to
demonstrate the adaptability of any item of material, equipment or device in the space upon which the Contract Documents are based.

B. Use these drawings in the field for the actual installation of this work. Provide three (3) copies, not for approval, to the Owner's Representative for his information, review and record.

1.14 WORKMANSHIP AND INSTALLATION

A. In no case shall the Contractor provide a class of material, equipment, device or workmanship less than that required by the Contract Documents or applicable codes, regulations, ordinances or standards. All modifications which may be required by a local authority having legal jurisdiction over all or any part of the work shall be made by the Contractor without any additional charge. In all cases where such authority requires deviations from the requirements of the Drawings or Specifications, the Contractor shall report same to the Owner's Representative and shall secure his approval before the work is started.

B. The work shall be performed by properly licensed technicians skilled in their respective trades. All materials, equipment and devices shall be installed in accordance with the recommendations of the manufacturer and in the best standard practice to bring about results of a first class condition.

C. The NECA "Standards of Installation" as published by the National Electrical Contractors Association shall be considered a part of these Specifications, except as specifically modified by other provisions contained in these Specifications.

1.15 INSPECTION OF SITE

A. The accompanying drawings do not indicate existing installations other than to identify modifications of and extensions thereto. The Contractor shall visit the site, inspect the installations and ascertain the conditions to be met and the work to be performed. Failure to comply with this shall not constitute ground for any additional payments in connection with removing or modifying any part of the existing installations and/or installing any new work under this Section.

B. Review construction details of the adjacent building presently under construction during the site inspection and include all work required to modify the existing installations and install new materials, comprising a part of the installation. Review all construction details of the new building as illustrated on the drawings and be guided thereby.

1.16 WARRANTY

A. All materials, equipment, devices and workmanship shall be warranted for a period of one year from the date of acceptance by the Owner's Representative for beneficial use by the Owner, except that where specific equipment is noted to have extended warranties. The warranty shall be in accordance with AIA Document A201. The Contractor shall be responsible for the proper registration of these warranties so that the Owner can make all proper claims should future need develop.

B. The Contractor shall furnish to the Owner's Representative for transmittal to the Owner, the name, address and telephone number of those persons responsible for service on systems and equipment covered by the warranty.
1.17 OPERATION PRIOR TO ACCEPTANCE

A. When any equipment is operable, and it is to the advantage of the Contractor to operate the equipment, the Contractor may do so provided that he properly supervises the operation, and retains full responsibility for the equipment operated. Regardless of whether or not the equipment has or has not been operated, the Contractor shall clean the equipment properly, make required adjustments and complete punch list items before final acceptance by the Owner.

1.18 INSTRUCTION OF OWNER’S PERSONNEL

A. Provide the services of competent engineers and/or technicians acceptable to the Owner’s Representative to instruct other representatives of the Owner in the complete and detailed operation of each item of equipment or device of all the various electrical systems. These instructions shall be provided for whatever periods may be necessary to accomplish the desired results. Upon completion of these instructions, the Contractor shall obtain a letter of release, acknowledged by the Owner or his authorized representative, stating the dates on which the various kinds of instruction were given, and the personnel to whom the instructions were given.

B. The Contractor shall be fully responsible for proper maintenance of equipment and systems until the instructions have been given to the Owner's personnel and the letter of release acknowledged.

C. In providing the instructions to the Owner’s personnel, the written operating and maintenance manuals shall be followed in all instances, and the Owner's personnel shall be familiarized with such manuals. Operating and maintenance manuals used for instructions shall include wiring diagrams, manufacturer’s operating and maintenance instructions, parts lists (with sources identified), and other data as appropriate for each system.

1.19 SCHEDULE AND SEQUENCE OF WORK

A. The Contractor shall meet and cooperate with the Owner and Owner's Representative to schedule and sequence this work so as to insure meeting scheduled completion dates and avoid delaying other portions of the work. Work requiring special sequencing shall be at no additional cost to the Owner and shall have no impact on the schedule.

1.20 INSTALLATION INSPECTIONS AND CERTIFICATIONS

A. Obtain timely inspections of the installation by the regulatory authorities. Remedy any deficiencies to the satisfaction of the inspecting official.

B. Upon final completion of the work, obtain certificates of acceptance from the regulatory authorities. Deliver the certificates to the Owner's Representative for transmission to the Owner.

1.21 EQUIPMENT INSTALLATION

A. Install equipment and devices in a manner to permit access to all surfaces or components, requiring such access, without the need to disassemble other unrelated parts of the work.

B. Equipment specified to be factory assembled and tested prior to shipment shall not be
disassembled at the job site and reassembled at its final location. Apparatus not so specified may be disassembled and reassembled in the proper location.

C. Furnish all scaffolding, rigging and hoisting required for the installation of all the work.

1.22 CONCRETE HOUSEKEEPING PADS

A. Concrete housekeeping pads shall be provided for all floor mounted equipment, unless noted or required otherwise.
B. All pads shall be not less than 3-1/2" high and extend a maximum 3" beyond the actual equipment size. Coordinate the proper size of the pad with the equipment furnished. Pads shall be poured in forms built of new dressed lumber with corners chamfered using sheet metal or triangular wood strips nailed to the form. Use 6 x 6 No. 3 mesh for reinforcing. Install heavy duty adjustable anchor bolts, set in the form and positioned using templates, prior to pouring concrete. After the equipment is set on the pad, the equipment shall be aligned, leveled and fully grouted to the pad and all void spaces shall be filled with a non-shrinking grout.
C. Perform all concrete work specified to be provided under this Section in strict accordance with the applicable provisions of Section, CONCRETE.

1.23 SLEEVES

A. Each conduit, regardless of material, which passes through a concrete slab, masonry wall, or roof or portion of the building structure shall be free from the structure and shall pass through a sleeve.
B. All sleeves shall be constructed from electrical-metallic tubing or equivalent weight galvanized steel tubing and shall be flush on both sides of the surface penetrated, unless noted otherwise. All sleeves penetrating the roof areas shall extend a minimum 10 inches above the roof with approved weatherproof counter flashing attached to the conduit above the roof. All sleeves penetrating floors shall extend a minimum of 6 inches above the finished floors. The sleeves shall be sized to allow free passage of the conduit to be inserted.
C. Sleeves passing through walls or floors on or below grade or in moist areas shall be constructed of galvanized rigid steel and shall be designed with a suitable flange in the center to form a waterproof passage. After the conduit has been installed in the sleeves, the void space around the conduit shall be caulked and filled with an asphalt-base compound to insure a waterproof penetration. Jute twine caulking shall not be used due to susceptibility to termite infestation.

1.24 ESCUTCHEONS

A. In each finished space, provided a chromium plated, sectional escutcheon on each conduit, or hanger rod penetrating a wall, floor or ceiling.
B. Size escutcheons and collars to fit snugly around conduit and rods.
C. Where required, provide escutcheons with set screws so that they fit snugly against the finished surface.

1.25 ACCESS PANELS
A. Provide wall and ceiling access panels for unrestricted access to all concealed electrical equipment items and devices installed behind furrings, chases or non-removable suspended ceilings.

B. Access panels shall be UL listed and labeled as required to suit the fire rating of the surface in which installed, with mounting straps, concealed hinges, screwdriver locks, 180 degree open door design, 16 gauge steel construction and door and frame finished in prime coat finish. Panels shall be 12-inch by 12-inch minimum size, but shall be larger as the access requirement of the concealed electrical equipment item or device increases.

### 1.26 Sealing of Penetrations

A. All penetrations in horizontal or vertical fire-rated construction shall be sealed using approved fire-rated sealing materials equivalent to the following:

1. Foam: Dow Corning 3-6548 RTV silicone foam, liquid component Part 4 (black) and liquid component Part B (off-white).
2. Sealant: Dow Corning 96-081 RTV silicone adhesive sealant.
3. Damming Materials: Mineral fiberboard, mineral fiber matting, mineral fiber putty, plywood or particle board, as selected by applicator.

B. Preparation: Remove combustible materials and loose impediments from penetration opening and involved surfaces. Remove free liquid and oil from penetration surfaces.

C. Installation: In accordance with manufacturer's instructions, install damming materials and sealant to cover and seal penetration openings; inject foam mixtures into openings.

D. In addition to the Dow Corning products, equal products by Spec Seal Firestop Products, 3M Fire Barrier or CS240 Firestop are acceptable.

### 1.27 Protection of Apparatus

A. At all times take every precaution to properly protect apparatus from damage due to dust, dirt, water, etc. or from damage due to physical forces. Include the erection of temporary shelters as required, to adequately protect any apparatus stored at the site, the cribbing of any apparatus directly above the construction, and the covering of apparatus in the incomplete building with tarpaulins or other protective covering. Failure on the part of the Contractor to comply with the above to the entire satisfaction of the Owner's Representative will be sufficient cause for the rejection of the pieces of apparatus in question.

B. Responsibility for the protection of apparatus extend also to existing apparatus involved in this Section of the work, whether such apparatus is designated to be used temporarily and later removed, or is to be reused as a part of the permanent installation. Erect temporary sheltering structures, provide temporary bracing and supports, or cover equipment as required or directed to afford proper protection for that equipment.

C. The Contractor shall protect this work and the work of all other Contractors from damage by his work or workmen and shall make good any damage thus caused. He shall also be responsible for the proper protection of his equipment, machinery, materials and accessories delivered and installed on the job.

### 1.28 Installation of Control and Operating Devices

B. Fasken Community Center Pool & Amenities

City of Laredo

Trinity Engineering

12-18-2019
A. The highest operable part of controls (light switches, dimmer switches, emergency power off devices, etc.), receptacles (electrical and communications) and other operable devices shall be 48" above finish floor. The lowest operable part shall be no less than 15" above finished floor. For purposes of uniformity, unless noted otherwise, the top of a device shall be maximum 48" AFF and the bottom of a device shall be minimum 15" AFF. Refer to the electrical symbols list on the Drawings for specific requirements.

B. Visual alarm appliances shall be placed 80" above finished floor (the highest floor level within a space) or 6" below the ceiling, whichever is lower.

1.29 INSTALLATION AND CONNECTION OF OTHER SECTION'S EQUIPMENT
A. Verify the electrical requirements of all equipment furnished under other Sections, separate contracts, or by the Owner. Install conduit, power wiring, control wiring, devices, etc. as required for complete operation of all equipment.

1.30 OPTION TO RELOCATE OUTLETS AND RELATED DEVICES
A. The location of power, data and telephone outlets, wall switches and other related devices may be relocated at the Owner's option, at no additional cost to the Owner, to a point within 10 feet of their present location provided the Contractor is notified prior to installation.

1.31 COOPERATION AND CLEAN-UP
A. It shall be the responsibility of the Contractor to cooperate fully to keep the job site in a clean and safe condition. Upon the Contractor shall immediately remove all of his tools, equipment, surplus materials and debris.

B. After installation is complete and before the equipment is energized, clean the interior and exterior of all equipment thoroughly. Clean equipment, removing all debris, rubbish and foreign materials. Each component shall be cleaned and all dust and other foreign material. Components shall be cleaned of oxidation. The inside and outside of all switchgear shall also be wiped clean with lemon-oil rag after all other cleaning is complete. Any portion of the work requiring touch-up finishing shall be so finished to equal the specified finish on the product.

1.32 RECORD DRAWINGS AND DOCUMENTATION FOR OWNER
A. The Contractor shall obtain at his own expense a complete set of blueline prints on which to keep an accurate record of the installation of all materials, equipment and devices covered by the Contract. The Contractor shall record up to date information at least once a week and retain the set of prints on site for periodic review by the Architect/Engineer. The record drawings shall indicate the location of all equipment and devices, and the routing of all systems. If the Contractor prepared large scale installation drawings of electrical rooms, conduit routing, busduct, routing, etc., these drawings or reproducible sepias therefrom shall be revised as required to accurately illustrate the actual installation. All conduit buried in concrete slabs, walls and below grade shall be located by dimension; both horizontally and by vertical elevation, unless a surface mounted device in each space indicates the exact location.

B. Upon anticipated completion of the job, obtain one complete reproducible set of the original
drawings on which to neatly, legibly and accurately transfer all project related notations and deliver these record drawings to the Architect/Engineer at job completion before final payment and delivery to the Owner. This information shall be delivered prior to final acceptance.

C. The Contractor shall accumulate in duplicate during the job progress, the following data prepared in indexed 3-ring looseleaf, hard-back binders sized for 8-1/2 inch by 11 inch sheets. No binder shall exceed 3-1/2 inches thick. This data shall be turned over to the Owner's Representative for review and subsequent delivery to the Owner prior to final acceptance.

1. Warranties, guarantees and manufacturer's directions on material, equipment and devices covered by the Contract.
2. Approved lighting fixture brochures, wiring diagrams and control diagrams.
3. Copies of approved submittals and shop drawings.
4. Operating instructions and recommended maintenance procedures for major apparatus.
5. Copies of all other data and/or drawings required during construction.
6. Repair parts list of major apparatus, including name, address and telephone number of local supplier or representative.
7. Tag charts and diagrams hereinbefore specified.

1.33 FINAL OBSERVATION

A. The purpose of the final observation is to determine whether the Contractor has completed the construction in accordance with the Contract Documents and that in the Owner Representative’s opinion the installation is satisfactory for final acceptance by the Owner.

B. It shall be the responsibility of the Contractor to assure that the installation is ready for final acceptance prior to calling upon the Owner's Representative to make a final observation.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION
SECTION 26 05 00
COMMON WORK RESULTS FOR ELECTRICAL

1.1 GENERAL

1.2 RELATED DOCUMENTS

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

1.3 SUMMARY

This Section includes the following:

1. Raceways.
2. Building wire and connectors.
4. Electrical identification.
5. Electricity-metering components.
6. Concrete equipment bases.
7. Electrical demolition.
8. Cutting and patching for electrical construction.

1.4 DEFINITIONS

EMT: Electrical metallic tubing.

FMC: Flexible metal conduit.

IMC: Intermediate metal conduit.

LFMC: Liquidtight flexible metal conduit.

RNC: Rigid nonmetallic conduit.

1.5 SUBMITTALS

Product Data: For electricity-metering equipment.

Shop Drawings: Dimensioned plans and sections or elevation layouts of electricity-metering equipment.

Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

1.6 QUALITY ASSURANCE

B. Fasken Community Center Pool & Amenities
City of Laredo
Trinity Engineering
12-18-2019
Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

Comply with NFPA 70.

1.7 COORDINATION

Coordinate chases, slots, inserts, sleeves, and openings with general construction work and arrange in building structure during progress of construction to facilitate the electrical installations that follow.

1. Set inserts and sleeves in poured-in-place concrete, masonry work, and other structural components as they are constructed.

Sequence, coordinate, and integrate installing electrical materials and equipment for efficient flow of the Work. Coordinate installing large equipment requiring positioning before closing in the building.

Coordinate electrical service connections to components furnished by utility companies.

2. Coordinate installation and connection of exterior underground and overhead utilities and services, including provision for electricity-metering components.
3. Comply with requirements of authorities having jurisdiction and of utility company providing electrical power and other services.

Coordinate location of access panels and doors for electrical items that are concealed by finished surfaces. Access doors and panels are specified in Section "Access Doors."

Where electrical identification devices are applied to field-finished surfaces, coordinate installation of identification devices with completion of finished surface.

Where electrical identification markings and devices will be concealed by acoustical ceilings and similar finishes, coordinate installation of these items before ceiling installation.

1.8 PRODUCTS

1.9 EQUIPMENT FOR UTILITY COMPANY’S ELECTRICITY METERING

Current-Transformer Cabinets: Comply with requirements of electrical power utility company.

Meter Sockets: Comply with requirements of electrical power utility company.

Modular Meter Centers: Factory-coordinated assembly of a main meter center circuit-breaker unit with wireways, tenant meter socket modules, and tenant branch circuit breakers arranged in adjacent vertical sections, complete with interconnecting buses.

1. Housing: NEMA 250, Type 3R enclosure.
2. Tenant Branch Circuit Breakers: Series combination rated to protect circuit breakers in downstream panelboards that have 10,000-A interrupting capacity,
3. minimum.

1.10 CONCRETE BASES

Concrete Forms and Reinforcement Materials: As specified in Section "Cast-in-Place Concrete."
Concrete: 3000-psi, 28-day compressive strength as specified in Section "Cast-in-Place Concrete."

1.11 TOUCHUP PAINT

For Equipment: Equipment manufacturer's paint selected to match installed equipment finish.
Galvanized Surfaces: Zinc-rich paint recommended by item manufacturer.

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.1 ELECTRICAL EQUIPMENT INSTALLATION

Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide the maximum possible headroom.

Materials and Components: Install level, plumb, and parallel and perpendicular to other building systems and components, unless otherwise indicated.

Equipment: Install to facilitate service, maintenance, and repair or replacement of components. Connect for ease of disconnecting, with minimum interference with other installations.

Right of Way: Give to raceways and piping systems installed at a required slope.

