PROJECT MANUAL

JOB NO. 1654

DATE: January 9, 2020

FIRST COMMUNITY BRANCH BANK
Brookland, Arkansas

ROARK • PERKINS • PERRY • YELVINGTON

RPPY ARCHITECTS

713 WEST SECOND STREET • LITTLE ROCK, ARKANSAS 72201-2287 • 501 372-0272 • FAX 501 372-3645

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FOR

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RPPY PROJECT #1654

ROARK • PERKINS • PERRY •YELVINGTON
ARCHITECTS
713 WEST SECOND STREET
LITTLE ROCK, AR 72201 - 2287

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(Not Applicable)

DIVISIONS 45 TO 49 - NOT USED

END OF DOCUMENT

DOCUMENT 00 11 16

INVITATION TO BID

Project: A New Branch for
First Community Bank
Brookland, AR

Owner: Mr. Dale Cole

Architect: Roark Perkins Perry & Yelvington

Date: January 9, 2020

Your firm is invited to submit a Bid to the Owner for construction of a new building located at the above address. The Owner will receive Bids until 2:00 PM local time on Tuesday, the 25th day of February, 2020, at the bank in Jonesboro, located at 630 Southwest Drive, Jonesboro, AR 72041, for the following project:

Description: Work includes site work, demolition, general construction, HVAC, plumbing and electrical work.

Identify Contract Time in the Bid Form. The completion date in the Agreement shall be the Contract Time added to the commencement date. The Owner requires the work of this contract be completed as quickly as possible. Consideration will be given to time of completion when reviewing submitted Bids.

Copies of the Contract Documents are available for review at the office of the Architect and at Southern Reprographics. Invited general contractors may obtain one complete set of Contract Documents and one electronic copy. Additional copies of Contract Documents may be obtained at the cost of reproduction from Southern Reprographics. Bids submitted by General Contractors who obtain documents by any other means, will be disqualified.

Subcontractors and suppliers may visit www.sribids.com for viewing and or downloading of electronic documents at no cost. Access to this site requires that you enter the following information: RPPY1654.

Bidders will be required to provide Bid security in the form of a Bid Bond in the amount of 5 percent of the Bid Sum. Refer to other bidding requirements described in Document 00 21 13, and Document 00 31 00.

Submit your Bid on the Bid Form provided. Your Bid will be required to be submitted under a condition of irrevocability for a period of 60 days after submission.

The Owner reserves the right to accept or reject any or all Bids.

Mr. Dale Cole

END OF DOCUMENT

DOCUMENT 00 21 13

INSTRUCTIONS TO BIDDERS

1.1 SUMMARY

A. Document Includes:
1. Bid submission.
2. Intent.
3. Work identified in contract documents.
4. Contract Time.
5. Definitions.
6. Contract Documents identification.
7. Availability of documents.
8. Examination of documents.
9. Inquiries and Addenda.
10. Product substitutions.
11. Site examination.
12. Subcontractors.
13. Submission procedure.
14. Bid ineligibility.
15. Security deposit.
16. Performance Assurance.
17. Additional Bid information.
18. Bid opening.
19. Duration of offer.
20. Acceptance of offer.

B. Related Documents:
1. Document 00 11 16 - Invitation to Bid.
2. Document 00 31 00 - Available Project Information.
3. Document 00 41 13 - Bid Form.
4. Document 00 41 43 - Bid Form Appendices.
5. Document 00 73 13 - Supplementary Conditions

1.2 BID SUBMISSION

A. Bids signed, executed, and dated will be received by the Owner at the bank in Jonesboro, located at 630 Southwest Drive, Jonesboro, AR 72041 until 2:00 PM local time on Tuesday, the 25th day of February, 2020.

B. Bids submitted after the above time will be returned to Bidder unopened.

C. Amendments to submitted Bids will be permitted when received in writing prior to bid closing and when endorsed by the same party or parties who signed and sealed the Bid.

D. Bidders may withdraw their Bid by written request at any time before bid closing.

1.3 WORK IDENTIFIED IN CONTRACT DOCUMENTS

A. Work of this proposed Contract comprises general construction, site development, including structural, mechanical, and electrical Work.

B. Location: Brookland, AR.

1.4 CONTRACT TIME

A. Identify Contract Time in the Bid Form. The completion date in the Agreement shall be the Contract Time added to the commencement date.

B. The Owner requires the work of this contract be completed as quickly as possible. Consideration will be given to time of completion when reviewing submitted Bids.

1.5 DEFINITIONS

A. Bidding Documents: Contract Documents supplemented with Invitation To Bid, Instructions to Bidders, Information Available to Bidders, Bid Form, Bid Form Appendices, and bid securities, identified.

B. Contract Documents: Defined in AIA Document A201-2007 Article 1, including issued Addenda.

C. Bid: Executed Bid Form and required attachments submitted in accordance with these Instructions to Bidders.

D. Bid Sum: Monetary sum identified by the Bidder in the Bid Form.

1.6 CONTRACT DOCUMENTS IDENTIFICATION

A. The Contract Documents are identified as Project number #1654 as prepared by RPPY Architects located at 713 W. 2nd Street in Little Rock, AR and identified in the Project Manual.