3.2 RACEWAY AND CABLE INSTALLATION

Conceal raceways and cables, unless otherwise indicated, within finished walls, ceilings, and floors.
Install raceways and cables at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Locate horizontal raceway runs above water and steam piping.
Use temporary raceway caps to prevent foreign matter from entering.
Make conduit bends and offsets so ID is not reduced. Keep legs of bends in the same plane and straight legs of offsets parallel, unless otherwise indicated.
Use raceway and cable fittings compatible with raceways and cables and suitable for use and location.
Install raceways embedded in slabs in middle third of slab thickness where practical, and leave at least 1-inch concrete cover.
1. Secure raceways to reinforcing rods to prevent sagging or shifting during concrete placement.
2. Space raceways laterally to prevent voids in concrete.
3. Install conduit larger than 1-inch trade size parallel to or at right angles to main reinforcement. Where conduit is at right angles to reinforcement, place conduit close to slab support.
4. Transition from nonmetallic tubing to Schedule 80 nonmetallic conduit, rigid steel conduit, or IMC before rising above floor.
5. Make bends in exposed parallel or banked runs from same centerline to make bends parallel. Use factory elbows only where elbows can be installed parallel; otherwise, provide field bends for exposed parallel raceways.

Install pull wires in empty raceways. Use No. 14 AWG zinc-coated steel or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of the pull wire.

Install telephone and signal system raceways, 2-inch trade size and smaller, in maximum lengths of 150 feet and with a maximum of two 90-degree bends or equivalent. Separate lengths with pull or junction boxes where necessary to comply with these requirements, in addition to requirements above.

Connect motors and equipment subject to vibration, noise transmission, or movement with a maximum of 72-inch flexible conduit. Install LFMC in wet or damp locations. Install separate ground conductor across flexible connections.

Set floor boxes level and trim after installation to fit flush to finished floor surface.

### 3.3 ELECTRICAL SUPPORTING DEVICE APPLICATION

**Damp Locations and Outdoors:** Hot-dip galvanized materials or nonmetallic, U-channel system components.

**Dry Locations:** Steel materials.

**Support Clamps for PVC Raceways:** Click-type clamp system.

**Selection of Supports:** Comply with manufacturer’s written instructions.

**Strength of Supports:** Adequate to carry present and future loads, times a safety factor of at least four; minimum of 200-lb design load.

### 3.4 SUPPORT INSTALLATION

Install support devices to securely and permanently fasten and support electrical components.

Install individual and multiple raceway hangers and riser clamps to support raceways. Provide U-bolts, clamps, attachments, and other hardware necessary for hanger assemblies and for securing hanger rods and conduits.

Support parallel runs of horizontal raceways together on trapeze- or bracket-type hangers.
Size supports for multiple raceway installations so capacity can be increased by a 25 percent minimum in the future.

Support individual horizontal raceways with separate, malleable-iron pipe hangers or clamps.

Install 1/4-inch-diameter or larger threaded steel hanger rods, unless otherwise indicated.

Spring-steel fasteners specifically designed for supporting single conduits or tubing may be used instead of malleable-iron hangers for 1-1/2-inch and smaller raceways serving lighting and receptacle branch circuits above suspended ceilings and for fastening raceways to slotted channel and angle supports.

Arrange supports in vertical runs so the weight of raceways and enclosed conductors is carried entirely by raceway supports, with no weight load on raceway terminals.

Simultaneously install vertical conductor supports with conductors.

Separately support cast boxes that are threaded to raceways and used for fixture support. Support sheet-metal boxes directly from the building structure or by bar hangers. If bar hangers are used, attach bar to raceways on opposite sides of the box and support the raceway with an approved fastener not more than 24 inches from the box.

Install metal channel racks for mounting cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices unless components are mounted directly to structural elements of adequate strength.

Install sleeves for cable and raceway penetrations of concrete slabs and walls unless core-drilled holes are used. Install sleeves for cable and raceway penetrations of masonry and fire-rated gypsum walls and of all other fire-rated floor and wall assemblies. Install sleeves during erection of concrete and masonry walls.

Securely fasten electrical items and their supports to the building structure, unless otherwise indicated. Perform fastening according to the following unless other fastening methods are indicated:

1. Wood: Fasten with wood screws or screw-type nails.
2. Masonry: Toggle bolts on hollow masonry units and expansion bolts on solid masonry units.
3. New Concrete: Concrete inserts with machine screws and bolts.
4. Existing Concrete: Expansion bolts.
5. Instead of expansion bolts, threaded studs driven by a powder charge and provided with lock washers may be used in existing concrete.
6. Steel: Welded threaded studs or spring-tension clamps on steel.
   a. Field Welding: Comply with AWS D1.1.
7. Welding to steel structure may be used only for threaded studs, not for conduits, pipe straps, or other items.
8. Light Steel: Sheet-metal screws.
9. Fasteners: Select so the load applied to each fastener does not exceed 25 percent of its proof-test load.
3.5 IDENTIFICATION MATERIALS AND DEVICES

Install at locations for most convenient viewing without interference with operation and maintenance of equipment.

Coordinate names, abbreviations, colors, and other designations used for electrical identification with corresponding designations indicated in the Contract Documents or required by codes and standards. Use consistent designations throughout Project.

Self-Adhesive Identification Products: Clean surfaces before applying.

Identify raceways and cables with color banding as follows:

1. Bands: Pretensioned, snap-around, colored plastic sleeves or colored adhesive marking tape. Make each color band 2 inches wide, completely encircling conduit, and place adjacent bands of two-color markings in contact, side by side.
2. Band Locations: At changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
3. Colors: As follows:
   c. Telecommunication System: Green and yellow.

Tag and label circuits designated to be extended in the future. Identify source and circuit numbers in each cabinet, pull and junction box, and outlet box. Color-coding may be used for voltage and phase identification.

Install continuous underground plastic markers during trench backfilling, for exterior underground power, control, signal, and communication lines located directly above power and communication lines. Locate 6 to 8 inches below finished grade. If width of multiple lines installed in a common trench or concrete envelope does not exceed 16 inches, overall, use a single line marker.

Color-code 208/120-V system secondary service, feeder, and branch-circuit conductors throughout the secondary electrical system as follows:

4. Phase A: Black.
5. Phase B: Red.
6. Phase C: Blue.
8. Ground: Green.

Color-code 480/277-V system secondary service, feeder, and branch-circuit conductors throughout the secondary electrical system as follows:

9. Phase A: BROWN.
10. Phase B: ORANGE.
11. Phase C: YELLOW.
12. Neutral: White with a colored stripe or gray.
Install warning, caution, and instruction signs where required to comply with 29 CFR, Chapter XVII, Part 1910.145, and where needed to ensure safe operation and maintenance of electrical systems and of items to which they connect. Install engraved plastic-laminated instruction signs with approved legend where instructions are needed for system or equipment operation. Install metal-backed butyrate signs for outdoor items.

Install engraved-laminated emergency-operating signs with white letters on red background with minimum 3/8-inch-high lettering for emergency instructions on power transfer, load shedding, and other emergency operations.

3.6 **UTILITY COMPANY ELECTRICITY-METERING EQUIPMENT**

Install equipment according to utility company's written requirements. Provide grounding and empty conduits as required by utility company.

3.7 **FIRESTOPPING**

Apply firestopping to cable and raceway penetrations of fire-rated floor and wall assemblies to achieve fire-resistance rating of the assembly. Firestopping materials and installation requirements are specified in Section "Firestopping."

3.8 **CONCRETE BASES**

Construct concrete bases of dimensions indicated, but not less than 4 inches larger, in both directions, than supported unit. Follow supported equipment manufacturer's anchorage recommendations and setting templates for anchor-bolt and tie locations, unless otherwise indicated. Use 3000-psi, 28-day compressive-strength concrete and reinforcement as specified in Section "Cast-in-Place Concrete."

3.9 **CUTTING AND PATCHING**

Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces required to permit electrical installations. Perform cutting by skilled mechanics of trades involved.

Repair and refinish disturbed finish materials and other surfaces to match adjacent undisturbed surfaces. Install new fireproofing where existing firestopping has been disturbed. Repair and refinish materials and other surfaces by skilled mechanics of trades involved.

3.10 **FIELD QUALITY CONTROL**

Inspect installed components for damage and faulty work, including the following:

1. Raceways.
2. Building wire and connectors.
4. Electrical identification.
5. Electricity-metering components.
6. Concrete bases.
7. Electrical demolition.
8. Cutting and patching for electrical construction.

Test Owner's electricity-metering installation for proper operation, accuracy, and usability of output data.

10. Connect a load of known kW rating, 1.5 kW minimum, to a circuit supplied by the metered feeder.
11. Turn off circuits supplied by the metered feeder and secure them in the "off" condition.
12. Run the test load continuously for eight hours, minimum, or longer to obtain a measurable meter indication. Use a test load placement and setting that ensure continuous, safe operation.
13. Check and record meter reading at end of test period and compare with actual electricity used based on test load rating, duration of test, and sample measurements of supply voltage at the test load connection. Record test results.
14. Repair or replace malfunctioning metering equipment or correct test setup; then retest. Repeat for each meter in installation until proper operation of entire system is verified.

3.11 REFINISHING AND TOUCHUP PAINTING

Refinish and touch up paint. Paint materials and application requirements are specified in Section "Painting."

Clean damaged and disturbed areas and apply primer, intermediate, and finish coats to suit the degree of damage at each location.

1. Follow paint manufacturer's written instructions for surface preparation and for timing and application of successive coats.
2. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
3. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

3.12 CLEANING AND PROTECTION

1. On completion of installation, including outlets, fittings, and devices, inspect exposed finish. Remove burrs, dirt, paint spots, and construction debris.
2. Protect equipment and installations and maintain conditions to ensure that coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

END OF SECTION
SECTION 26 05 19
LOW-VOLTAGE ELECTRICAL POWER CONDUCTOR AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes building wires and cables and associated connectors, splices, and terminations for wiring systems rated 600 V and less.

1.3 SUBMITTALS

A. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

1.4 QUALITY ASSURANCE

A. Listing and Labeling: Provide wires and cables specified in this Section that are listed and labeled.

   1. The Terms "Listed" and "Labeled": As defined in NFPA 70, Article 100.

B. Comply with NFPA 70.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver wires and cables according to NEMA WC 26.

1.6 COORDINATION

A. Coordinate layout and installation of cables with other installations.

B. Revise locations and elevations from those indicated, as required to suit field conditions and as approved by Architect.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

B. Fasken Community Center Pool & Amenities
   City of Laredo

Trinity Engineering
12-18-2019
A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Wires and Cables:
   b. BICC Brand-Rex Company.
   c. Carol Cable Co., Inc.
   d. Senator Wire & Cable Company.
   e. Southwire Company.

2. Connectors for Wires and Cables:
   a. AMP Incorporated.
   b. General Signal; O-Z/Gedney Unit.
   c. Monogram Co.; AFC.
   d. Square D Co.; Anderson.
   e. 3M Company; Electrical Products Division.

2.2 BUILDING WIRES AND CABLES

A. UL-listed building wires and cables with conductor material, insulation type, cable construction, and rating as specified in Part 3 "Wire and Insulation Applications" Article.

B. Rubber Insulation Material: Comply with NEMA WC 3.

C. Thermoplastic Insulation Material: Comply with NEMA WC 5.

D. Ethylene Propylene Rubber Insulation Material: Comply with NEMA WC 8.

E. Conductor Material: Copper.

F. Stranding: Solid conductor for No. 10 AWG and smaller; stranded conductor for larger than No. 10 AWG.

G. Plenum rated cable for all cables above the ceiling.

2.3 CONNECTORS AND SPLICES
A. UL-listed, factory-fabricated wiring connectors of size, ampacity rating, material, type, and class for application and service indicated. Comply with Project's installation requirements and as specified in Part 3 "Wire and Insulation Applications" Article.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine raceways and building finishes to receive wires and cables for compliance with requirements for installation tolerances and other conditions affecting performance of wires and cables. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 WIRE AND INSULATION APPLICATIONS

A. Service Entrance: Type RHW or THWN, in raceway.

B. Feeders: Type 75C insulation THHN/THWN, in raceway.

C. Fire-Pump Feeder: Type MI, 3-conductor.

D. Branch Circuits: Type THHN/THWN, in raceway.

E. Fire Alarm Circuits: Type THHN/THWN, in raceway.

F. Class 1 Control Circuits: Type THHN/THWN, in raceway.

G. Class 2 Control Circuits: Type THHN/THWN, in raceway.

H. Equipment or any device rated 100 amperes or less, conductor shall be rated 60C as per National Electrical Code.

I. Equipment or any device rated over 100 amperes, conductor shall be rated 75C as per National Electrical Code.

3.3 INSTALLATION

A. Install wires and cables as indicated, according to manufacturer's written instructions and NECA's "Standard of Installation."

B. Remove existing wires from raceway before pulling in new wires and cables.

C. Pull Conductors: Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

E. Install exposed cables, parallel and perpendicular to surfaces of exposed structural members,
and follow surface contours where possible.

F. Support cables according to Section "Basic Electrical Materials and Methods."

G. Seal around cables penetrating fire-rated elements according to Section "Firestopping."

H. Identify wires and cables according to Section "Basic Electrical Materials and Methods."

I. Identify wires and cables according to Section "Electrical Identification."

3.4 CONNECTIONS

A. Conductor Splices: Keep to minimum.

B. Install splices and tapes that possess equivalent or better mechanical strength and insulation ratings than conductors being spliced.

C. Use splice and tap connectors compatible with conductor material.

D. Use oxide inhibitor in each splice and tap connector for aluminum conductors.

E. Wiring at Outlets: Install conductor at each outlet, with at least 12 inches (300 mm) of slack.

F. Connect outlets and components to wiring and to ground as indicated and instructed by manufacturer.

G. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.5 FIELD QUALITY CONTROL

A. Testing: On installation of wires and cables and before electrical circuitry has been energized, demonstrate product capability and compliance with requirements.

   1. Procedures: Perform each visual and mechanical inspection and electrical test stated in NETA ATS, Section 7.3.1. Certify compliance with test parameters.

B. Correct malfunctioning conductors and cables at Project site, where possible, and retest to demonstrate compliance; otherwise, remove and replace with new units and retest.

END OF SECTION
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes grounding and bonding of electrical systems and equipment. Grounding requirements specified in this Section may be supplemented by special requirements of systems described in other Sections.

B. Related Sections include the following:

1. List below only products, construction, and equipment that the reader might expect to find in this Section but are specified elsewhere.

2. Section "Underground Ducts and Utility Structures" for ground test wells.

1.3 SUBMITTALS

A. Revise this Article to suit Project and office practice. Frequently, no product submittal is required for this Section.

B. Product Data: For each type of product indicated.

C. Retain paragraph above if Product Data are required for each product specified. Retain paragraph below if Product Data are required only for selected products.

D. Product Data: For the following:

1. Ground rods.

2. Chemical rods.


E. Field Test Reports: Submit written test reports to include the following:

1. Test procedures used.
2. Test results that comply with requirements.

3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

1.4 QUALITY ASSURANCE

A. Retain paragraph and subparagraph below if Contractor or manufacturer selects testing agency. Delete if Contractor is allowed to perform ground-resistance testing.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1. Comply with UL 467.

C. Comply with NFPA 70; for overhead-line construction and medium-voltage underground construction, comply with IEEE C2.

D. Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Retain above for nonproprietary or below for semiproprietary Specification. Refer to Division 1 Section "Materials and Equipment."

C. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. See Editing Instruction No. 1 in the Evaluations for cautions about naming products and manufacturers.

2. Grounding Conductors, Cables, Connectors, and Rods:

   a. Apache Grounding/Erico Inc.

   b. Boggs, Inc.

   c. Chance/Hubbell.

   d. Copperweld Corp.

   e. Dossert Corp.

g. Framatome Connectors/Burndy Electrical.

h. Galvan Industries, Inc.

i. Hastings Fiber Glass Products, Inc.

j. Ideal Industries, Inc.

k. ILSCO.

l. Kearney/Cooper Power Systems.

m. Korns: C. C. Korns Co.; Division of Robroy Industries.

n. Lightning Master Corp.

o. Lyncole XIT Grounding.


q. Raco, Inc.; Division of Hubbell.

r. Robbins Lightning, Inc.


t. Superior Grounding Systems, Inc.

u. Thomas & Betts, Electrical.

2.2 GROUNDING CONDUCTORS

A. For insulated conductors, comply with Section "Conductors and Cables."

B. If only copper conductors are permitted in Division 16 Section "Conductors and Cables," delete paragraph below.

C. Material: copper.

D. Equipment Grounding Conductors: Insulated with green-colored insulation.

E. Isolated Ground Conductors: Insulated with green-colored insulation with yellow stripe. On feeders with isolated ground, use colored tape, alternating bands of green and yellow tape to provide a minimum of three bands of green and two bands of yellow.

F. Grounding Electrode Conductors: Stranded cable.
G. Underground Conductors: stranded, unless otherwise indicated.

H. Sizes and types below are typical. Adjust to suit Project conditions and requirements.

I. Copper Bonding Conductors: As follows:

1. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG copper conductor, 1/4 inch (6.4 mm) in diameter.

2. Bonding Conductor: No. 4 or No. 6 AWG, stranded copper conductor.

3. Bonding Jumper: Bare copper tape, braided bare copper conductors, terminated with copper ferrules; 1-5/8 inches (42 mm) wide and 1/16 inch (1.5 mm) thick.

4. Tinned Bonding Jumper: Tinned-copper tape, braided copper conductors, terminated with copper ferrules; 1-5/8 inches (42 mm) wide and 1/16 inch (1.5 mm) thick.

J. Delete paragraph and subparagraphs below if use of aluminum conductors is not permitted.

K. Ground Conductor and Conductor Protector for Wood Poles: As follows:

1. No. 4 AWG minimum, soft-drawn copper conductor.

2. Conductor Protector: Half-round PVC or wood molding. If wood, use pressure-treated fir, or cypress or cedar.

L. Grounding Bus: Bare, annealed copper bars of rectangular cross section, with insulators.

2.3 CONNECTOR PRODUCTS

A. Comply with IEEE 837 and UL 467; listed for use for specific types, sizes, and combinations of conductors and connected items.

B. Bolted Connectors: Bolted-pressure-type connectors, or compression type.

C. Welded Connectors: Exothermic-welded type, in kit form, and selected per manufacturer's written instructions.

2.4 GROUNDING ELECTRODES

A. Copper-clad steel is most common. See Evaluations for discussion on where other materials might be more appropriate.

B. Ground Rods: Copper-clad steel.

1. Select paragraph above or paragraph and subparagraph below. Sectional types are used when rods longer than 10 feet (3 m) are installed.

2. Size: 3/4 by 120 inches (19 by 3000 mm) in diameter.
C. Chemical Electrodes: Copper tube, straight or L-shaped, filled with nonhazardous chemical salts, terminated with a 4/0 bare conductor. Provide backfill material recommended by manufacturer.

D. Test Wells: Provide handholes as specified in Section "Underground Ducts and Utility Structures."

PART 3 - EXECUTION

3.1 APPLICATION

A. Delete paragraph below if only copper conductors are specified in Division 16 Section "Conductors and Cables."

B. Use only copper conductors for both insulated and bare grounding conductors in direct contact with earth, concrete, masonry, crushed stone, and similar materials.

C. In raceways, use insulated equipment grounding conductors.

D. Exothermic-Welded Connections: Use for connections to structural steel and for underground connections, except those at test wells.

E. Equipment Grounding Conductor Terminations: Use bolted pressure clamps.

F. Ground Rod Clamps at Test Wells: Use bolted pressure clamps with at least two bolts.

G. Delete paragraph and subparagraphs below if grounding bus is not required, or edit to suit Project.

H. Grounding Bus: Install in electrical and telephone equipment rooms, in rooms housing service equipment, and elsewhere as indicated.

1. Use insulated spacer; space 1 inch (25.4 mm) from wall and support from wall 6 inches (150 mm) above finished floor, unless otherwise indicated.

2. At doors, route the bus up to the top of the door frame, across the top of the doorway, and down to the specified height above the floor.

I. Edit below to suit Project.

J. Underground Grounding Conductors: Use tinned copper conductor, No. 2/0 AWG minimum. Bury at least 24 inches (600 mm) below grade or bury 12 inches (300 mm) above duct bank when installed as part of the duct bank.

3.2 EQUIPMENT GROUNDING CONDUCTORS

A. NEC permits two basic types of equipment grounding conductors: metallic raceway or cable sheath as the conductor, or a separate equipment grounding conductor. The installation of an
equipment grounding conductor provides an additional degree of safe operation when compared to relying on raceway as the conductor. Revise paragraphs and subparagraphs in this Article to suit Project.

B. Comply with NFPA 70, Article 250, for types, sizes, and quantities of equipment grounding conductors, unless specific types, larger sizes, or more conductors than required by NFPA 70 are indicated.

C. Install equipment grounding conductors in all feeders and circuits.

D. Select paragraph above or paragraph and subparagraphs below.

E. Install insulated equipment grounding conductor with circuit conductors for the following items, in addition to those required by NEC:
   1. Feeders and branch circuits.
   2. Lighting circuits.
   3. Receptacle circuits.
   5. Three-phase motor and appliance branch circuits.
   6. Flexible raceway runs.
   7. Armored and metal-clad cable runs.

F. Busway Supply Circuits: Install insulated equipment grounding conductor from the grounding bus in the switchgear, switchboard, or distribution panel to equipment grounding bar terminal on busway.

G. Computer Outlet Circuits: Install insulated equipment grounding conductor in branch-circuit runs from computer-area power panels or power-distribution units.

H. Isolated Grounding Receptacle Circuits: Install an insulated equipment grounding conductor connected to the receptacle grounding terminal. Isolate grounding conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.

I. Isolated Equipment Enclosure Circuits: For designated equipment supplied by a branch circuit or feeder, isolate equipment enclosure from supply raceway with a nonmetallic raceway fitting listed for the purpose. Install fitting where raceway enters enclosure, and install a separate equipment grounding conductor. Isolate equipment grounding conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.
J. Nonmetallic Raceways: Install an equipment grounding conductor in nonmetallic raceways unless they are designated for telephone or data cables.

K. Air-Duct Equipment Circuits: Install an equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners and heaters. Bond conductor to each unit and to air duct.

L. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate equipment grounding conductor to each electric water heater, heat-tracing, and antifrost heating cable. Bond conductor to heater units, piping, connected equipment, and components.

M. Coordinate paragraph and subparagraphs below with Drawings and Specification Sections for systems referenced. Edit to suit Project.

N. Signal and Communication Systems: For telephone, alarm, voice and data, and other communication systems, provide No. 4 AWG minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.


2. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.

O. Metal Poles Supporting Outdoor Lighting Fixtures: Provide a grounding electrode in addition to installing a separate equipment grounding conductor with supply branch-circuit conductors.

### 3.3 INSTALLATION

A. Ground Rods: Install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes.

1. Drive ground rods until tops are 2 inches (50 mm) below finished floor or final grade, unless otherwise indicated.

2. Interconnect ground rods with grounding electrode conductors. Use exothermic welds, except at test wells and as otherwise indicated. Make connections without exposing steel or damaging copper coating.

B. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

C. Bonding Straps and Jumpers: Install so vibration by equipment mounted on vibration isolation hangers and supports is not transmitted to rigidly mounted equipment. Use exothermic-welded connectors for outdoor locations, unless a disconnect-type connection is required; then, use a bolted clamp. Bond straps directly to the basic structure taking care not to penetrate any adjacent parts. Install straps only in locations accessible for maintenance.
D. Metal Water Service Pipe: Provide insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes by grounding clamp connectors. Where a dielectric main water fitting is installed, connect grounding conductor to street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.

E. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with grounding clamp connectors.

F. Bond interior metal piping systems and metal air ducts to equipment grounding conductors of associated pumps, fans, blowers, electric heaters, and air cleaners. Use braided-type bonding straps.

G. Bond each aboveground portion of gas piping system upstream from equipment shutoff valve.

H. Install one test well for each service at the ground rod electrically closest to the service entrance. Set top of well flush with finished grade or floor.

I. Ufer Ground (Concrete-Encased Grounding Electrode): Fabricate according to NFPA 70, Paragraph 250-81(c), using a minimum of 20 feet (6 m) of bare copper conductor not smaller than No. 4 AWG. If concrete foundation is less than 20 feet (6 m) long, coil excess conductor within the base of the foundation. Bond grounding conductor to reinforcing steel in at least four locations and to anchor bolts. Extend grounding conductor below grade and connect to building grounding grid or to a grounding electrode external to concrete.

### 3.4 CONNECTIONS

A. Coordinate paragraph and subparagraphs below with Drawings.

B. General: Make connections so galvanic action or electrolysis possibility is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.

1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer to order of galvanic series.

2. Make connections with clean, bare metal at points of contact.


5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.
C. Exothermic-Welded Connections: Comply with manufacturer's written instructions. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.

D. Equipment Grounding Conductor Terminations: For No. 8 AWG and larger, use pressure-type grounding lugs. No. 10 AWG and smaller grounding conductors may be terminated with winged pressure-type connectors.

E. Noncontact Metal Raceway Terminations: If metallic raceways terminate at metal housings without mechanical and electrical connection to housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to grounding bus or terminal in housing. Bond electrically noncontinuous conduits at entrances and exits with grounding bushings and bare grounding conductors, unless otherwise indicated.

F. Connections at Test Wells: Use compression-type connectors on conductors and make bolted- and clamped-type connections between conductors and ground rods.

G. Tighten screws and bolts for grounding and bonding connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

H. Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Use tools and dies recommended by connector manufacturer. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on grounding conductor.

I. Moisture Protection: If insulated grounding conductors are connected to ground rods or grounding buses, insulate entire area of connection and seal against moisture penetration of insulation and cable.

3.5 FIELD QUALITY CONTROL

A. Retain one of three paragraphs below.

B. Testing: Perform the following field quality-control testing:

1. After installing grounding system but before permanent electrical circuitry has been energized, test for compliance with requirements.

2. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, and at ground test wells. Measure ground resistance not less than two full days after the last trace of precipitation, and without the soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance. Perform tests, by the fall-of-potential method according to IEEE 81.

3. Provide drawings locating each ground rod and ground rod assembly and other grounding electrodes, identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location and include
observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.

a. NFPA 70 has minimum value of 25 ohms. See Evaluations for discussion on appropriate grounding resistance values. Values listed below are typical; adjust to suit Project conditions.

b. Equipment Rated 500 kVA and Less: 10 ohms.

c. Equipment Rated 500 to 1000 kVA: 5 ohms.

d. Equipment Rated More Than 1000 kVA: 3 ohms.

e. Substations and Pad-Mounted Switching Equipment: 5 ohms.

f. Manhole Grounds: 10 ohms.

4. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

3.6 GRADING AND PLANTING

A. Delete below if inappropriate or if surface restoration work is covered on Drawings or in Division 2 Sections. Coordinate with Drawings.

B. Restore surface features, including vegetation, at areas disturbed by Work of this Section. Reestablish original grades, unless otherwise indicated. If sod has been removed, replace it as soon as possible after backfilling is completed. Restore areas disturbed by trenching, storing of dirt, cable laying, and other activities to their original condition. Include application of topsoil, fertilizer, lime, seed, sod, sprig, and mulch. Comply with Section “Landscaping.” Maintain restored surfaces. Restore disturbed paving as indicated.

END OF SECTION
PART 1 - GENERAL

1.1 RELATED REQUIREMENTS


B. Comply with this sections, as applicable. Refer to other sections for coordination of work.

1.2 SCOPE OF WORK

A. Provide labor, material, equipment, tools and services, and perform operations required for, and reasonably incidental to, the providing of supporting devices, including related systems and accessories.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Unistrut Corp.

B. B-Line Systems, Inc.

C. Midland Ross-Kindorf

2.2 MATERIALS

A. Suspension Hangers
   1. Suspension hangers for individual conduit runs shall be zinc plated formed steel type.

B. Vertical Supports
   1. Malleable iron one hole pipe straps shall be used for vertical runs

C. Clamps
   1. Beam clamps shall be used for bar joists and beams.

D. Anti-Vibration Hangers
   1. Anti-vibration hangers shall be combination type having a double deflection neoprene element in series with a steel coil spring; double deflection of 0.30"; steel coil spring shall be selected from a 1" static deflection series with a minimum additional travel to solid of ½"; spring diameters shall be large enough to permit 15 degree angular misalignment of the rod connecting the hanger to the ceiling support without rubbing the hanger box.
2.3 LIGHT FIXTURE HANGERS

A. Refer to Section 26 51 00

B. Corrosive Areas: PVC; at factory apply a minimum of 10-mil-thick PVC coating, bonded to metal, inside and outside.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Hangers

1. Approved hangers and stiff leg supports shall be installed in quantity and size as required to carry the weight of raceway and contents and shall be arranged to prevent vibration transmission to the building and allow for raceway movement.

2. Hangers shall be supported by means of uncoated solid steel rods which are threaded to allow vertical adjustments. Lock nuts shall be provided in sufficient number and location to lock all rod adjustments permanently at the adjusted height. Two lock nuts shall be used unless the nut tightens against a threaded socket. Minimum rod diameters shall be as follows:

B. NOMINAL CONDUIT SIZE      ROD DIAMETER

1/2" through 2 1/4"

2-1/2" through 3 3/8"                  4" and 5 1/2"

1. Hanger spacing shall be as required for proper and adequate support raceway, but in no case shall be less than one hanger per 8'-0" of raceway length except that conduit less than 1" diameter shall be supported at least every 6'-0".

2. Where numerous conduits are run parallel to one another, they may be supported from a trapeze type hanger arrangement with strut bottom.

3. Anti-vibration type hangers shall be provided for equipment as required to minimize vibration and/or as directed by the Architect/Engineer.

Supports

4. Support of hangers shall be by means of sufficient quantities of individual after set steel expansion shields, or beam clamps attached to structural steel.

5. Stiff-legs shall be furnished and installed in cases where support from overhead structure is not possible.
6. Ceiling mounted lighting fixtures shall be supported from the building structure at two opposite corners. The Contractor shall provide fixture hangers to properly interface with the ceiling system.

7. Furnish and install complete any additional structural support steel, brackets, fasteners, etc., as required to adequately support all raceway and equipment.

8. Support of hangers from concrete slabs shall be by means of sufficient quantity of "U" brackets attached with after set expansion shields and bolts.

9. Support of hangers from concrete tees shall be by means of sufficient quantity of angle iron brackets attached with after set expansion shields and bolts.

END OF SECTION
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

1. Edit lists below to suit Project.

2. Raceways include the following:
   a. RMC.
   b. IMC.
   c. PVC externally coated, rigid steel conduits.
   d. PVC externally coated, IMC.
   e. EMT.
   f. FMC.
   g. LFMC.
   h. LFNC.
   i. RNC.
   j. ENT.
   k. Wireways.
   l. Surface raceways.

3. Boxes, enclosures, and cabinets include the following:
   a. Device boxes.
   b. Floor boxes.
   c. Outlet boxes.
d. Pull and junction boxes.
e. Cabinets and hinged-cover enclosures.

B. Related Sections include the following:

1. List below only products and equipment for this Project that the reader might expect to find in this Section but are specified elsewhere. Verify that Section titles listed below are correct for this Project’s Specifications because Section titles may have changed since this Section was updated.

2. Section "Basic Electrical Materials and Methods" for raceways and box supports.

3. Section "Wiring Devices" for devices installed in boxes and for floor-box service fittings.

1.3 DEFINITIONS

A. EMT: Electrical metallic tubing.
B. ENT: Electrical nonmetallic tubing.
C. FMC: Flexible metal conduit.
D. IMC: Intermediate metal conduit.
E. LFMC: Liquidtight flexible metal conduit.
F. LFNC: Liquidtight flexible nonmetallic conduit.
G. RMC: Rigid metal conduit.
H. RNC: Rigid nonmetallic conduit.

1.4 SUBMITTALS

A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

B. Delete below except for custom enclosures.

C. Shop Drawings: Include layout drawings showing components and wiring for nonstandard boxes, enclosures, and cabinets.

1.5 QUALITY ASSURANCE

A. Listing and Labeling: Provide raceways and boxes specified in this Section that are listed and labeled.

1. The Terms "Listed" and "Labeled": As defined in NFPA 70, Article 100.

2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laborato-
1.6 COORDINATION

A. Coordinate layout and installation of raceways and boxes with other construction elements to ensure adequate headroom, working clearance, and access.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Retain above for nonproprietary or below for semiproprietary Specification. Refer to Division 1 Section "Materials and Equipment."

C. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Metal Conduit and Tubing:
   a. Alflex Corp.
   b. Anamet, Inc.; Anaconda Metal Hose.
   c. Anixter Brothers, Inc.
   d. Carol Cable Co., Inc.
   e. Cole-Flex Corp.
   f. Electri-Flex Co.
   g. Flexcon, Inc.; Coleman Cable Systems, Inc.
   h. Grinnell Co.; Allied Tube and Conduit Div.
   i. Monogram Co.; AFC.
   j. Spiraduct, Inc.
   k. Triangle PWC, Inc.
   l. Wheatland Tube Co.

2. Nonmetallic Conduit and Tubing:
a. Anamet, Inc.; Anaconda Metal Hose.
b. Arnco Corp.
c. Breeze-Illinois, Inc.
d. Cantex Industries; Harsco Corp.
e. Certainteed Corp.; Pipe & Plastics Group.
f. Cole-Flex Corp.
g. Condux International; Electrical Products.
h. Electri-Flex Co.
i. George-Ingraham Corp.
j. Hubbell, Inc.; Raco, Inc.
k. Lamson & Sessions; Carlon Electrical Products.
l. R&G Sloan Manufacturing Co., Inc.
m. Spiraduct, Inc.
n. Thomas & Betts Corp.

3. Conduit Bodies and Fittings:
   b. Crouse-Hinds; Div. of Cooper Industries.
   d. Hubbell, Inc.; Killark Electric Manufacturing Co.
   e. Lamson & Sessions; Carlon Electrical Products.
   f. O-Z/Gedney; Unit of General Signal.
   g. Scott Fetzer Co.; Adalet-PLM.
   h. Spring City Electrical Manufacturing Co.