1.7 AVAILABILITY OF DOCUMENTS

A. Bidding Documents may be obtained as stated in Invitation to Bid.

B. Partial sets of Bidding Documents will not be issued to general contract Bidders.

C. Bidding Documents are made available only for the purpose of obtaining offers for this Project. Their use does not grant a license for other purposes.

1.8 EXAMINATION OF DOCUMENTS

A. Bidding Documents may be viewed at the office of the Architect/Engineer and at Southern Reprographics.

B. Upon receipt of Bidding Documents verify documents are complete. Notify Architect/Engineer if documents are incomplete.

C. Immediately notify Architect/Engineer upon finding discrepancies or omissions in Bidding Documents.

1.9 INQUIRIES AND ADDENDA

A. Direct questions in writing to Matt Galbraith, at the office of the Architect/Engineer; facsimile 501.372.0272 or mg@rppyarchitects.com.

B. Verbal answers are not binding on any party.

C. Submit questions not less than 3 days before date set for receipt of Bids. Replies will be made by Addenda.

D. Addenda may be issued during bidding period. Addenda will be sent to known Bidders. Addenda become part of the Contract Documents. Include resultant costs in the Bid Sum.

1.10 PRODUCT SUBSTITUTIONS

A. Requests for Product substitutions are not permitted before Notice to Proceed. Refer to Section 01 60 00 - Product Requirements for substitution procedures.

B. In submission of substitutions to Products specified, Bidders shall include in their Bid, changes required in the Work and changes to Contract Time and Contract Sum to accommodate such approved substitutions. Later claims by the Bidder for an addition to the Contract Time or Contract Sum because of changes in Work necessitated by use of substitutions will not be considered.

1.11 SITE EXAMINATION

A. Examine Project site before submitting a Bid.

1.12 SUBCONTRACTORS

A. The Owner reserves the right to reject a proposed Subcontractor for reasonable cause.

B. Refer to AIA Document A201-2007, Article 5 of General Conditions.

1.13 SUBMISSION PROCEDURE

A. Bidders shall be solely responsible for delivery of Bids in manner and time prescribed.

B. Submit one copy of executed offer on Bid Forms provided, signed with required security deposit in a closed opaque envelope, clearly identified with Bidder’s name, Project name, and Owner's name on the outside.

C. Improperly completed information, irregularities in bid bond, may be cause not to open the Bid Form envelope and declare the Bid invalid or informal.

D. An abstract summary of submitted Bids will be made available to all Bidders following bid opening.

1.14 BID INELIGIBILITY

A. Bids that are unsigned, improperly signed or sealed, conditional, illegible, obscure, contain arithmetical errors, erasures, alterations, or irregularities of any kind, may be declared unacceptable at Owner's discretion.

B. Bid Forms, Appendices, and enclosures which are improperly prepared may be declared unacceptable at Owner's discretion.

C. Failure to provide security deposit, bonds or insurance requirements may invalidate the Bid at the discretion of the Owner.

D. Bids are by invitation, only, from selected Bidders. Unsolicited Bids will be returned.

1.15 SECURITY DEPOSIT

A. Bids shall be accompanied by security deposit as follows:
   1. Bid Bond of a sum no less than 5 percent of the Bid Sum on standard surety company form.

B. Endorse Bid Bond in name of the Owner as obligee, signed and sealed by the principal (Contractor) and surety.

C. Security deposit of accepted Bidder will be returned after delivery to the Architect of the required Performance and Payment Bonds by the accepted Bidder.

D. Include the cost of security deposit in the Bid Sum.

E. After a Bid has been accepted, security deposits will be returned to the respective Bidders.

F. If no contract is awarded, security deposits will be returned.

1.16 PERFORMANCE ASSURANCE

A. Accepted Bidder: Provide a Performance and Payment bond as described in Document 00 73 13.

B. Include the cost of performance assurance bonds in the Bid Sum and identify the cost when requested by the Owner.

1.17 ADDITIONAL BID INFORMATION

A. Complete and submit Document 00 43 00 with Bid.

1.18 BID OPENING

A. Bids will be opened publicly immediately after time for receipt of Bids. Bidders may be present.

1.19 DURATION OF OFFER

A. Bids shall remain open to acceptance and shall be irrevocable for a period of 60 days after bid closing date.

1.20 ACCEPTANCE OF OFFER

A. The Owner reserves the right to accept or reject any or all offers.

B. After acceptance by the Owner and receipt of required insurance, the Architect/Engineer, on behalf of the Owner, will issue to the accepted Bidder, a written Notice to Proceed.

C. Notwithstanding delay in the preparation and execution of the Agreement, accepted Bidder shall be prepared, upon written Notice to Proceed, to commence work within ten days following receipt of official written order of the Owner to proceed, or on date stipulated in such order.