4. Metal Wireways:
   c. Square D Co.
2.2 METAL CONDUIT AND TUBING
A. Rigid Steel Conduit: ANSI C80.1.
B. Rigid Aluminum Conduit: ANSI C80.5.
C. IMC: ANSI C80.6.
D. EMT and Fittings: ANSI C80.3.
   1. Fittings: Set-screw type.
E. Fittings: NEMA FB 1; compatible with conduit/tubing materials.

2.3 NONMETALLIC CONDUIT AND TUBING
A. RNC: NEMA TC 2, Schedule 40 or 80 PVC.
B. RNC Fittings: NEMA TC 3; match to conduit or conduit/tubing type and material.
C. LFNC: UL 1660.

2.4 METAL WIREWAYS
A. Material: Sheet metal sized and shaped as indicated.
B. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
C. Select features, unless otherwise indicated, as required to complete wiring system and to comply with NFPA 70.
D. Select 1 of 4 paragraphs below.
E. Wireway Covers: Screw – cover type flanged-and-gasketed type.
F. Finish: Manufacturer's standard enamel finish.

2.5 OUTLET AND DEVICE BOXES
A. Sheet Metal Boxes: NEMA OS 1.
B. Edit paragraph below. Aluminum is also available and suitable for use with steel raceways.
C. Cast-Metal Boxes: NEMA FB 1, Type FD, cast box with gasketed cover.

2.6 PULL AND JUNCTION BOXES
A. Small Sheet Metal Boxes: NEMA OS 1.
B. Fasken Community Center Pool & Amenities
City of Laredo
Trinity Engineering
12-18-2019
B. Cast-Metal Boxes: NEMA FB 1, cast aluminum with gasketed cover.

2.7 ENCLOSURES AND CABINETS

A. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous hinge cover and flush latch.
   1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.

B. Cabinets: NEMA 250, Type 1, galvanized steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel. Hinged door in front cover with flush latch and concealed hinge. Key latch to match panelboards. Include metal barriers to separate wiring of different systems and voltage, and include accessory feet where required for freestanding equipment.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces to receive raceways, boxes, enclosures, and cabinets for compliance with installation tolerances and other conditions affecting performance of raceway installation. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 WIRING METHODS

A. Use a comprehensive wiring method schedule on Drawings or use this Article to specify where various raceway types are to be installed. Edit examples below, adding or deleting materials and methods to suit Project. Coordinate with Division 16 Section "Wires and Cables." Do not duplicate information on Drawings, in NFPA 70, or in other Division 16 Sections. List exceptions to stated requirements. Check code to avoid specifying uses not permitted.

B. Outdoors: Use the following wiring methods:
   1. Exposed: Rigid steel.
   2. Concealed: Rigid steel.
   3. Underground, Single Run: RNC.
   4. Underground, Grouped: RNC.
   5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
   6. Boxes and Enclosures: NEMA 250, Type 3R.

C. Indoors: Use the following wiring methods:
   1. Exposed: EMT.
   2. Concealed: EMT.
3. Under-ground, Single Run: RNC.

4. Under-ground, Grouped: RNC

5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC; except in wet or damp locations, use LFMC.

6. Damp or Wet Locations: Rigid steel conduit.

7. Boxes and Enclosures: NEMA 250, Type 1, except as follows:
   a. Select 1 of 2 subparagraphs below and add other specific box and enclosure requirements to suit Project.
   b. Damp or Wet Locations: NEMA 250, Type 4, stainless steel.

3.3 INSTALLATION

A. Install raceways, boxes, enclosures, and cabinets as indicated, according to manufacturer's written instructions.

B. Select paragraph above or below.

C. Minimum Raceway Size: 3/4-inch trade size (DN21).

D. Conceal conduit and EMT, unless otherwise indicated, within finished walls, ceilings, and floors.

E. Keep raceways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

F. Install raceways level and square and at proper elevations. Provide adequate headroom.

G. Complete raceway installation before starting conductor installation.

H. Support raceways as specified in Section "Basic Electrical Materials and Methods."

I. Use temporary closures to prevent foreign matter from entering raceways.

J. Protect stub-ups from damage where conduits rise through floor slabs. Arrange so curved portion of bends is not visible above the finished slab.

K. Make bends and offsets so ID is not reduced. Keep legs of bends in the same plane and straight legs of offsets parallel, unless otherwise indicated.

L. Use raceway fittings compatible with raceways and suitable for use and location. For intermediate steel conduit, use threaded rigid steel conduit fittings, unless otherwise indicated.

M. Run concealed raceways, with a minimum of bends, in the shortest practical distance considering the type of building construction and obstructions, unless otherwise indicated.
N. Raceways Embedded in Slabs (Must be indicated on drawings to be embedded. Please notify Engineer if required but not shown): Install in middle third of slab thickness where practical, and leave at least 1-inch (25-mm) concrete cover.

1. Secure raceways to reinforcing rods to prevent sagging or shifting during concrete placement.

2. Space raceways laterally to prevent voids in concrete.

3. Run conduit larger than 1-inch trade size (DN27) parallel to or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.

4. Transition from nonmetallic tubing to Schedule 80 nonmetallic conduit, rigid steel conduit, or IMC before rising above floor.

O. Install exposed raceways parallel to or at right angles to nearby surfaces or structural members, and follow the surface contours as much as practical.

1. Run parallel or banked raceways together, on common supports where practical.

2. Make bends in parallel or banked runs from same centerline to make bends parallel. Use factory elbows only where elbows can be installed parallel; otherwise, provide field bends for parallel raceways.

P. Join raceways with fittings designed and approved for the purpose and make joints tight.

1. Make raceway terminations tight. Use bonding bushings or wedges at connections subject to vibration. Use bonding jumpers where joints cannot be made tight.

2. Use insulating bushings to protect conductors.

Q. Tighten set screws of threadless fittings with suitable tools.

R. Terminus: Where raceways are terminated with locknuts and bushings, align raceways to enter squarely and install locknuts with dished part against the box. Where terminations are not secure with 1 locknut, use 2 locknuts: 1 inside and 1 outside the box.

S. Where raceways are terminated with threaded hubs, screw raceways or fittings tightly into the hub so the end bears against the wire protection shoulder. Where chase nipples are used, align raceways so the coupling is square to the box and tighten the chase nipple so no threads are exposed.

T. Install pull wires in empty raceways. Use No. 14 AWG zinc-coated steel or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of the pull wire.

U. Telephone and Signal System Raceways, 2-Inch Trade Size (DN53) and Smaller: In addition to the above requirements, install raceways in maximum lengths of 150 feet (45 m) and with a maximum of two 90-degree bends or equivalent. Separate lengths with pull or junction boxes where necessary to comply with these requirements.

V. Delete paragraph below if not applicable.
W. Install raceway sealing fittings according to manufacturer’s written instructions. Locate fittings at suitable, approved, and accessible locations and fill them with UL-listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:

1. Where conduits pass from warm to cold locations, such as the boundaries of refrigerated spaces.

2. Where otherwise required by NFPA 70.

X. Stub-up Connections: Extend conduits through concrete floor for connection to freestanding equipment. Install with an adjustable top or coupling threaded inside for plugs set flush with the finished floor. Extend conductors to equipment with rigid steel conduit; FMC may be used 6 inches (150 mm) above the floor. Install screwdriver-operated, threaded flush plugs flush with floor for future equipment connections.

Y. Flexible Connections: Use maximum of 6 feet (1830 mm) of flexible conduit for recessed and semirecessed lighting fixtures; for equipment subject to vibration, noise transmission, or movement; and for all motors. Use liquidtight flexible conduit in wet or damp locations. Install separate ground conductor across flexible connections.

Z. Delete paragraph below if no high-frequency installation.

AA. Install nonferrous conduit or tubing for circuits operating above 60 Hz. Where aluminum raceways are installed for such circuits and pass through concrete, install in a nonmetallic sleeve.

BB. Do not install aluminum conduits embedded in or in contact with concrete.

CC. PVC Externally Coated, Rigid Steel Conduits: Use only fittings approved for use with that material. Patch all nicks and scrapes in PVC coating after installing conduits.

DD. Surface Raceways: Install a separate, green, ground conductor in raceways from junction box supplying the raceways to receptacle or fixture ground terminals.

1. Select each surface raceway outlet box, to which a lighting fixture is attached, of sufficient diameter to provide a seat for the fixture canopy.

2. Where a surface raceway is used to supply a fluorescent lighting fixture having central-stem suspension with a backplate and a canopy (with or without extension ring), no separate outlet box is required.

3. Provide surface metal raceway outlet box, and the backplate and canopy, at the feed-in location of each fluorescent lighting fixture having end-stem suspension.

4. Where a surface metal raceway extension is made from an existing outlet box on which a lighting fixture is installed, no additional surface-mounted outlet box is required. Provide a backplate slightly smaller than the fixture canopy.

EE. Set floor boxes level and adjust to finished floor surface.
FF. Select paragraph above for metal floor boxes and below for nonmetallic floor boxes.

GG. Set floor boxes level and trim after installation to fit flush to finished floor surface.

HH. Install hinged-cover enclosures and cabinets plumb. Support at each corner.

II. NO PVC CONDUIT ALLOWED ABOVE THE CEILING OR IN THE A/C RETURN PLENUM. PROVIDE RIGID CONDUIT. Verify all MEP documents.

3.4 PROTECTION

A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure coatings, finishes, and cabinets are without damage or deterioration at the time of Substantial Completion.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.

2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

3.5 CLEANING

A. On completion of installation, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finish, including chips, scratches, and abrasions.

END OF SECTION
PART 1 - GENERAL

1.1 RELATED REQUIREMENTS


1.2 SCOPE OF WORK

A. Provide labor, materials, equipment, tools and services, and perform operations required for, and reasonably incidental to, the providing of all site electrical work.

B. The site electrical work shall include, but not be limited to, the furnishing and installation of necessary materials and making arrangements for:

1. The connection of electrical and telephone utilities.

2. Underground conduit.

1.3 SUBMITTALS

A. Submit product data and shop drawings in accordance with Section for products specified under PARTS 2 PRODUCTS.

1.4 REFERENCE STANDARDS

A. National Electrical Code (NEC), Article 300

B. Service installation standards of the serving utility company(s).

PART 2 - PRODUCTS

2.1 ELECTRICAL SERVICE

A. Coordination: The location of the service entrance shall be coordinated with all other trades. Provide materials and equipment required to connect the electrical service. Contractor shall coordinate with the Power Company for all requirements prior to bid date. Contractor shall include all cost to for Utility Company to extend service to project site bid.

B. Materials: Provide materials in accordance with other Sections of these Specifications.

2.2 COMMUNICATION SERVICE

A. Coordination: The location of the telephone, cable, and internet service entrance shall be coordinated with all other trades. Provide materials and equipment required to connect the
B. Fasken Community Center Pool & Amenities - 26 05 43
City of Laredo  UNDERGROUND DUCTS & RACEWAYS
Trinity Engineering 2o f 3  12-18-2019

telephone, cable and internet services. Contractor shall coordinate with the Telephone, cable, and internet company for all requirements prior to bid date. Contractor is responsible to coordinate with utility companies.

B. Materials: Provide materials in accordance with other sections of this specification.

PART 3 - EXECUTION

3.1 GENERAL

A. Underground installation of more than one conduit shall be in a duct arrangement as indicated. All conduits shall be laid so joints are staggered. All bends and stub-ups shall be rigid steel.

B. Pour a red colored concrete envelope 3" thick over utility service, emergency generator and fire pump conduits. Where conduits cross a driveway, road or parking area, reinforcing rods shall be installed.

C. Perform excavation, shoring, backfilling and concrete work in connection with electrical work in accordance with other sections of the Specifications.

D. All conduit shall be sloped away from the building to negate water entering the building through the conduit system.

3.2 UTILITIES

A. The locations, elevations and voltage of electrical lines and the location of the telephone lines included within the area of this work are indicated on the Drawings or in the Specifications in accordance with information received by the Architect/Engineer and Owner.

B. The Contractor shall examine the site and shall verify, to his own satisfaction, the location and elevation of all utilities, and shall adequately inform himself as to their relation to the work.

C. Existing utility lines not indicated but encountered during construction shall be protected, relocated or capped as directed by the Architect/Engineer. All precautions shall be exercised to prevent damage to existing lines not shown, but should work become necessary, it must be authorized prior to execution except in an emergency situation.

D. Before beginning excavations of any nature whatsoever, the Contractor shall make an attempt to locate all underground utilities of every nature occurring within the bounds of the area to be excavated. Contractor is responsible to call 811 prior to any work. The Contractor shall then proceed with caution in his excavation work so that no utility shall be damaged with a resultant loss of service.

E. Should a damage result to any utility through the Contractor's negligence or failure to comply with the above directive, he shall be liable for such damage and for all expense incurred in the expeditious repair or replacement of such damaged utilities.
F. Repair of damaged utilities shall be to a condition equal to or better than the adjacent undamaged portion of such utility and to the complete satisfaction of the Architect/Engineer and Owner.

END OF SECTION
SECTION 26 05 53
IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS


B. Comply with ELECTRICAL Sections, as applicable. Refer to other sections for coordination of work.

1.2 SCOPE OF WORK

A. Provide labor, material, equipment, tools and services, and perform operations required for, and reasonably incidental to, the providing of electrical identification, including related accessories.

B. Provide electrical identification for the following:

1. Panelboards, motor starters, contactors, disconnect switches, circuit breakers and other electrical equipment with nameplate identifying the item of equipment and the equipment serving the same.

2. Raceways, junction boxes and pull boxes.

3. Label each panelboard index indicating the room #s to the related circuit. Also add the index sheet in a laminated white core, plastic with beveled edges, minimum 1/16 inch thick. Lettering shall be machine-engraved, not less than 1/4" high, cut through the black or red surface to the white core.


5. Wiring.

6. Three phase motor rotation.

1.3 SUBMITTALS

A. Submit product data in accordance with Section for products specified under PART 2 - PRODUCTS.

PART 2 - PRODUCTS

1.1 ACCEPTABLE MANUFACTURERS

A. Brady

B. Panduit
1.2 IDENTIFICATION

E. A. Nameplates

1. Nameplates shall be black engraved surface on white core for normal power circuits and red engraved surface on white core for emergency power circuits.

2. Provide for each distribution panelboard, branch circuit panelboard, transformer and any other similar equipment furnished under this section identification as to its given name, voltage and origination of service. Examples are as follows:

   ‘LR1’       ‘LR2’
   120/240V    120/240V
   FED FROM ‘MDP’ FED FROM ‘MDP’

3. Provide for each motor starter enclosure, circuit breaker enclosure, disconnect switch and any other similar equipment furnished under this section, identification as to the specific load that it serves and the origination of service. Examples are as follows:

   ‘AHU-1’      ‘CU-1’
   FED FROM ‘MDP’ FED FROM ‘MDP’

4. Provide for each feeder protective device in each distribution panelboard and any other similar equipment furnished under this section, identification as to the specific load that it serves.

5. Nameplates shall be laminated, white core, plastic with beveled edges, minimum 1/16 inch thick. Lettering shall be machine-engraved, not less than 1/4” high, cut through the black or red surface to the white core.

F. B. Junction Boxes and Pull Boxes

1. Identification shall be with a black permanent marking pen on the top of 4” x 4” junction box covers or on the back of an outlet box cover plate identifying the branch circuits and systems within the conduit. Pull boxes shall be provided with a nameplate stating voltage and system served.

G. C. Wiring Device Wall Plates

1. On the back side of wiring device wall plates identify with a black permanent marking pen the panelboard and branch circuit number the device is served from.

H. D. Wire Markers

1. Wire markers for identification of wiring shall be self-adhesive type having letters and numerals indicating serving equipment and feeder or branch circuit number.
I. Rotation Tags

1. Rotation tags shall be brass or aluminum securely attached to equipment.

PART 3 - EXECUTION

1.3 PREPARATION

A. Surfaces to receive labels or nameplates shall be carefully prepared in accordance with the manufacturer's instructions and recommendations.

1.4 NAMEPLATES

J. Nameplates shall be properly attached to identify panelboards, feeder circuit breakers, disconnect switches, pull boxes and other similar equipment furnished under this section.

1.5 WIRE MARKERS

K. Wire markers shall be applied to each conductor or cable within panelboards, motor starter enclosures, circuit breaker enclosures, disconnect switches, cabinets, junction boxes, pull boxes, and other similar equipment identifying the serving equipment and feeder or branch circuit from which the conductors originate.

END OF SECTION
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes load centers and panelboards, overcurrent protective devices, and associated auxiliary equipment rated 600 V and less for the following types:

1. Edit panelboards below to suit Project.

2. Lighting and appliance branch-circuit panelboards.

3. Distribution panelboards.

B. Related Sections include the following:

1. List below only products, construction, and equipment that the reader might expect to find in this Section but are specified elsewhere.