END OF DOCUMENT

DOCUMENT 00 41 13

BID FORM

To: Mr. Dale Cole

Project: A New Branch Bank for
First Community Bank
Brookland, AR

Date: .....

Submitted by: .....
(full name and address) .....

1. OFFER

Having examined the Place of The Work and all matters referred to in the Instructions to Bidders and the Contract Documents prepared by Architect for the above mentioned project, we, the undersigned, hereby offer to enter into a Contract to perform the Work for the Sum of:

$.....dollars, in lawful money of the United States of America.

We have included, the security Bid Bond as required by the Instruction to Bidders.

All applicable taxes are included in the Bid Sum.

All Cash Allowances described in Section 01 20 00 - Price and Payment Procedures are included in the Bid Sum.

2. ACCEPTANCE

This offer shall be open to acceptance and is irrevocable for sixty days from the bid closing date.

If this bid is accepted by the Owner within the time period stated above, we will:

- Execute the Agreement within ten days of receipt of Notice of Award.

- Furnish the required bonds and insurance within ten days of receipt of Notice of Award.

- Commence work within ten days after written Notice to Proceed.

If this bid is accepted within the time stated, and we fail to commence the Work or we fail to provide the required bonds], the security deposit shall be forfeited as damages to the Owner by reason of our failure, limited in amount to the lesser of the face value of the security deposit or the difference between this bid and the bid upon which a Contract is signed.

In the event our bid is not accepted within the time stated above, the required security deposit will be returned to the undersigned, in accordance with the provisions of the Instructions to

Bidders; unless a mutually satisfactory arrangement is made for its retention and validity for an extended period of time.

3. CONTRACT TIME

If this Bid is accepted, we will:

Complete the Work in .....(.....) calendar days from Notice to Proceed.

4. ADDENDA

The following Addenda have been received. The modifications to the Bid Documents noted below have been considered and all costs are included in the Bid Sum.

Addendum # ..... Dated .....

Addendum # ..... Dated .....

Addendum # ..... Dated .....

Addendum # ..... Dated .....

Addendum # ..... Dated .....

5. APPENDICES

The following documents are attached to and made a condition of the Bid:

Bid security in form of .....
Document 00 43 00 including:
Appendix A - List of Unit Prices.

6. SUBCONTRACTOR LISTING

		Subcontractor	License No.
A.	Plumbing	.....	.....
B.	Mechanical	.....	.....
C.	Electrical	.....	.....
D.	Roofing	.....	.....

7. BID FORM SIGNATURES

.....

(Bidder - print the full name of your firm)

.....

(Authorized signing officer)

.....

(License Number)

END OF DOCUMENT

DOCUMENT 00 43 00

BID FORM SUPPLEMENTS

To: Mr. Dale Cole

Project: A New Branch for
First Community Bank
Brookland, AR

Date: .....

Submitted by: .....
(full name and address) .....

In accordance with Document 00 21 13 and Document 00 41 13, we include the Appendices to Bid Form Supplements listed below. The information provided shall be considered an integral part of the Bid Form.

The following Appendices are attached to this document:

Appendix A - List of Unit Prices: Include listing of unit prices specifically requested by Contract Documents.

BID FORM SUPPLEMENTS SIGNATURES

.....
(Bidder - print the full name of your firm)

.....
(Authorized signing officer)

.....
(License Number)

APPENDIX A

LIST OF UNIT PRICES

The following is the list of unit prices referenced in the bid submitted by:

(Bidder) .....

To: Mr. Dale Cole

Dated ..... and which is an integral part of the Bid Form.

The following are Unit Prices for specific portions of the Work as listed, and are applicable to authorized variations from the Contract Documents.

ITEM DESCRIPTION	UNIT	UNIT VALUE
1. Removal and replacement of unstable soil, compacted in place.	Cu. yd.	

END OF DOCUMENT

DOCUMENT 00 72 14

GENERAL CONDITIONS

1.1 SUMMARY

A. Document Includes: General Conditions.

B. Related Documents:
1. Document 00 73 13 - Supplementary Conditions.

1.2 GENERAL CONDITIONS

A. AIA Document A201-2017, General Conditions of the Contract for Construction, is the General Conditions of the Contract. They are hereby incorporated into and made as much a part of this Project Manual as if bound herein. A copy of the General Conditions is on file and may be examined in the Architect's office. The printed General Conditions will be bound in each of the contract copies of the Project Manual to be retained by the Owner, Architect, and Contractor as part of the executed Contract Documents.

1.3 SUPPLEMENTARY CONDITIONS

A. Refer to Document 00 73 13 for modifications to General Conditions.

END OF DOCUMENT

DOCUMENT 00 73 13

SUPPLEMENTARY CONDITIONS

1.1 SUMMARY

A. Document Includes: Supplementary Conditions.

B. Related Documents:
1. Document 00 72 14 - General Conditions.

1.2 SUPPLEMENTARY CONDITIONS

A. These Supplementary Conditions modify the General Conditions of the Contract for Construction, AIA Document A201-2017, and other provisions of the Contract Documents as indicated below. All provisions which are not so modified remain in full force and effect.

B. The terms used in these Supplementary Conditions which are defined in the General Conditions of the Contract for Construction, AIA Document A201-2017, have the meanings assigned to them in the General Conditions.

ARTICLE 1.1 - BASIC DEFINITIONS

Delete subparagraph 1.2.1 and substitute the following:

"1.2.1The Architect shall identify those Contract Documents which are a part of the Agreement."

ARTICLE 3 - CONTRACTOR

Add subparagraph 3.4.4 under paragraph 3.4 as follows:

"3.4.4 All contractors and subcontractors engaged in the Owner/Contractor Agreement shall conform to the labor laws of the State of Arkansas and the various acts amendatory and supplementary thereto; and to all other laws, ordinances and legal requirements applicable thereto."

Add the following to the end of paragraph 3.5 as follows:

"The Contractor shall guarantee and warrant his and his subcontractors' work and materials (including the materials and work of suppliers of the Contractor and his subcontractors) for a period of one year from the date of acceptance of the project by the Owner. This warranty shall be for a longer period on certain items if so designated in the specifications. The foregoing one-year guaranty and warranty shall not in any way limit, restrict or affect the liability of the Contractor, or his subcontractors, for indemnity as provided for in this Contract, nor shall it in any way shorten the period of limitation fixed by law for the filing of any action against the Contractor for enforcement or for breach of any provisions of the Contract Documents. Should the Contractor elect to use any of the equipment in the building during the construction period,

he shall make arrangements with the subcontractor or supplier of the equipment for any extension of warranty of that equipment made necessary by such use. The warranty period for such equipment to the Owner shall not be reduced by the use of equipment by the Contractor."

Add the following sentence to subparagraph 3.7.1:

"Specifically including the Occupancy Permit."

Add the following sentence to subparagraph 3.9.3:

"The Contractor shall, at all times, enforce strict discipline and good order among his employees and shall not employ on the Work any unfit person or anyone not skilled in the Work assigned to him."

ARTICLE 5 - SUBCONTRACTORS

Add subparagraph 5.2.5 under paragraph 5.2 as follows:

"5.2.5 Where any of the provisions of this paragraph 5.2 conflict with laws of the State of Arkansas, as amended, the provisions of such laws and amendments thereto shall govern."

ARTICLE 7 - CHANGES IN THE WORK

Delete subparagraph 7.3 and substitute the following new paragraph 7.1.4 in lieu thereof:

"7.1.4 The method used in determining adjustments in the contract sum shall be as follows:

1. Without invalidating the Contract, the Owner may order extra Work or make changes by altering, adding to or deducting from the Work, the contract sum being adjusted accordingly, and with the Contractor obtaining the consent of the surety where necessary or desirable.
2. No claims for any extra Work or materials shall be allowed unless the Work is ordered in writing by the Architect.
3. Any changes in the Work will be on a basis of actual cost plus 12% of the cost for overhead and profit, including insurance, for the Contractor performing the Work (subcontractor or General Contractor).
4. If changes in the Work are performed by a subcontractor, the value of any such Work shall be computed as outlined in subparagraph 3 above, to which the General Contractor may add an overhead and profit charge of six percent (6%), including insurance.
5. Work omitted that was included in the original Contract shall be computed on the same basis.
6. The Contractor shall furnish an itemized breakdown for the requested change in Work.
7. Bills for extras will be allowed only when Work is ordered in writing. No bills based on verbal orders will be allowed unless accompanied by a written order from the Owner.
8. The Contractor waives all claims for extension of time of completion on account of extra Work, unless application for such extension of time is made by the Contractor in writing within 24 hours of the time such Work is ordered."

ARTICLE 9 - PAYMENTS AND COMPLETION

Delete paragraph 9.3 in its entirety and substitute the following paragraph 9.3 in lieu thereof:

"9.3 APPLICATIONS FOR PAYMENT

9.3.1 The Contractor shall present to the Architect an application for payment on or before the twenty-fifth day of each calendar month. These periodical estimates for partial payment shall be submitted on AIA Document G702 and G703.

An original and a requested number of copies of such estimate shall be tendered to the Architect. In preparing estimates, the material delivered and suitably stored on the site and preparatory Work done may be taken into consideration. The Architect shall review the applications for payment in accordance with the general observations of the Work and the percentage of completion of each category before submitting them to the Owner for payment. No later than the 10th day of each calendar month, the Owner will make partial payment to the Contractor, but the Owner will retain 10% of the amount of each such estimate. There shall be retained 10% on the estimated amounts until final completion and acceptance of all Work covered by the Contract. Before issuance of the final certificate, the Contractor shall obtain in writing from the bonding company, approval of such payment. No certificate issued nor payment made to the Contractor, nor partial or entire use or occupancy of the Contract Work by the Owner, shall be an acceptance of any Work or materials not in accordance with this Contract.

9.3.2 If approved in advance by the Owner, payment may similarly be made for materials and equipment suitable stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include applicable insurance, storage and transportation to the site for such materials and equipment stored off the site."