2. Retain subparagraph below if Project includes fusible panelboards.

3. Section "Fuses."

1.3 DEFINITIONS

A. Retain abbreviations that remain after this Section has been edited.

B. EMI: Electromagnetic interference.

C. GFCI: Ground-fault circuit interrupter.

D. RFI: Radio-frequency interference.

E. RMS: Root mean square.

F. SPDT: Single pole, double throw.

G. TVSS: Transient voltage surge suppressor.

1.4 SUBMITTALS
A. Product Data: For each type of panelboard, overcurrent protective device, TVSS device, accessory, and component indicated. Include dimensions and manufacturers’ technical data on features, performance, electrical characteristics, ratings, and finishes.

B. Shop Drawings: For each panelboard and related equipment.
   1. Dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings. Include the following:
      a. Enclosure types and details for types other than NEMA 250, Type 1.
      b. Bus configuration, current, and voltage ratings.
      c. Short-circuit current rating of panelboards and overcurrent protective devices.
      d. Delete subparagraph below if series rating of overcurrent protective devices is not used.
      e. UL listing for series rating of installed devices.
      f. Features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
   2. Wiring Diagrams: Diagram power, signal, and control wiring and differentiate between manufacturer-installed and field-installed wiring.

C. Delete paragraph below if independent testing agency is not used.

D. Qualification Data: Submit data for testing agencies indicating that they comply with qualifications specified in “Quality Assurance” Article.

E. Field Test Reports: Submit written test reports and include the following:
   1. Test procedures used.
   2. Test results that comply with requirements.
   3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

F. Panelboard Schedules: For installation in panelboards. Submit final versions after load balancing.

G. Maintenance Data: For panelboards and components to include in maintenance manuals specified in other sections. In addition to requirements specified in Section “Contract Closeout,” include the following:
   1. Manufacturer’s written instructions for testing and adjusting overcurrent protective devices.
   2. Time-current curves, including selectable ranges for each type of overcurrent protective device.

1.5 QUALITY ASSURANCE

A. Retain paragraph and subparagraph below if Contractor or manufacturer selects testing agency.
B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with NEMA PB 1.

D. Comply with NFPA 70.

1.6 COORDINATION

A. Edit below to delete or add types of equipment that affect panelboard installation.

B. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, and encumbrances to workspace clearance requirements.

1.7 EXTRA MATERIALS

A. Extra materials may not be allowed for publicly funded projects. Revise quantity below to suit Project.

B. Keys: [SIX] 6 spares of each type of panelboard cabinet lock.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Retain above for nonproprietary or below for semiproprietary Specification. Refer to Division 1 Section "Materials and Equipment."

C. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Lists below are examples only. Retain or insert only those manufacturers whose products correspond with other requirements and whose availability and suitability for the application have been verified.

2. Panelboards, Overcurrent Protective Devices, Controllers, Contactors, and Accessories:
   a. Eaton
   b. Square D Co.
   c. General Electric

2.2 FABRICATION AND FEATURES

A. Enclosures: Flush- and surface-mounted cabinets. NEMA PB 1, Type 1, to meet environmental conditions at installed location.

1. Delete items below if not applicable. Add other Project-specific requirements.

2. Outdoor Locations: NEMA 250, Type 3R.
3. Other Wet or Damp Indoor Locations: NEMA 250, Type 4.

4. Enclosures in hazardous locations must be carefully selected to meet the division and group listing of the environment.

5. Hazardous Areas Indicated on Drawings: NEMA 250, Type 7C.

B. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box.

C. Retain paragraph above or below.

D. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover.

E. Finish: Manufacturer's standard enamel finish over corrosion-resistant treatment or primer coat.

F. Directory Card: With transparent protective cover, mounted inside metal frame, inside panelboard door.


H. Main and Neutral Lugs: Copper mechanical type suitable for use with conductor material.

I. Ten paragraphs below are special features. Add other required features and coordinate with Drawings.

J. Equipment Ground Bus: Copper and adequate for feeder and branch-circuit equipment ground conductors; bonded to box.

K. Delete paragraph below except for panelboards incorporating one or more main service disconnect switches. Edit to suit Project.

L. Service Equipment Label: UL labeled for use as service equipment for panelboards with main service disconnect switches.

M. Delete paragraph below if future provisions are not required.

N. Isolated Equipment Ground Bus: Copper and adequate for branch-circuit equipment ground conductors; insulated from box.

O. Extra-Capacity Neutral Bus: Copper neutral bus rated 200 percent of phase bus and UL listed as suitable for nonlinear loads.

P. Split Bus: Vertical buses divided into individual vertical sections.

Q. Skirt for Surface-Mounted Panelboards: Same gage and finish as panelboard front with flanges for attachment to panelboard, wall, and ceiling or floor.

R. Gutter Barrier: Arrange to isolate individual panel sections.

S. Column-Type Panelboards: Narrow gutter extension, with cover, to overhead junction box equipped with ground and neutral terminal buses.
T. Feed-through Lugs: Copper mechanical type suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.

2.3 PANELBOARD SHORT-CIRCUIT RATING

A. Select one of two paragraphs below for series-rated system or system that has panelboards and circuit breakers rated for full value of short-circuit current available at location of equipment. Edit to suit Project and coordinate with Drawings.

B. Fully rated to interrupt symmetrical short-circuit current available at terminals.

2.4 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

A. Branch Overcurrent Protective Devices: Plug-in or bolt on circuit breakers, replaceable without disturbing adjacent units.

B. Coordinate below with Drawings.

C. Doors: Front mounted with concealed hinges; secured with flush latch with tumbler lock; keyed alike.

2.5 DISTRIBUTION PANELBOARDS

A. Edit three paragraphs and associated subparagraphs below to suit Project. Coordinate with Drawings.

B. Doors: Front mounted, except omit in fused-switch panelboards; secured with vault-type latch with tumbler lock; keyed alike.

C. Main Overcurrent Protective Devices: Circuit breaker.

D. Branch overcurrent protective devices shall be one of the following:

1. For Circuit-Breaker Frame Sizes 125 A and Smaller: Plug-in or Bolt-on circuit breakers.

2. For Circuit-Breaker Frame Sizes Larger Than 125 A: Bolt-on circuit breakers; plug-in circuit breakers where individual positive-locking device requires mechanical release for removal.

2.6 OVERCURRENT PROTECTIVE DEVICES

A. Edit three paragraphs and associated subparagraphs below to suit Project. Coordinate with schedules and Drawings.

B. Molded-Case Circuit Breaker: NEMA AB 1, with interrupting capacity to meet available fault currents.


2. Electronic Trip Unit Circuit Breakers: RMS sensing; field-replaceable rating plug; with the following field-adjustable settings:

   a. Instantaneous trip.
b. Long- and short-time pickup levels.

c. Long- and short-time time adjustments.

d. Ground-fault pickup level, time delay, and \( I^2t \) response.

3. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller; let-through ratings less than NEMA FU 1, RK-5.

4. Integrally Fused Circuit Breakers: Thermal-magnetic trip element with integral limiter-style fuse listed for use with circuit breaker; trip activation on fuse opening or on opening of fuse compartment door.


C. Molded-Case Circuit-Breaker Features and Accessories. Standard frame sizes, trip ratings, and number of poles.

1. Lugs: Mechanical style, suitable for number, size, trip ratings, and material of conductors.

2. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HACR for heating, air-conditioning, and refrigerating equipment.


D. Fused Switch: NEMA KS 1, Type HD; clips to accommodate specified fuses; lockable handle.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install panelboards and accessories according to NEMA PB 1.1.

B. Mounting Heights: Top of trim 74 inches (1880 mm) above finished floor, unless otherwise indicated.

C. Mounting: Plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish.

D. Revise paragraph below if "Balancing Loads" Paragraph is deleted from "Field Quality Control" Article below.

E. Circuit Directory: Create a directory to indicate installed circuit loads after balancing panelboard loads. Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are not acceptable.

F. Install filler plates in unused spaces.

G. Revise below if "Balancing Loads" Paragraph is deleted from "Field Quality Control" Article below.
H. Wiring in Panelboard Gutters: Arrange conductors into groups and bundle and wrap with wire ties after completing load balancing.

3.2 IDENTIFICATION

A. Select Division 16 Section "Basic Electrical Materials and Methods" for projects with simple requirements and Division 16 Section "Electrical Identification" for projects with complex requirements.

B. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs as specified in Section "Basic Electrical Materials and Methods" [Electrical Identification."

C. Panelboard Nameplates: Label each panelboard with engraved metal or laminated-plastic nameplate mounted with corrosion-resistant screws.

3.3 CONNECTIONS

A. Coordinate paragraphs below with Drawings.

B. Install equipment grounding connections for panelboards with ground continuity to main electrical ground bus.

C. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.4 FIELD QUALITY CONTROL

A. Prepare for acceptance tests as follows:

1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.

2. Test continuity of each circuit.

B. Testing: After installing panelboards and after electrical circuitry has been energized, demonstrate product capability and compliance with requirements.

1. Procedures: Perform each visual and mechanical inspection and electrical test indicated in NETA ATS, Section 7.5 for switches and Section 7.6 for molded-case circuit breakers. Certify compliance with test parameters.

2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

C. Balancing Loads: After Substantial Completion, but not more than 60 days after Final Acceptance, measure load balancing and make circuit changes as follows:

1. Measure as directed during period of normal system loading.

2. Perform load-balancing circuit changes outside normal occupancy/working schedule of the facility and at time directed. Avoid disrupting critical 24-hour services such as fax machines and on-line data-processing, computing, transmitting, and receiving equipment.
3. After circuit changes, recheck loads during normal load period. Record all load readings before and after changes and submit test records.

4. Tolerance: Difference exceeding 20 percent between phase loads, within a panelboard, is not acceptable. Rebalance and recheck as necessary to meet this minimum requirement.

3.5 ADJUSTING

A. Set field-adjustable switches and circuit-breaker trip ranges.

3.6 CLEANING

A. On completion of installation, inspect interior and exterior of panelboards. Remove paint splatters and other spots. Vacuum dirt and debris; do not use compressed air to assist in cleaning. Repair exposed surfaces to match original finish.

END OF SECTION
PART 1 - GENERAL

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

1.2 SUMMARY
   A. This Section includes receptacles, connectors, switches, and finish plates.

1.3 DEFINITIONS
   A. Retain abbreviations that remain after this Section has been edited for Project.
   B. GFI: Ground-fault circuit interrupter.
   C. TVSS: Transient voltage surge suppressor.

1.4 SUBMITTALS
   A. Product Data: For each product specified.
   B. Shop Drawings: Legends for receptacles and switch plates.
   C. Include sample review below if products may have critical features needing hands-on appraisal.
   D. Samples: For devices and device plates for color selection and evaluation of technical features.
   E. Maintenance Data: For materials and products to include in maintenance manuals specified in other sections.

1.5 QUALITY ASSURANCE
   A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.
   B. Comply with NEMA WD 1.
   C. Comply with NFPA 70.

1.6 COORDINATION
   A. Delete paragraph below unless receptacles for Owner-Furnished equipment with plugs have unknown configurations.
   B. Receptacles for Owner-Furnished Equipment: Match plug configurations.
   C. Coordinate with pool contractor for special receptacles.
PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Wiring Devices:
   a. Bryant Electric, Inc.
   b. Eagle Electric Manufacturing Co., Inc.
   c. GE Company; GE Wiring Devices.
   e. Killark Electric Manufacturing Co.
   f. Leviton Manufacturing Co., Inc.
   g. Pass & Seymour/Legrand; Wiring Devices Div.
   h. Pyle-National, Inc.; an Amphenol Co.

2.2 RECEPTACLES

A. Select one of three paragraphs below to specify grade of receptacles. See Editing Instruction No. 3 in the Evaluations for wiring device grades.

B. Straight-Blade and Locking Receptacles: Heavy-Duty grade. The device shall be 20-ampere, 125-volts, Nema configuration 5-20R, back and side wired.

C. Special Receptacles for NEMA configuration refer to Manufacturer specs.

D. Termination-type GFCI unit may be substituted for feed-through type where no protection of downstream receptacles is required.

E. GFI Receptacles: Feed-through type, with integral NEMA WD 6, Configuration 5-20R duplex receptacle arranged to protect connected downstream receptacles on same circuit. Design units for installation in a 2-3/4-inch- (70-mm-) deep outlet box without an adapter. Device shall have an indicator light.

F. Isolated-Ground Receptacles: Equipment grounding contacts connected only to the green grounding screw terminal of the device with inherent electrical isolation from mounting strap. Device shall be white finish with the orange symbol.

2. Devices: Listed and labeled as isolated-ground receptacles.

3. Isolation Method: Integral to receptacle construction and not dependent on removable parts.

2.3 SWITCHES

A. General
1. Switches shall be toggle rocker type as indicated herein. The body of the switch shall be made of an arc-resistant thermoset material. All toggle switch handles shall be constructed of a thermoplastic material. All rocker switch handles shall be constructed of a thermoset material. All wall switches shall be of the quiet AC type.

2. Switches shall be SPST, DPST, 3-way or 4-way as indicated on the Drawings.

3. Switch color shall be white unless noted otherwise. Coordinate with Architect.

B. Specification Grade

1. Specification Grade switches shall be toggle type. The contact arms shall be made of one-piece copper alloy material. The switch shall include a green ground screw attached to the mounting strap. The switch shall be 20-ampere, 120/277-volts AC, horsepower rated, back and side-wired.

C. Dimmer Switches: Modular, full-wave, solid-state units with integral, quiet on/off switches and audible and electromagnetic noise filters.

1. Modify subparagraph below to suit preference.

2. Control: Continuously adjustable slide, toggle, or rotary knob. Single-pole or three-way switch to suit connections.

3. Incandescent Lamp Dimmers: Modular, 120 V, 60 Hz with continuously adjustable slide with “on/off” switch; single pole with soft tap or other quiet switch; electromagnetic filter to eliminate noise, RF, and TV interference; and 5-inch (130-mm) wire connecting leads. Dimmer to be sized per circuit load.

2.4 WALL PLATES (All wall plates)

A. For all single and combination types match corresponding wiring devices.

4. Plate-Securing Screws: Metal with head color to match plate finish.

5. Select one of five subparagraphs below. Coordinate with Division 9 Section "Painting."

6. Material for Finished Spaces: 0.04-inch- (1-mm-) thick, Type 302, satin-finished stainless steel.

7. Select one of three subparagraphs below or delete all.


2.5 FLOOR SERVICE FITTINGS

A. Items in this Article are available for telephone and data cable service as well as power. Edit to suit Project.

B. Select one of three paragraphs below.

C. Power Receptacle: NEMA WD 6, Configuration 5-20R, gray finish, unless otherwise indicated.

D. Signal Outlet: Blank cover with bushed cable opening, unless otherwise indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

B. Fasken Community Center Pool & Amenities - 26 27 26
City of Laredo WIRING DEVICES
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A. Install devices and assemblies plumb and secure.

B. Install wall plates when painting is complete.

C. Install wall dimmers to achieve indicated rating after derating for ganging as instructed by manufacturer.

D. Do not share neutral conductor on load side of dimmers.

E. Coordinate two paragraphs below with Drawings.

F. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical, and grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.

G. Protect devices and assemblies during painting.

H. Adjust locations at which floor service outlets and telephone/power service poles are installed to suit arrangement of partitions and furnishings.

I.

3.2 IDENTIFICATION

A. Comply with Section "Electrical Identification."

B. Select paragraph above or below.

C. Comply with Section "Basic Electrical Materials and Methods."

   1. Switches: Where three or more switches are ganged, and elsewhere as indicated, identify each switch with approved legend engraved on wall plate.

   2. Receptacles: Identify panelboard and circuit number from which served. Use machine-printed, pressure-sensitive, abrasion-resistant label tape on face of plate and durable wire markers or tags within outlet boxes.

3.3 CONNECTIONS

A. Select paragraph above or below. Coordinate with Division 16 Section "Grounding."

B. Connect wiring device grounding terminal to branch-circuit equipment grounding conductor.

C. Isolated-Ground Receptacles: Connect to isolated-ground conductor routed to designated isolated equipment ground terminal of electrical system.

D. Tighten electrical connectors and terminals according to manufacturers published torque-tightening values. If manufacturers torque values are not indicated, use those specified in UL 486A and UL 486B.

3.4 FIELD QUALITY CONTROL

A. Test wiring devices for proper polarity and ground continuity. Operate each device at least six times.

B. Dparagraph below if GFCIs are not in Part 2.
C. Test GFCI operation with both local and remote fault simulations according to manufacturer’s written instructions.

D. Replace damaged or defective components.

3.5 CLEANING

A. Internally clean devices, device outlet boxes, and enclosures. Replace stained or improperly painted wall plates or devices.

END OF SECTION
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Fuses.

1.3 SUBMITTALS

A. Use this Article to convey basic design intent. Delete if Drawings show sufficient detail to clarify intent.

B. General: Submit each item in this Article according to the Conditions of the Contract and Specification Sections.

C. Product Data for each fuse type specified.

D. Select above or below. Data listed in paragraph below are appropriate where selective coordination is necessary.

E. Field test reports indicating and interpreting test results.

F. Maintenance data for tripping devices to include in the operation and maintenance manual specified in other sections.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain fuses from one source and by a single manufacturer.