ARTICLE 11 - INSURANCE AND BONDS

Delete paragraphs 11.1, 11.2, 11.3, and 11.4, and substitute the new paragraphs 11.1, 11.2, 11.3, and 11.4 as follows:

"11.1 GENERAL

11.1.1 The Contractor shall not commence Work under this Contract or allow any subcontractor or anyone directly or indirectly employed by anyone of them, to commence Work until he has obtained all insurance required under this section and duly executed certificates of such insurance have been filed with the Architect and approved by the Owner. All insurance policies, certificates and endorsements shall be submitted to the Architect in duplicate; one copy of which will be retained by the Architect and the other forwarded to the Owner.

The Contractor shall require all subcontractors or anyone directly or indirectly employed by any of them, and anyone for whose acts any of them may be liable, to either obtain statutory Workmen's Compensation, Comprehensive General Liability and Comprehensive Automobile Insurance coverage for his (the subcontractor's) portion of the Work or reimburse the Contractor for providing such insurance coverage. Comprehensive General Liability insurance and Comprehensive Automobile Liability insurance shall protect the Contractor from claims for bodily injury including death to his employees, or of any person other than his employees, and all other claims for property damage including water damage legal liability, personal injury liability, damage from collapse, damage from grading, excavation and all underground work, any and all of which may arise out of or result from the Contractor's operations required for the project, whether such operations be by himself or by any subcontractor or anyone directly employed by either of them.

11.1.2 The required insurance must be written by a company licensed to do business in the State of Arkansas, at the time of the policy issue. In addition, the companies must be acceptable to the Owner.

11.1.3 The Contractor shall not cause any insurance to be canceled nor permit any insurance to lapse. All insurance policies shall contain a clause to the effect that the policy shall not be cancelled or reduced, restricted or limited until fifteen days after the Owner and Architect have received written notice. Certificates of insurance shall contain transcripts from the proper office of the insurer, evidencing in particular, those insured, the extent of the insurance, the location, and the operations to which the insurance applies, the expiration date, and the above mentioned notice of cancellation clause.

11.2 WORKMEN'S COMPENSATION INSURANCE

11.2.1 The Contractor shall procure and maintain during the term of the Contract, Workmen's Compensation Insurance for all his employees engaged at the site of the Work, in accordance with the statutes of the State of Arkansas. In case any hazardous occupations are required for the execution of the Work, which are not covered by the above insurance, special Employer's Liability policy shall be procured and maintained during the term of the Contract by the Contractor to cover workmen engaged in such hazardous occupations.

11.3 LIABILITY AND PROPERTY INSURANCE

11.3.1 Comprehensive General Liability Insurance - The Contractor shall procure and maintain during the term of this Contract, at the Contractor's expense, a comprehensive general liability policy including products/completed operations with limits no less than $1,000,000 combined single limit or $500,000 each occurrence and $1,000,000 aggregate for bodily injury and $500,000 each occurrence and $500,000 aggregate for property damage. Contractor shall also furnish umbrella limits of $1,000,000.

This policy must include "Contractual Coverage" to cover contractual indemnity, and hold harmless the Owner and Architect and all their agents and employees from and against all claims, damages, losses, and expenses, including attorney's

fees arising out of or resulting from the performance of the Work, provided such claim, damage, loss, injury, sickness, disease, death or injury to or destruction of tangible property other than the Work itself, including the loss of use resulting therefrom, and is caused in whole or in part by any negligent act or omission of the Contractor, any subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a part indemnified thereunder. Provide an endorsement to the policy to include the Architect as additional insured.

11.3.2 Comprehensive Automobile Liability Insurance - The Contractor shall procure and maintain during the term of the contract, at the Contractor's expense, comprehensive automobile liability limits not less than $1,000,000 combined single limit or $500,000 per person and $500,000 per accident for bodily injury and $500,000 limit per accident for property damage. Umbrella liability limits may be used to certify the limits. Provide an endorsement to the policy to include the Architect as additional insured.

11.3.3 Builder's Risk Insurance - The Contractor shall take out and maintain during the life of the Contract and until same has been accepted, Builder's Risk, Fire Extended Coverage, Vandalism, and Malicious Mischief Insurance for an amount equal to 100% of the total value of the Contract sum of the Work. Said insurance coverage to be written in the name of the Contractor and Owner. This insurance shall not be cancelled or reduced upon Substantial Completion of the Project, but shall be kept in force until final acceptance of the Project and final payment is made.

11.4 PERFORMANCE AND PAYMENT BOND

11.4.1 Furnish a Performance and Payment Bond in the amount equal to 100% of the Contract Price, as security for the faithful performance of this Contract and for payment of all indebtedness for labor and materials furnished in connection with this Contract. The bond shall be written by a surety company which has qualified and is authorized to do business in the State of Arkansas and must be executed by a resident local agent who shall be entitled to full commission paid local agents and who is licensed by the Insurance Commissioner to represent the surety company executing said bond and filing with said bond, his power of attorney as his authority. The mere countersigning of a bond will not be sufficient. The bond shall be written in favor of the Owner.

11.4.2 An original and two copies of the bond must be furnished, with power of attorney attached to each. The bond must not be dated prior to the date of the Contract. The Contractor shall file (not record) the original with the Clerk of the Circuit Court of the County in which the Work to be performed is located. The Contractor is to pay all expenses incident to the filing of the bond. The remaining two copies should be certified by the Clerk to evidence the filing of the original and these two copies submitted to the Architect."

ARTICLE 13 - MISCELLANEOUS PROVISIONS

Add paragraph 13.6, "SUBSTITUTIONS", as follows:

"13.6 SUBSTITUTIONS

13.6.1 Where a definite material is specified, it is not the intent to discriminate against any equal product of another manufacturer. It is the intent to set a definite standard. Open competition is expected, but in all cases, complete data must be submitted on all proposed substitutes and samples shall be submitted for comparison and test when requested by the Architect. No substitution shall be made unless authorized in writing by the Architect. If the Contractor intends to substitute an equal product, he shall make this fact known, in writing, to the Architect within 30 days after the award of the Contract, including any changes in the Work required to accommodate the substitution.

13.6.2 Should a substitution be accepted and should the substitute material prove defective or otherwise unsatisfactory for the service intended and within the guaranty period, the Contractor shall replace this material or equipment with the material or equipment specified by name.

13.6.3 After execution of the Contract Agreement, proposed substitutions will be considered only if there is no decrease in quality, and only when submitted by or through the General Contractor. Such requests shall be submitted promptly in order to allow adequate time for checking and study by the Owner and Architect without delaying the project. Requests for time extensions will not be approved for delays due to related substitutions. No substitution will be allowed without the Architect's approval, in writing.

ARTICLE 15 - CLAIMS AND DISPUTES

In subparagraph 15.4.1, after the words, "American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the agreement", add the words, "subject to applicable laws of the state of Arkansas".

END OF DOCUMENT

SECTION 01 10 00

SUMMARY

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Contract description.

B. Work by Owner.

C. Owner supplied products.

1.2 CONTRACT DESCRIPTION

A. Work Covered by Contract Documents: Architect's Project #1654 dated January 9, 2020 includes furnishing tools, labor and equipment to perform the work required for the New Branch for First Community Bank, located at 1325 Harrison Street in Brookland, AR including civil, landscaping, general construction, mechanical and electrical work in accordance with the following:
   1. Conditions of Contract: General Conditions, Supplementary Conditions
   2. Specifications: Divisions 0, 1, 3 through 12, 23, 26, 27, 28, 31, 32, and 33
   3. Drawings:
      a. Cover Sheet
      b. Civil Sheet Nos. C1.01, C1.02, C1.03, C1.04, C1.05, C2.01, C2.02, C5.01, C5.02, C5.03, C5.04, C5.05
      c. Landscape Sheet Nos. L1.01
      d. Architectural Sheet Nos. A1.0, A1.1, A1.2, A1.3, A2.1, A2.2, A3.1, A4.1, A4.2, A4.3, A4.4, A4.5, A5.1, A6.1, A6.2, A7.1, A8.1, A9.1, A10.1
      e. Structural Sheet Nos. S1.1, S2.1, S3.1, S4.1, S4.2, S4.3, S5.1, S5.2, S5.3, S5.4
      f. Mechanical Sheet Nos. M1.1, M2.1, M3.1, MP1.1
      g. Plumbing Sheet Nos. P1.1, P2.1
      h. Electrical Sheet Nos. E1.1, E2.1, E3.1, E4.1
   4. Addenda: Any addenda issued during the bidding period and made a part of the Contract Documents.
   5. Agreements: Contract Agreement between Owner and Contractor as executed, and mutually agreed upon Bid Modification Documents and change orders issued.

1.3 WORK BY OWNER

A. Items noted NIC (Not in Contract), will be furnished and installed by Owner at Substantial Completion.

B. Schedule:
   1. Audio Visual equipment, including projection screens. Provide blocking as required.
   2. Furnishings and office equipment

3. Data cabling.

1.4 OWNER FURNISHED CONTRACTOR INSTALLED (OFCI) PRODUCTS

A. Owner's Responsibilities:
1. Arrange for and deliver Owner-reviewed Shop Drawings, Product Data, and Samples, to Contractor.
2. Arrange and pay for delivery to site.
3. On delivery, inspect products jointly with Contractor.
4. Submit claims for transportation damage and replace damaged, defective, or deficient items.
5. Arrange for manufacturers' warranties, inspections, and service.

B. Contractor's Responsibilities:
1. Review Owner-reviewed Shop Drawings, Product Data, and Samples.
2. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
3. Handle, store, install and finish products.
4. Repair or replace items damaged after receipt.

C. Items furnished by Owner for installation by Contractor:
1. Refrigerator with icemaker.
2. Icemaker.
3. Dishwasher.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 20 00

PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Cash allowances.