B. Comply with NFPA 70 for components and installation.

C. Listing and Labeling: Provide fuses specified in this Section that are listed and labeled.

1. The Terms "Listed" and "Labeled": As defined in the National Electrical Code, Article 100.

2. Subparagraph below is required by some Federal agencies.

3. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.
1.5 EXTRA MATERIALS

A. Extra materials may not be allowed for publicly funded projects.

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

1. Spare Fuses: Furnish quantity equal to 20 percent of each fuse type and size installed, but not less than 1 set of 3 of each type and size.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering fuses that may be incorporated into the Work include, but are not limited to, the following:

B. Retain above for nonproprietary or below for semiproprietary Specification. Refer to Division 1 Section "Materials and Equipment."

C. Manufacturers: Subject to compliance with requirements, provide fuses by one of the following:

1. See Editing Instruction No. 1 in the Evaluations for cautions about naming products and manufacturers.


4. Ferraz Corp.


2.2 CARTRIDGE FUSES

A. Characteristics: NEMA FU 1, nonrenewable cartridge fuse; class as specified or indicated; current rating as indicated; voltage rating consistent with circuit voltage.

2.3 SPARE FUSE CABINET

A. Cabinet: Wall-mounted, 0.05-inch- (1.27-mm-) thick steel unit with full-length, recessed piano-hinged door with key-coded cam lock and pull.

1. Size: Adequate for orderly storage of spare fuses specified with 15 percent spare capacity minimum.
2. Finish: Gray, baked enamel.

3. Identification: Stencil legend “SPARE FUSES” in 1-1/2-inch (40-mm) letters on door.

4. Fuse Pullers: For each size fuse.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine utilization equipment nameplates and installation instructions to verify proper fuse locations, sizes, and characteristics.

B. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 FUSE APPLICATIONS

A. Select and edit paragraphs below. Add paragraphs as Project requires to specify fuse applications rather than show them on Drawings.

B. Motor Branch Circuits: Class RK1, time delay.

C. Other Branch Circuits: Class RK5, non-time delay.

3.3 INSTALLATION

A. Install fuses in fusible devices as indicated. Arrange fuses so fuse ratings are readable without removing fuse.

B. Install spare fuse cabinet where indicated.

3.4 IDENTIFICATION

A. Install typewritten labels on inside door of each fused switch to indicate fuse replacement information.

END OF SECTION
PART 1 - GENERAL

1.1 RELATED REQUIREMENTS


1.2 SCOPE OF WORK

A. Provide labor, materials, equipment, tools and services, and perform operations required for, and reasonably incidental to, the providing of disconnect switches, including all related systems and accessories.

1.3 SUBMITTALS

A. Submit product data and shop drawings in accordance with other Sections for products specified under PART 2 - PRODUCTS.

B. Provide outline drawings with dimensions, and equipment ratings for voltage, amperage, horsepower and short circuit.

C. Provide designations for each disconnect. RE: to section 16075.

1.4 REFERENCE STANDARDS

A. Switches shall be manufactured in accordance with the following standards:

1. UL 98 - Enclosed and Dead Front Switches

2. NEMA KS1 - Enclosed Switches

3. NEMA 250 - Enclosures for Electrical Equipment

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Eaton

B. Square D Co.

C. General Electric

2.2 GENERAL

A. Switches shall be heavy duty type.

2.3 SWITCH INTERIOR
A. Switches shall have switch blades which are visible when the switch is OFF and the cover is open.

D. Lugs shall be copper and front removable and UL listed for 60°C or 75°C conductors 30-100 ampere, 75°C conductors 200 ampere and up.

E. Current carrying parts shall be plated to resist corrosion.

F. Switches shall have removable arc suppressor to facilitate easy access to line side lugs.

G. Switches shall have provisions for a field installable electrical interlock.

2.4 SWITCH MECHANISM

A. Switch operating mechanism shall be quick-make, quick-break such that, during normal operation of the switch, the operation of the contacts shall not be capable of being restrained by the operating handle after the closing or opening action of the contacts has started.

B. The operating handle shall be an integral part of the box, not the cover.

C. Provisions for padlocking the switch in the OFF position with at least three padlocks shall be provided.

D. The handle position shall travel at least 90° between OFF and ON positions to clearly distinguish and indicate handle position.

E. Switches shall have a dual cover interlock mechanism to prevent unintentional opening of the switch cover when the switch is ON and prevent turning the switch ON when the cover is open. The cover interlock mechanism shall have an externally operated override but the override shall not permanently disable the interlock mechanism. The tool used to override the cover interlock mechanism shall not be required to enter the enclosure in order to override the interlock.

2.5 SWITCH ENCLOSURES

A. Switch covers shall be attached with welded pin-type hinges (Type 1) or top-hinged, attached with removable screws and securable in the open position (Type 3R).

B. The enclosure shall be finished with gray baked enamel paint which is electrodeposited on cleaned, phosphate pre-treated steel (Type 1) or gray baked enamel paint which is electrodeposited on cleaned, phosphate pre-treated galvannealed steel (Type 3R).

C. The enclosure shall have ON and OFF markings stamped into the cover.

D. The operating handle shall be provided with a dual colored, red/black position indication.

E. Switches shall have provisions to accept up to three 3/8" hasp padlocks to lock the operating handle in the OFF position.

H. Tangential knockouts shall be provided to facilitate ease of conduit entry (Type 1).

I. Type 3R enclosure shall contain no knockouts. Supply watertight hubs.

J. Type 4x shall be stainless steel enclosure with no knockouts. Supply watertight hubs.
2.6 SWITCH RATINGS

A. Switches shall be horsepower rated.

B. The UL listed short circuit current rating of the switches shall be: 200,000 rms symmetrical amperes when used with or protected by Class R or Class J fuses 30-600 ampere employing appropriate fuse rejection schemes.

PART 3- EXECUTION

3.1 INSTALLATION

D. Install disconnect switches where indicated shown or not shown.

E. Install fuses in fusible disconnect switches.

END OF SECTION
PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

A. The General Provisions, Supplemental General Provisions, Special Provisions, apply to work covered by this Section.

B. Comply with Electrical Sections, as applicable. Refer to other Sections for coordination of work.

1.2 SCOPE OF WORK

A. Provide labor, material, equipment, tools and services, and perform operations required for, and reasonably incidental to, the providing of a high-energy power conditioning surge protection device(s) at branch circuit panelboards where indicated on the Drawings. The device shall incorporate transient voltage surge suppression (TVSS) and high-frequency electrical line noise filtering. The device shall provide effective high energy transient voltage suppression, surge current diversion, high-frequency attenuation, and line stabilization in ANSI/IEEE C62.41-2002 environments connected downstream from the facility's main overcurrent protective device. The device shall be connected in parallel with the facility's wiring system.

B. The device shall be installed as an integral part or external of the panelboard, switchboard.

1.3 SUBMITTALS

A. Submit product data and shop drawings for products specified under PART 2 - PRODUCTS.

B. Manufacturers' Product Data: Submit material specifications and installation data for products specified under PART 2 - PRODUCTS.

C. Shop Drawings: Submit shop drawings to indicate information not fully described by the product data to indicate compliance with the contract documents.

1. Include electrical characteristics and ratings for the specified equipment.

2. Include wiring diagrams indicating the internal connections of the specified equipment within its enclosure.

3. Drawings shall be provided indicating device dimensions, weights, mounting provisions, connection details and wiring diagrams.

4. Documentation of the specified device UL 1449 3rd Edition voltage protection rating (VPR) and per mode surge current rating shall be included. All submittals without this documentation will be rejected.


D. Record Drawings
1.4 QUALITY ASSURANCE

A. Industry Reference Standards and Publications: The device shall be designed, manufactured, tested and installed in compliance with the latest editions of:

1. American National Standards Institute (ANSI) and Institute of Electrical and Electronic Engineers (ANSI/IEEE C62.41-2002 and C62.45-2002)
2. Federal Information Processing Standards Publication 94 (FIPS PUB 94)
3. National Electrical Manufacturers Association (NEMA LS-1)
4. National Fire Protection Association (NFPA 70, National Electrical Code (NEC), 75 and 78)
5. Underwriters Laboratories UL 1449 Standard for Transient Voltage Surge Suppressors Surge Protection Devices and UL 1283 Standard for Electromagnetic Interference Filters.

B. The device shall be UL listed under UL 1449 and UL 1283 complimentary listed.

C. The device shall be warranted against defects in material and/or workmanship and any failure or end-of-life event including lightning for a minimum of TEN (10) years from the date of shipment.

D. The device shall be thoroughly factory-tested before shipment. Testing of the device shall include but not be limited to quality control checks, maximum continuous operating voltage (MCOV) check, and clamping voltage verification tests. The MCOV check shall consist of a minimum of one (1) hour burn-in at the applicable MCOV.

1.5 SYSTEM DESCRIPTION

A. Environmental Requirements

1. Storage Temperature: Storage temperature range shall be -40° to +85° C (-40° to +185° F).
2. Operating Temperature: Operating temperature range shall be -40° to +60° C (-40° to 140° F).
3. Relative Humidity: Operation shall be reliable in an environment with 5% to 95% non-condensing relative humidity.
4. Operating Altitude: The device shall be capable of operation in an altitude of 0 - 12,000 feet above sea level.
5. Audible Noise: The device shall not generate any audible noise.
6. Magnetic Fields: No appreciable magnetic fields shall be generated. The device shall be capable of use directly in computer rooms in any location without danger to data storage systems or devices.
7. Electrical Requirements

8. Device Operating Voltage: The nominal operating voltage and configuration shall be that of the switchgear, distribution panel, sub or branch panelboard. Maximum Continuous Operating Voltage (MCOV): The...
allowable maximum continuous operating voltage of all suppression components utilized in the unit shall not be less than 115% of the nominal operating voltage.

9 Operating Frequency: The operating frequency range of the device shall be 47 to 63 Hertz.

10 Protection Modes: The device's primary mode of protection shall be line-to-neutral. The secondary modes of protection shall be line-to-ground and neutral-to-ground.

11 Surge Current Capacity and Voltage Protection Rating: Unless specifically noted on the drawings and/or the schedules, the surge current capacity, and the voltage protection rating of the SPD shall be not less than listed on the following table.

<table>
<thead>
<tr>
<th>Location</th>
<th>Per Mode Surge Current Rating</th>
<th>120/208va 3 phase VPR</th>
<th>277/480vac 3 phase VPR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switchgear</td>
<td>200,000 amps</td>
<td>900v</td>
<td>1200v</td>
</tr>
<tr>
<td>Distribution Panel</td>
<td>150,000 amps</td>
<td>900v</td>
<td>1200v</td>
</tr>
<tr>
<td>Sub or Branch Panel</td>
<td>100,000 amps</td>
<td>900v</td>
<td>1200v</td>
</tr>
</tbody>
</table>

The above text gives you the option to request a specific surge current rating on the riser or panel schedules.

5. Construction: SPD’s with a surge current rating of greater than 155,000 amps per mode shall be field serviceable modular devices. SPD’s with a surge current rating of less than 155,000 amps may be non-modular.

1.6 DOCUMENTATION

A. Equipment Manual. The manufacturer shall furnish an equipment manual with installation, operation, and maintenance instructions for the system.

PART 2 - PRODUCTS

3.1 MANUFACTURER

1 Square D
2 Cutler-Hammer
3 Current Technology
4 THOR SYSTEMS

3.2 TRANSIENT VOLTAGE SURGE SUPPRESSION COMPONENTS

A. The device shall include a solid-state suppression system which includes arrays of fused non-linear
voltage dependent metal oxide varistors (MOV’s) with similar operating characteristics. The suppression system shall not utilize gas tubes, spark gaps, silicon avalanche diodes or other components which might short or crowbar the line, thus leading to interruption of normal power flow to or system upset of connected loads. The suppression system shall not incorporate any other components which may degrade performance or reliability of the

3.3 HIGH-FREQUENCY FILTER

A. The device shall include a UL 1283 high frequency extended range tracking filter. The filter shall reduce fast rise-time, high-frequency, error-producing transients and electrical line noise eliminating disturbances which may lead to system upset. The filter shall provide minimum insertion loss of 45 dB at 100 kHz attenuation frequency utilizing the MIL-STD-E220A 50 ohm insertion loss methodology.

3.4 INTERNAL CONNECTIONS

a. All internal wiring associated with the suppression/filter device and subject to surge currents shall utilize low-impedance copper bus bar and/or #4 AWG copper conductor or larger. All internal connections associated with the suppression/filter device and subject to surge currents shall be made with compression solderless-type lugs and shall be bolted to the bus bars in order to reduce overall system impedance.

3.5 FIELD CONNECTIONS

A. The device shall include mechanical lugs for each phase, neutral and ground, or permanently connected conductors as applicable. The lugs shall accommodate up to #4 AWG copper conductor.

3.6 ENCLOSURE

A. The device shall be provided in a surface mounted NEMA 1 type hinged enclosure, with a NEMA rating that matches or exceeds that of the switchgear, distribution panel, sub or branch panelboard that is being protected. of minimum 14 gauge steel, painted inside and out. Enclosure width shall not be greater than 24 inches.

3.7 MONITORING

a. The device shall include solid-state, long-life externally mounted LED visual status indicators that indicate the on-line status of each phase of the unit.

b. Dry Contacts

c. Audible alarm with silence switch

d. For Service Entrance or Switchgear SPD’s: LED visual status indicators, Audible alarm with silence switch, Dry Contacts plus Surge Event Counter.

PART 3 - EXECUTION

3.1 INSTALLATION

A. The installation and testing of the system shall be in full accordance with the manufacturer's installation, operation and maintenance instructions, and all national and local codes.

B. The device shall be installed as close as practical to the facility's wiring system in accordance with NEC Article 285, IEEE 1100-2005 section 8.4.2.5, plus applicable national/local electrical codes and the
manufacturer's recommended installation instructions. Connection shall be from a minimum 40A branch circuit breaker in the switchgear, distribution panel or panelboard with #4 AWG copper conductors not any longer than necessary, avoiding unnecessary bends. Advise the engineer if the installed In no case shall conductors will be longer than 3 feet in length. Verify circuit breaker size with manufacturer.

3.2 TESTING

A. The system shall be field tested in the presence of the Owner. At the same time operational procedures shall be reviewed with the Owner.

B. If external test equipment is required, two (2) testers shall be furnished to the owner and two (2) training sessions shall be furnished. The first training session shall be with 90 days of occupancy and the second training session shall be not less eight months, but not more than 12 months after the first training session. Training and test equipment shall be furnished at no additional cost to the owner.

END OF SECTION
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes interior lighting fixtures, lighting fixtures mounted on exterior building surfaces, emergency lighting units, and accessories.

B. Related Sections include the following:

1.3 SUBMITTALS

A. Product Data: For each type of lighting fixture indicated, arranged in order of fixture designation. Include data on features, accessories, and the following:

1. Dimensions of fixtures.

2. Select one of two subparagraphs below. With second subparagraph, photometric tests by manufacturer's laboratory are acceptable.

3. Certified results of laboratory tests for fixtures and lamps for photometric performance.

4. Emergency lighting unit battery and charger.

5. LED lights

6. Retain two subparagraphs below for projects with air-handling fixtures.

7. Types of lamps.

B. Delete paragraph and subparagraph below unless custom fixtures are indicated.

C. Shop Drawings: Show details of nonstandard or custom fixtures. Indicate dimensions, weights, method of field assembly, components, features, and accessories.

1. Wiring Diagrams: Detail wiring for fixtures and differentiate between manufacturer-installed and field-installed wiring.

D. Consider retaining paragraph below for projects with congested ceiling space and where Drawings do not include comprehensive reflected ceiling plans.
E. Coordination Drawings: Reflected ceiling plans and sections drawn to scale and coordinating fixture installation with ceiling grid, ceiling-mounted items, and other components in the vicinity. Include work of all trades that is to be installed near lighting equipment.

F. Retain paragraph and subparagraphs below if fixture Samples are required for verification purposes. Edit if sample requirements are indicated in other than interior lighting fixture schedule. As an alternative, list of fixture types for sample submission can be added below.

G. Delete paragraph below if not required.

H. Product Certificates: Signed by manufacturers of lighting fixtures certifying that products comply with requirements.

I. Delete paragraph below except for projects with extensive tests of emergency lighting equipment.

J. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

K. Maintenance Data: For lighting fixtures to include in maintenance manuals in the close out documents.

1.4 QUALITY ASSURANCE

A. Fixtures, Emergency Lighting Units, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by an acceptable to authorities having jurisdiction.

B. Comply with NFPA 70.

C. Delete paragraph below if FM compliance is not required. Coordinate with Drawings.

D. NFPA 101 Compliance: Comply with visibility and luminance requirements for exit signs.

1.5 COORDINATION

A. Retain this Article if Coordination Drawings are not required.

B. Fixtures, Mounting Hardware, and Trim: Coordinate layout and installation of lighting fixtures with ceiling system and other construction.