B. Schedule of values.

C. Applications for payment.

D. Change procedures.

E. Unit prices.

1.2 CASH ALLOWANCES

A. Costs Included in Cash Allowances: Cost of product to Contractor, less applicable trade discounts; delivery to site and applicable taxes.

B. Costs Not Included in Cash Allowances but Included in Contract Sum/Price: Product handling at site, including unloading, uncrating, and storage; protection of products from elements and from damage; and labor for installation and finishing.

C. Architect Responsibilities:
1. Consult with Contractor for consideration and selection of products, suppliers, and installers.
2. Select products in consultation with Owner and transmit decision to Contractor.
3. Prepare Change Order.

D. Contractor Responsibilities:
1. Assist Architect in selection of products, suppliers and installers.
2. Obtain proposals from suppliers and installers and offer recommendations.
3. On notification of selection by Architect, execute purchase agreement with designated supplier and installer.
4. Arrange for and process shop drawings, product data, and samples. Arrange for delivery.
5. Promptly inspect products upon delivery for completeness, damage, and defects. Submit claims for transportation damage.

E. Differences in costs will be adjusted by Change Order.

F. Allowances Schedule:
1. Provide an allowance of 3,500 cubic yards for removal and replacement of unsuitable soil. Soil to be compacted and minimum 95 percent maximum Modified Proctor dry density (ASTM D 1557) as required by soils engineer.

1.3 SCHEDULE OF VALUES

A. Submit printed schedule on AIA Form G703 - Continuation Sheet for G702.

B. Submit Schedule of Values in duplicate within 15 days after date established in Notice to Proceed.

C. Format: Utilize Table of Contents of this Project Manual. Identify each line item with number and title of major specification Section.

D. Include in each line item, amount of Allowances specified in this section.

E. Include separately from each line item, direct proportional amount of Contractor's overhead and profit.

F. Revise schedule to list approved Change Orders, with each Application for Payment.

1.4 APPLICATIONS FOR PAYMENT

A. Submit three copies of each application on AIA Form G702 - Application and Certificate for Payment and AIA G703 - Continuation Sheet for G702.

B. Content and Format: Utilize Schedule of Values for listing items in Application for Payment.

C. Submit updated construction schedule with each Application for Payment.

D. Payment Period: Monthly, as stated in the Supplementary Conditions.

E. Substantiating Data: When Architect requires substantiating information, submit data justifying dollar amounts in question.

1.5 CHANGE PROCEDURES

A. The Architect will advise of minor changes in the Work not involving adjustment to Contract Sum/Price or Contract Time by issuing a Drawing Clarification.

B. The Architect may issue a Proposal Request including a detailed description of proposed change with supplementary or revised Drawings and specifications, a change in Contract Time for executing the change. Contractor will prepare and submit estimate within 10 days.

C. Contractor may propose changes by submitting a request for change to Architect, describing proposed change and its full effect on the Work. Include a statement describing reason for the change, and effect on Contract Sum/Price and Contract Time with full documentation and a statement describing effect on Work by separate or other Contractors.

D. Stipulated Sum/Price Change Order: Based on Proposal Request and Contractor's fixed price quotation or Contractor's request for Change Order as approved by Architect.

E. Change Order: Submit itemized account and supporting data after completion of change, within time limits indicated in Conditions of the Contract. Architect will

determine change allowable in Contract Sum/Price and Contract Time as provided in Contract Documents.

F. Provide full information required for evaluation of proposed changes, and to substantiate costs for changes in the Work. Document each quotation for change in cost or time with sufficient data to allow evaluation of quotation.

G. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in Conditions of the Contract.

H. Correlation Of Contractor Submittals:
   1. Promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as separate line item and adjust Contract Sum/Price.
   2. Promptly revise progress schedules to reflect change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
   3. Promptly enter changes in Project Record Documents.

1.6 UNIT PRICES

A. Unit Quantities: Quantities and measurements indicated in Bid Form are for contract purposes only. Actual quantities provided shall determine payment.

B. Payment Includes: Full compensation for required labor, products, tools, equipment, plant and facilities, transportation, services and incidentals; erection, application or installation of item of the Work; overhead and profit.

C. Final payment for Work governed by unit prices will be made on basis of actual measurements and quantities accepted by Architect multiplied by unit sum/price for Work incorporated in or made necessary by the Work.

D. Unit Price Schedule:
   1. Removal and replacement of unstable soil, compacted in place.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Coordination and project conditions.

B. Field engineering.

C. Preconstruction meeting.

D. Progress meetings.

E. Pre-installation meetings.

F. Cutting and patching.

1.2 COORDINATION AND PROJECT CONDITIONS

A. Coordinate scheduling, submittals, and Work of various sections of Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements .

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

C. Coordinate space requirements, supports, and installation of mechanical and electrical Work indicated diagrammatically on Drawings. Follow routing shown 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.

D. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within construction. Coordinate locations of fixtures and outlets with finish elements.

E. Coordinate completion and clean-up of Work of separate sections in preparation for Substantial Completion, and for portions of Work designated for Owner's partial occupancy.

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.