1.6 EXTRA MATERIALS

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

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products indicated in the Interior Lighting Fixture Schedule at the end of Part 3.
B. Products: Subject to compliance with requirements, provide one of the products indicated for each designation in the Interior Lighting Fixture Schedule in the plans. Submit Manufacturers as is in the Lighting Fixture Schedule or Equal. Submit Equal Manufacturers 10 days prior to bidding day for approval. For Equal Manufacturers submit lighting calculation for each equal fixture submitted for approval.

2.2 FIXTURES AND FIXTURE COMPONENTS, GENERAL

A. Metal Parts: Free from burrs, sharp corners, and edges.

B. Sheet Metal Components: Steel, unless otherwise indicated. Form and support to prevent warping and sagging.

C. Doors, Frames, and Other Internal Access: Smooth operating, free from light leakage under operating conditions, and arranged to permit relamping without use of tools. Arrange doors, frames, lenses, diffusers, and other pieces to prevent accidental falling during relamping and when secured in operating position.

D. Reflecting Surfaces: Minimum reflectance as follows, unless otherwise indicated:
   1. White Surfaces: 85 percent.
   2. Specular Surfaces: 83 percent.
   3. Diffusing Specular Surfaces: 75 percent.
   4. Laminated Silver Metallized Film: 90 percent.

E. Lenses, Diffusers, Covers, and Globes: 100 percent virgin acrylic plastic or annealed crystal glass, unless otherwise indicated.
   1. Plastic: High resistance to yellowing and other changes due to aging, exposure to heat, and ultraviolet radiation.
   2. Lens Thickness: 0.125 inch (3 mm) minimum, unless greater thickness is indicated.

2.3 LED FIXTURES

A. Except as otherwise indicated, provide LED luminaires, of types and sizes indicated on fixture schedules.

B. Include the following features unless otherwise indicated:
   1. Each Luminaire shall consist of an assembly that utilizes LEDs as the light source. In addition, a complete luminaire shall consist of a housing, LED array, and electronic driver (power supply).
   2. Each luminaire shall be rated for a minimum operational life of 50,000 hours utilizing a minimum ambient temperature of (25°C).
   3. Light Emitting Diodes tested under LM-80 Standards for a minimum of 12,000 hours.
   4. Color Rendering Index (CRI) of 82 at a minimum.
5. Color temperature [3500] <Insert value> K, unless otherwise indicated.

6. Rated lumen maintenance at 70% lumen output for 50,000 hours, unless otherwise indicated.

7. Fixture efficacy of 60 Lumens/Watt, minimum.

8. 5 year luminaire warranty, minimum.


10. The individual LEDs shall be constructed such that a catastrophic loss of the failure of one LED will not result in the loss of the entire luminaire.

11. Luminaire shall be constructed such that LED modules may be replaced or repaired without the replacement of the whole fixture.

C. Technical Requirements

1. Luminaire shall have a minimum efficacy of 60 lumens per watt. The luminaire shall not consume power in the off state.

2. Operation Voltage: The luminaire shall operate from a 50 HZ to 60 HZ AC line over a voltage ranging from 120 VAC to 277 VAC. The fluctuations of line voltage shall have no visible effect on the luminous output.

3. Power Factor: The luminaire shall have a power factor of 0.9 or greater.

4. THD: Total harmonic distortion (current and voltage) induced into an AC power line by a luminaire shall not exceed 15 percent.

5. Operational Performance: The LED circuitry shall prevent visible flicker to the unaided eye over the voltage range specified above.

D. Thermal Management

1. The thermal management (of the heat generated by the LEDs) shall be of sufficient capacity to assure proper operation of the luminaire over the expected useful life.

2. The LED manufacturer’s maximum thermal pad temperature for the expected life shall not be exceeded.

3. Thermal management shall be passive by design. The use of fans or other mechanical devices shall not be allowed.

4. The luminaire shall have a minimum heat sink surface such that LED manufacturer’s maximum junction temperature is not exceeded at maximum rated ambient temperature.

2.4 LED EXIT SIGNS

A. Exit light fixtures shall meet applicable requirements of NFPA and UL.
B. Housing and door shall be die-cast aluminum.

C. For general purpose exit light fixtures, door frame shall be hinged, with latch. For vandal-resistant exit light fixtures, door frame shall be secured with tamper-resistant screws.

D. Finish shall be satin or fine-grain brushed aluminum.

E. There shall be no radioactive material used in the fixtures.

F. Fixtures:

1. Inscription panels shall be cast or stamped aluminum a minimum of 2.25 mm (0.090 inch) thick, stenciled with 150 mm (6 inch) high letters, baked with red color stable plastic or fiberglass. Lamps shall be luminous Light Emitting Diodes (LED) mounted in center of letters on red color stable plastic or fiberglass.

2. Double-Faced Fixtures: Provide double-faced fixtures where required or as shown on drawings.

3. Directional Arrows: Provide directional arrows as part of the inscription panel where required or as shown on drawings. Directional arrows shall be the "chevron-type" of similar size and width as the letters and meet the requirements of NFPA 101.

G. Voltage: Multi-voltage (120 – 277V).

2.5 EMERGENCY LIGHTING UNITS

A. General Requirements: Self-contained units. Comply with UL 924. Units include the following features:

1. Battery: Sealed, maintenance-free, lead-acid type with minimum 5-year nominal life and special warranty.

2. Charger: Fully automatic, solid-state type with sealed transfer relay.

3. Operation: Relay automatically turns lamp on when supply circuit voltage drops to 80 percent of nominal voltage or below. Lamp automatically disconnects from battery when voltage approaches deep-discharge level. When normal voltage is restored, relay disconnects lamps, and battery is automatically recharged and floated on charger.

2.6 LAMPS

A. ALL LED – NO LAMPS

2.7 FINISHES

A. Fixtures: Manufacturer's standard, unless otherwise indicated.

PART 3 - EXECUTION

3.1 INSTALLATION
A. Fixtures: Set level, plumb, and square with ceiling and walls, and secure according to manufacturer's written instructions and approved submittal materials. Install lamps in each fixture.

B. NFPA 70 requires minimum support for fixtures. Retain paragraphs below for more specific support requirements and for requirements exceeding code minimums. Units in seismic zones must have additional supports and restraining devices beyond those specified here. See Editing Instruction No. 3 in the Evaluations.

C. Support for Fixtures in or on Grid-Type Suspended Ceilings: Do not use grid for support.

   1. Install a minimum of two ceiling support system wires for each fixture. Locate not more than 6 inches (150 mm) from fixture corners.

   2. Support Clips: Fasten to fixtures and to ceiling grid members at or near each fixture corner.

   3. Fixtures of Sizes Less Than Ceiling Grid: Arrange as indicated on reflected ceiling plans or center in acoustical panel, and support fixtures independently with at least two 3/4-inch (20-mm) metal channels spanning and secured to ceiling tees.

D. Suspended Fixture Support: As follows:

   1. Pendants and Rods: Where longer than 48 inches (1200 mm), brace to limit swinging.


3.2 CONNECTIONS

A. Ground equipment.

   1. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.3 FIELD QUALITY CONTROL

A. Inspect each installed fixture for damage. Replace damaged fixtures and components.

B. Advance Notice: Give dates and times for field tests.

C. Provide instruments to make and record test results.

D. Tests: As follows:

   1. Verify normal operation of each fixture after installation.

   2. Emergency Lighting: Interrupt electrical supply to demonstrate proper operation.

   3. Verify normal transfer to battery source and retransfer to normal.

   4. Report results in writing.
E. Malfunctioning Fixtures and Components: Replace or repair, then retest. Repeat procedure until units operate properly.

F. Corrosive Fixtures: Replace during warranty period.

3.4 CLEANING AND ADJUSTING

A. Clean fixtures internally and externally after installation. Use methods and materials recommended by manufacturer.

B. Adjust aimable fixtures to provide required light intensities.

END OF SECTION
SECTION 26 56 00
EXTERIOR LIGHTING

PART 1 - GENERAL

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

1.2 SUMMARY
   A. This Section includes exterior lighting units with luminaries and lamps.
   B. Related Sections include the following:
      1. Section "Interior Lighting" for interior fixtures, lamps, ballasts, emergency lighting units, and accessories; and for exterior luminaires normally mounted on buildings.

1.3 DEFINITIONS
   A. Lighting Unit: A luminaire or an assembly of luminaires complete with a common support, including pole, post, or other structure, and mounting and support accessories.
   B. Luminaire (Light Fixture): A complete lighting device consisting of lamp(s) and ballast(s), when applicable, together with parts designed to distribute light, to position and protect lamps, and to connect lamps to power supply.

1.4 SUBMITTALS
   A. Product Data: For each type of lighting unit indicated, arranged in order of lighting unit designation. Include data on features, accessories, finishes, and the following:
      1. Materials and dimensions of luminaries.
      2. Delete "independent" in subparagraph below if certified tests by manufacturer are adequate.
      3. Select one of two subparagraphs below. With second subparagraph, photometric tests by manufacturer's laboratory are acceptable.
      4. Certified results of independent laboratory tests for fixtures and lamps for electrical ratings and photometric data.
      5. Certified results of laboratory tests for fixtures and lamps for photometric performance.
      6. High-intensity-discharge luminaire ballasts.
   B. Product Certificates: Signed by manufacturers of lighting units certifying that products comply with requirements.
   C. Delete paragraph below except for projects with extensive tests of installations.
   D. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.
   E. Maintenance Data: For lighting units to include in maintenance manuals specified in other sections.

1.5 QUALITY ASSURANCE
   A. Luminaires and Accessories: Listed and labeled as defined in NFPA 70, Article 100, for their indicated use, location, and installation conditions by acceptable to authorities having jurisdiction

B. Fasken Community Center Pool & Amenities
City of Laredo
Trinity Engineering
12-18-2019
B. Comply with ANSI C2.

C. Comply with NFPA 70.

1.6 WARRANTY

A. General Warranty: LED fixture warranty is a five year limited warranty. Pole standard warranty is one year.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products indicated in the Exterior Lighting Unit Schedule at the end of Part 3.

B. Retain above for nonproprietary or below for semiproprietary Specification, and name products in schedules or details.

C. Products: Subject to compliance with requirements, provide one of the products indicated for each designation in the Interior Lighting Fixture Schedule in the plans. Submit Manufacturers as is in the Lighting Fixture Schedule or Equal. Submit Equal Manufacturers 10 days prior to bidding day for approval. For Equal Manufacturers submit lighting calculation for each equal fixture submitted for approval.

2.2 LUMINAIRES

A. Comply with IESNA RP-8 for parameters of lateral light distribution patterns indicated for luminaires.

B. Metal Parts: Free from burrs, sharp corners, and edges.

C. Sheet Metal Components: Corrosion-resistant aluminum, unless otherwise indicated. Form and support to prevent warping and sagging.

D. Housings: Rigidly formed, weather- and light-tight enclosures that will not warp, sag, or deform in use. Provide filter/breather for enclosed luminaires.

E. Doors, Frames, and Other Internal Access: Smooth operating, free from light leakage under operating conditions, and arranged to permit relamping without use of tools. Arrange doors, frames, lenses, diffusers, and other pieces to prevent accidental falling during relamping and when secured in operating position. Provide for door removal for cleaning or replacing lens. Arrange to disconnect ballast when door opens.

F. Exposed Hardware Material: Stainless steel.

G. Plastic Parts: High resistance to yellowing and other changes due to aging, exposure to heat, and ultraviolet radiation.

H. Reflecting Surfaces: Minimum reflectance as follows, unless otherwise indicated:
   1. White Surfaces: 85 percent.
   2. Specular Surfaces: 83 percent.
   3. Diffusing Specular Surfaces: 75 percent.
I. Lenses and Refractors: Materials as indicated. Use heat- and aging-resistant, resilient gaskets to seal and cushion lens and refractor in luminaire doors.

J. Photoelectric Relays: As follows:
   1. Contact Relays: Single throw, arranged to fail in the on position and factory set to turn light unit on at 1.5 to 3 fc (16 to 32 lx) and off at 4.5 to 10 fc (48 to 108 lx) with 15-second minimum time delay.
   2. Relay Mounting: In luminaire housing.

K. High-Intensity-Discharge Ballasts: Comply with ANSI C82.4. Constant wattage autotransformer or regulating high-power-factor type, unless otherwise indicated.
   1. Single-Lamp Ballasts: Minimum starting temperature of minus 40 deg C.
   2. Open-circuit operation will not reduce average life.
   3. High-Pressure Sodium Ballasts: Equip with a solid-state igniter/starter having an average life in pulsing mode of 10,000 hours at an igniter/starter case temperature of 90 deg C.
   4. Noise: Uniformly quiet operation, with a noise rating of B or better.

L. Lamps: Comply with the standard of the ANSI C78 series that is applicable to each type of lamp. Provide luminaires with indicated lamps of designated type, characteristics, and wattage. Where a lamp is not indicated for a luminaire, provide medium wattage lamp recommended by manufacturer for luminaire.

M. LED sources shall meet the following requirements:
   1. Operating temperature rating shall be between -40 degrees C (-40 degrees F) and 50 degrees C (120 degrees F).
   2. Correlated Color Temperature (CCT): 4000K
   4. The manufacturer shall have performed reliability tests on the LEDs luminaires complying with Illuminating

LED DRIVERS

A. LED drivers shall meet the following requirements:
   1. Drivers shall have a minimum efficiency of 85%.
   2. Starting Temperature: -40 degrees C (-40 degrees F).
   3. Input Voltage: 120 to 480 (±10%) volt.
   4. Power Supplies: Class I or II output.
   5. Surge Protection: The system must survive 250 repetitive strikes of “C Low” (C Low: 6kV/1.2 x 50 μs, 10kA/8 x 20 μs) waveforms at 1-minute intervals with less than 10% degradation in clamping voltage. “C Low” waveforms are as defined in IEEE/ASNI C62.41.2-2002, Scenario 1 Location Category C.
   6. Power Factor (PF): ≥ 0.90.
7. Total Harmonic Distortion (THD): ≤ 20%.
9. Drivers shall be reduction of hazardous substances (ROHS)-compliant.//

PART 3 - EXECUTION

3.1 CONNECTIONS
A. Ground equipment.
   1. Tighten electrical connectors and terminals according to manufacturer’s published torque-tightening values. If manufacturer’s torque values are not indicated, use those specified in UL 486A and UL 486B.
B. Ground metal poles/support structures according to Section "Grounding and Bonding."
   1. Nonmetallic Poles: Ground metallic components of lighting units and foundations. Connect luminaires to grounding system with No. 6 AWG conductor.

3.2 FIELD QUALITY CONTROL
A. Inspect each installed unit for damage. Replace damaged units.
B. Advance Notice: Give dates and times for field tests.
C. Provide instruments to make and record test results.
D. Tests and Observations: Verify normal operation of lighting units after installing luminaires and energizing circuits with normal power source, and as follows:

3.3 CLEANING AND ADJUSTING
A. Clean units after installation. Use methods and materials recommended by manufacturer.

END OF SECTION
SECTION 31 2316.16
STRUCTURAL EXCAVATION

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Excavating for building volume below grade, footings, pile caps, slabs-on-grade, paving, site structures, and utilities within the building.

1.02 RELATED REQUIREMENTS
A. Geotechnical report; bore hole locations and findings of subsurface materials.
B. Section 31 2323.16 - Structural Fill: Fill materials, filling, and compacting.

1.03 PROJECT CONDITIONS
A. Verify that survey bench mark and intended elevations for the Work are as indicated.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PREPARATION
A. Identify required lines, levels, contours, and datum locations.
B. Locate, identify, and protect utilities that remain and protect from damage.

3.02 EXCAVATING
A. Excavate to accommodate new structures and construction operations.
B. Notify Architect/Structural Engineer of Record of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
C. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.
D. Do not interfere with 45 degree bearing splay of foundations.
E. Cut utility trenches wide enough to allow inspection of installed utilities.
F. Hand trim excavations. Remove loose matter.
G. Correct areas that are over-excavated and load-bearing surfaces that are disturbed; see Section 31 2323.
H. Grade top perimeter of excavation to prevent surface water from draining into excavation.
I. Remove excavated material that is unsuitable for re-use from site.
J. Remove excess excavated material from site.

3.03 FIELD QUALITY CONTROL
A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection and testing.
B. Provide for visual inspection of load-bearing excavated surfaces before placement of foundations.

3.04 PROTECTION
A. Prevent displacement of banks and keep loose soil from falling into excavation; maintain soil stability.
B. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.

END OF SECTION
SECTION 31 2323.16
STRUCTURAL FILL

PART 1 GENERAL
1.01 SECTION INCLUDES
   A. Filling, backfilling, and compacting for building volume below grade.

1.02 RELATED REQUIREMENTS
   A. Geotechnical report; bore hole locations and findings of subsurface materials.
   B. Section 31 2316.16 - Structural Excavation: Removal and handling of soil to be re-used.

1.03 REFERENCE STANDARDS
   A. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN·m/m³)); 2012.
   B. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2011.

1.04 SUBMITTALS
   A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
   B. Materials Sources: Submit name of imported materials source.
   C. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used.
   D. Compaction Density Test Reports.

1.05 DELIVERY, STORAGE, AND HANDLING
   A. When necessary, store materials on site in advance of need.

PART 2 PRODUCTS
2.01 FILL MATERIALS
   A. General Fill: Subsoil excavated on-site.
      1. Graded.
      2. Free of lumps larger than 3 inches, rocks larger than 2 inches, and debris.
      3. Conforming to ASTM D2487 Group Symbol CL.
      4. Plasticity Index (PI) maximum 20 percent, with moisture content between minus two (-2) and plus three (+3) points of the optimum.
   B. Structural Fill - Fill Type Item 247, Type “A”, Grade 2: Conforming to State of Texas Highway Department standard.
   C. Granular Fill - Fill Type 57 Rock: Coarse aggregate, conforming to State of Texas Highway Department standard.

2.02 SOURCE QUALITY CONTROL
   A. See Section 01 4000 - Quality Requirements, for general requirements for testing and analysis of soil material.
   B. Where fill materials are specified by reference to a specific standard, test and analyze samples for compliance before delivery to site.
   C. If tests indicate materials do not meet specified requirements, change material and retest.

PART 3 EXECUTION
3.01 EXAMINATION
   A. Identify required lines, levels, contours, and datum locations.
3.02 PREPARATION
   A. In the area occupied by the foundation, plus a distance shown on the drawings, remove topsoil including all organic materials, roots, etc. from the site per drawings. Do not use for underfloor fill. Remove additional material as necessary to provide minimum fill per drawings.
   B. The resulting surface shall be proof rolled with a sufficiently heavy roller (15 TONS) to locate and densify weak and compressible zones. A minimum of 6 passes of the roller is required. Any soft spots shall be removed and replaced with compacted structural fill.
   C. The rolled subgrade shall be scarified just prior to fill placement to a minimum depth of 6” and recompacted to a minimum of 95% of the maximum density as determined by ASTM D 698 compaction test, maintaining moisture content between -1 and +3 percentage points until covered.

3.03 FILLING
   A. Granular Fill: Place and compact materials in equal continuous layers not exceeding 6 inches compacted depth.
   B. Beginning at low end, build up to the bottom of the slab with structural fill. Refer to plan for minimum thicknesses. NO DIRT FILL SHALL BE USED UNDER THE BUILDING FOUNDATION. Submit written certification of compliance with requirements above by test performed on field sample.
   C. All fill shall be placed in 8” loose horizontal lifts and compacted to a minimum of 95% of the maximum density as determined by ASTM D 698 compaction test.

3.04 FILL AT SPECIFIC LOCATIONS
   A. Under Interior Slabs-On-Grade:
      1. Use structural fill.
   B. At Foundation Walls and Footings:
      Use general fill.
      1. Fill up to subgrade elevation.
      2. Compact each lift to 90 percent of maximum dry density.
      3. Do not backfill against unsupported foundation walls.
      4. Backfill simultaneously on each side of unsupported foundation walls until supports are in place.
   C. At Foundation Walls and Footings with concrete or paving above fill:
   D.  
      1. Use Select Fill.
      2. Fill up to subgrade elevation.
      3. Compact each lift to 95 percent of maximum dry density.
      4. Do not backfill against unsupported foundation walls.
      5. Backfill simultaneously on each side of unsupported foundation walls until supports are in place.
   E. Over Subdrainage Piping at Foundation Perimeter and Under Slabs:
      1. Drainage fill and geotextile fabric: Section 33 4600.
      2. Cover drainage fill with structural fill or flowable fill.
      3. Fill up to subgrade elevation.
      4. Compact to 95 percent of maximum dry density.
   F. Over Buried Utility Piping, Conduits, and Duct Bank in Trenches:
      2. Cover with structural fill or flowable fill.
      3. Fill up to subgrade elevation.
      4. Compact in maximum 8 inch lifts to 95 percent of maximum dry density.
   G. At French Drains:
      1. Use granular fill.
2. Fill up to 8 inches below finish grade.
3. Compact to 95 percent of maximum dry density.

3.05 TOLERANCES
A. Top Surface of General Filling: Plus or minus 1 inch from required elevations.

3.06 FIELD QUALITY CONTROL
A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection and testing.

3.07 CLEANING
A. Leave unused materials in a neat, compact stockpile.
B. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.
C. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.
PART 1 GENERAL

1.01 SECTION INCLUDES
A. Decorative steel fences.

1.02 RELATED REQUIREMENTS
A. Section 03 3000 - Cast-in-Place Concrete.

1.03 REFERENCE STANDARDS
D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04 SUBMITTALS
A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Product Data: Submit manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.
C. Shop Drawings:
   1. Indicate plan layout, spacing of components, post foundation dimensions, hardware anchorage, gates, and schedule of components.

1.05 DELIVERY, STORAGE AND HANDLING
A. Store materials in a manner to ensure proper ventilation and drainage. Protect against damage, weather, vandalism and theft.

PART 2 PRODUCTS

2.01 MANUFACTURERS
A. Decorative Metal Fences and Gates:
   2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 FENCES
A. Fences: Complete factory-fabricated system of posts and panels, accessories, fittings, and fasteners; finished with electrodeposition coating, and having the following performance characteristics:
B. Electro-Deposition Coating: Multi-stage pretreatment/wash with zinc phosphate, followed by epoxy primer and acrylic topcoat.
   1. Total Coating Thickness: 2 mils (0.058 mm), minimum.
   2. Color: As selected by Architect from manufacturer's standard range.
C. Steel: ASTM A653/A653M; tensile strength 45,000 psi (310 MPa), minimum.
   2. 62 percent recycled steel, minimum.
D. Fasteners: ASTM A276/A276M, Type 302 stainless steel; finished to match fence components.
   1. Tamper-proof security bolts.
E. Hinges: Finished to match fence components.
F. Latches: Finished to match fence components.

2.03 MECHANICALLY FASTENED STEEL FENCE

A. Provide fence meeting requirements for Industrial class as defined by ASTM F2408.
B. Fence Panels: Mechanically fastened with internal reinforcement and tamperproof fasteners; 8 feet (1.5 m) high by 8 feet (2.4 m) long.
   1. Panel Style: Three rail.
   2. Panel Strength: Capable of supporting 600 pound (272 kg) load applied at midspan without deflection.
   3. Attach panels to posts with manufacturer's standard panel brackets.
C. Posts: Steel tube.
   1. Size: 2-1/2 inches (63 mm) square by 12 gage, 0.1094 inch (2.76 mm thick), with manufacturer's standard cap.
   2. Post Cap: Ball.
D. Rails: Manufacturer's standard, double-wall steel channel; 1-1/2" x 2" inch (______ mm) square by 14 gage, 0.0747 inch (1.90 mm thick) with pre-punched picket holes.
   1. Picket Retaining Rods: 1/8 inch (3.17 mm) galvanized steel.
   2. Picket-to-Rail Intersection Seals: PVC grommets.
E. Pickets: Steel tube.
   1. Spacing: 6 inch (___ mm) on center.
   2. Size: 3/4 inch (___ mm) square by 14 gage, 0.0747 inch (1.90 mm thick)
F. Flexibility: Capable of following variable slope of up to 1:4.
G. Color: Black.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.
B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Clean surfaces thoroughly prior to installation.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions.
B. Set fence posts in accordance with the manufacturer recommended spacing.
C. Space gate posts according to the manufacturers' drawings, dependent on standard out-to-out gate leaf dimensions and gate hardware selected.
   1. Base type and quantity of gate hinges o the application; weight, height, and number of gate cycles.
D. Install operator in accordance with manufacturer's instructions and in accordance with NFPA 70.

3.04 CLEANING

A. Clean jobsite of excess materials; scatter excess material from post hole excavations uniformly away from posts. Remove excess material if required.
B. Clean fence with mild household detergent and clean water rinse well.
C. Touch up scratched surfaces using materials recommended by manufacturer. Match touched-up paint color to factory-applied finish.

3.05 CLOSEOUT ACTIVITIES
A. See Section 01 7800 - CONTRACT CLOSEOUT, for closeout submittals.

3.06 PROTECTION
A. Protect installed products until completion of project.
B. Touch-up, repair, or replace damaged products before Date of Substantial Completion.

END OF SECTION
SECTION 32 3132
WOOD COMPOSITE FENCES

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Wood composite fences.
   B. Wood composite gates.

1.02 RELATED SECTIONS
   A. Section 03 3000 - Cast-in-Place Concrete.
   B. Section 06 73 00 - Composite Decking.

1.03 REFERENCE STANDARDS
   A. ASTM C 94 - Standard Specification for Ready-Mixed Concrete
      Transmission Properties by Means of the Guarded-Hot-Plate Apparatus
   C. ASTM D 143 - Standard Test Methods for Small Clear Specimens of Timber
   D. ASTM D 198 - Standard Test Methods of Static Tests of Lumber in Structural Sizes
   E. ASTM D 1037 - Standard Test Methods for Evaluating Properties of Wood-Base Fiber and
      Particle Panel Materials.
   F. ASTM D 1413 - Standard Test Method for Wood Preservatives by Laboratory Soil-Block
      Cultures
   G. ASTM D 1761 - Standard Test Methods for Mechanical Fasteners in Wood
   I. ASTM D 2047 - Standard Test Method for Static Coefficient of Friction of Polish-Coated
      Flooring Surfaces as Measured by the James Machine.
   J. ASTM D 2394 - Standard Methods for Simulated Service Testing of Wood and Wood-Base
      Finish Flooring.
   K. ASTM D 2395 - Standard Test Methods for Specific Gravity of Wood and Wood-Based
      Materials
   L. ASTM D 4761 - Standard Test Methods for Mechanical Properties of Lumber and Wood-Base
      Structural Material.
   O. American Wood Preservers Association (AWPA) E1-06 - Standard Method for Laboratory
      Evaluation to Determine Resistance to Subterranean Termites.

1.04 ADMINISTRATIVE REQUIREMENTS
   A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to start of work of this
      section; require attendance by affected installers.

1.05 SUBMITTALS
   A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
   B. Product Data: Submit manufacturer's data sheets on each product to be used, including:
      1. Preparation instructions and recommendations.
      2. Storage and handling requirements and recommendations.
      3. Installation methods.
      4. Instructions on care and cleaning of composite wood products.
C. Verification Samples: For each finish product specified, two samples, minimum size 9 inches (229 mm) square, representing actual product, color, and patterns.
D. Manufacturer's Certificates: Certify products meet or exceed specified requirement.
E. Closeout Submittals: Provide manufacturer's maintenance instructions that include recommendations for cleaning and maintenance.

1.06 QUALITY ASSURANCE
A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum five years documented experience.
B. Installer Qualifications: Experienced with type of construction involved and materials and techniques specified and approved by fence manufacturer.

1.07 DELIVERY, STORAGE AND HANDLING
A. Deliver, store and handle products in accordance with the manufacturer's instructions.
B. Store level and flat, off ground or floor, with supports at each end and maximum 24 inches on center.
C. Do not stack wood composite over 8 feet (203 mm) high
D. Cover wood composite with waterproof covering, vented to prevent moisture buildup

1.08 WARRANTY
A. Provide manufacturer's 25 year residential warranty / 10 year commercial warranty providing coverage against checking, splitting, splintering, rotting, structural damage from termites, and fungal decay of wood composite.

PART 2 PRODUCTS
2.01 MANUFACTURERS
A. Decorative Metal Fences, Gates, and Decking:
   1. Acceptable Manufacturer: Trex Fencing, which is located at: 160 Exeter Dr.; Winchester, VA 22603; Fax: 877-770-8739; Email: request info (edmund@cfcdistributors.com); Web: www.trexfencing.com
   2. Substitutions: Not permitted.
   3. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.02 MATERIALS
A. Wood composite: Reclaimed wood and plastic with integral coloring; free from toxic chemicals and preservatives
B. Electro-Deposition Coating: Multi-stage pretreatment/wash with zinc phosphate, followed by epoxy primer and acrylic topcoat.
   1. Characteristics:
      a. Abrasion resistance: 0.01 inch wear per 1000 revolutions, tested to ASTM D 2394.
      b. Hardness: 1124 pounds, tested to ASTM D 143.
      c. Self ignition temperature: 743 degrees F, tested to ASTM D 1929.
      d. Flash ignition temperature: 698 degrees F, tested to ASTM D 1929.
      e. Flame spread rating: 80, tested to ASTM E 84.
      f. Water absorption, 24 hour immersion, tested to ASTM D 1037:
         1) Sanded surface: 4.3 percent.
         2) Unsanded surface: 1.7 percent.
      g. Thermal expansion coefficient, 36 inch long samples:
         1) Width: 35.2 x 10-6 to 42.7 x 10-6.
         2) Length: 16.1 x 10-6 to 19.2 x 10-6.
      h. Fastener withdrawal, tested to ASTM D 1761:
1) Nail: 163 pounds per inch.
2) Screw: 558 pounds per inch.

i. Static coefficient of friction:
   1) Dry: 0.53 to 0.55, tested to ASTM D 2047.
   2) Dry: 0.59 to 0.70, tested to ASTM F 1679.
   3) Wet: 0.70 to 0.75, tested to ASTM F 1679.

j. Fungus resistance, white and brown rot: No decay, tested to ASTM D 1413.
k. Termite resistance: 9.6 rating, tested to AWPA E-1.
l. Specific gravity: 0.91 to 0.95, tested to ASTM D 2395.
m. Compression:
   1) Parallel: 1806 PSI ultimate, 550 PSI design, tested to ASTM D 198.
   2) Perpendicular: 1944 PSI ultimate, 625 PSI design, tested to ASTM D 143.

n. Tensile strength: 854 PSI ultimate, 250 PSI design, tested to ASTM D 198.
o. Shear strength: 561 PSI ultimate, 200 PSI design, tested to ASTM D 143.
p. Modulus of rupture: 1423 PSI ultimate, 250 PSI design, tested to ASTM D 4761.
q. Modulus of elasticity: 175,000 PSI ultimate, 100,000 PSI design, tested to ASTM D 4761.
r. Thermal conductivity: 1.57 BTU per inch per hour per square foot at 85 degrees F, tested to ASTM C 177

2.03 COMPONENTS

A. Fence System: Horizons Privacy Screens with Interlocking Pickets
   1. Fence Height: 8 feet (2.4 m) high by 6 feet (1.8 m) long panels.
   2. Components
      a. Fence Posts:
      b. Post Caps
         1) Posts:
            (a) Flat
      c. Top Rails.
      d. Aluminum bottom rail inserts.
      e. Bottom rail covers/Pickets, 67 inch
      f. Bottom rail covers/Pickets, 91 inch
      g. Fence brackets
   5. Fence System: Seclusions Privacy Fence System

B. Composite Decking Board
   1. For Use as Dressing Room bench seating surface
   2. Components
      a. 2" Square Edge Board
      b. Color Selected from Manufacturers Standard Colors

2.04 ACCESSORIES

A. Fasteners: 1-5/8 inch galvanized or corrosion-resistant coated steel. Provide finish nails where applicable.
B. Concrete: Provide as Specified in Section 03 30 00 - Cast-in-Place Concrete; minimum 2500 PSI compressive strength at 28 days, with a 3 to 5 inch slump.
C. Trex Post Mounts with 4 - 3/8" x 3-3/4" expansion anchors;
D. Concrete: Provide concrete conforming to ASTM C 94; minimum 2500 PSI compressive strength at 28 days, with a 3 to 5 inch slump
E. Gate Hardware:
   1. Provide two Trex hinges per gate leaf minimum, and size to gate weight and conditions
2. Provide with latching mechanism.

PART 3 EXECUTION

3.01 EXAMINATION
A. Do not begin installation until substrates have been properly prepared.
B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION
A. Clean surfaces thoroughly prior to installation.
B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION
A. Install in accordance with manufacturer's instructions.
B. Cut and drill wood composite using carbide tipped blades
C. Drill post holes into undisturbed or compacted soil; excavate deeper in soft or loose soils and for posts with heavy lateral loads.
D. Drill posts to 12 inch diameter. Locate bottom of post 30 inches below grade or below frost line whichever is greater.
E. Screw fence brackets to posts with four 1-5/8 inch long exterior screws.
F. Cut top rails, pickets, bottom rail covers and aluminum bottom rails to lengths required
G. Slide bottom rail covers over aluminum bottom rail pieces.
H. Position aluminum bottom rail on fence brackets with deeper side of rail channel facing downward
I. Cut end pickets to height to provide clearance under brackets and screw to posts.
J. Insert pickets into bottom rail, interlocking adjacent pieces.
K. Position top rail and screw attach to top brackets with 1-5/8 inch long exterior screws.
L. Use finish nails to secure pickets to rails if the pickets are not tightly interlocked
M. Place post caps over post tops and secure with construction adhesive or four finish nails.

3.04 CLEANING
A. Cleaning
   1. Clean wood composite to remove stains:
      a. Mold, mildew, and berry and leaf stains: Clean surfaces with conventional deck wash containing detergent or sodium hypochlorite.
      b. Rust and ground-in dirt: Clean surfaces with cleaner containing oxalic or phosphoric acid.
      c. Oil and grease: Clean surfaces with detergent containing degreasing agent.

3.05 PROTECTION
A. Protect installed products until completion of project.
B. Touch-up, repair, or replace damaged products before Date of Substantial Completion.

END OF SECTION