1.3 FIELD ENGINEERING

A. Employ Land Surveyor registered at Project location and acceptable to Architect.

B. Locate and protect survey control and reference points. Promptly notify Architect of discrepancies discovered.

C. Verify set-backs and easements; confirm drawing dimensions and elevations.

D. Provide field engineering services. Establish elevations, lines, and levels, utilizing recognized engineering survey practices.

E. Maintain complete and accurate log of control and survey work as Work progresses.

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

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

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

1.4 PRECONSTRUCTION MEETING

A. Architect will schedule meeting after Notice to Proceed.

B. Attendance Required: Owner, Architect, major subcontractors, Superintendent, and Contractor.

C. Agenda:
1. Bonds and insurance.
2. Documents
3. List of subcontractors.
4. Please provide construction schedule.
5. Please provide designation of personnel represented for contact on this job.
6. Procedure for processing field decisions as they relate to proposal requests and finally change orders.
    a. RFI's, PR's and Change Orders.
    b. Design questions.
7. Scheduling and reports of geotech.
8. Visits by Owner and contractor to project site.
9. Temporary utilities provided by the Owner.
10. Survey and building layout.
11. Security on site.
12. Application of payment document preference, date, etc.
13. Special Inspections.
14. As built drawings schedule.
15. Protection of in-place equipment and use of before end of construction.
16. Owner furnished items – coordination and installation.

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

1.5 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the Work at maximum bi-monthly intervals.

B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.

C. Attendance Required: Job superintendent, major subcontractors and suppliers, Owner, Architect, as appropriate to agenda topics for each meeting.

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

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

1.6 PRE-INSTALLATION MEETINGS

A. When required in individual specification sections, convene pre-installation meetings at Project site prior to commencing work of specific section.

B. Require attendance of parties directly affecting, or affected by, Work of specific section.

C. Notify Architect/Engineer one week in advance of meeting date.

D. Prepare agenda and preside at meeting:
1. Review conditions of installation, preparation and installation procedures.
2. Review coordination with related work.

E. Record minutes and distribute copies within two days after meeting to participants, with one copy to Architect/Engineer, and those affected by decisions made.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION

3.1 CUTTING AND PATCHING

A. Employ skilled and experienced installer to perform cutting and patching.

B. Submit written request in advance of cutting or altering elements affecting:
   1. Structural integrity of element.
   2. Integrity of weather-exposed or moisture-resistant elements.
   3. Efficiency, maintenance, or safety of element.
   4. Visual qualities of sight exposed elements.
   5. Work of Owner or separate contractor.

C. Execute cutting, fitting, and patching including excavation and fill, to complete Work, and to:
   1. Fit the several parts together, to integrate with other Work.
   2. Uncover Work to install or correct ill-timed Work.
   3. Remove and replace defective and non-conforming Work.
   4. Remove samples of installed Work for testing.
   5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.

D. Execute work by methods to avoid damage to other Work, and to provide proper surfaces to receive patching and finishing.

E. Cut masonry and concrete materials using masonry saw or core drill.

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

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

H. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.

I. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 84 00, to full thickness of penetrated element.

END OF SECTION

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Submittal procedures.

B. Construction progress schedules.

C. Proposed products list.

D. Product data.

E. Shop drawings.

F. Samples.

G. Design data.

H. Test reports.

I. Certificates.

J. Manufacturer's instructions.

K. Manufacturer's field reports.

L. Construction photographs.

1.2 SUBMITTAL PROCEDURES

A. Transmit each submittal with AIA Form G810.

B. Submittals may be sent electronically if no more than 15 pages. Do not submit MSDS sheets.

C. Sequentially number transmittal forms. Mark revised submittals with original number and sequential alphabetic suffix.

D. Identify Project, Contractor, subcontractor and supplier; pertinent drawing and detail number, and specification section number, appropriate to submittal.

E. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with requirements of the Work and Contract Documents.

F. Schedule submittals to expedite Project, and deliver to Architect. Coordinate submission of related items.

G. For each submittal for review, allow 15 days excluding delivery time to and from Contractor.

H. Identify variations from Contract Documents and product or system limitations which may be detrimental to successful performance of completed Work.

I. Allow space on submittals for Contractor and Architect/Engineer review stamps.

J. When revised for resubmission, identify changes made since previous submission. The complete submittal will not be reviewed again, only the items marked. Architect/Engineer will not be responsible for any other changes to previously accepted items.

K. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report inability to comply with requirements.

L. Submittals not requested will not be recognized or processed.

1.3 CONSTRUCTION PROGRESS SCHEDULES

A. Submit initial schedules within 15 days after date of Owner-Contractor Agreement.

B. Submit revised Progress Schedules with each Application for Payment.

C. Distribute copies of reviewed schedules to Project site file, subcontractors, suppliers, and other concerned parties.

D. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.

E. Submit computer generated horizontal bar chart with separate line for each major portion of Work or operation, identifying first work day of each week.

F. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate early and late start, early and late finish, float dates, and duration.

G. Indicate estimated percentage of completion for each item of Work at each submission.

H. Submit separate schedule of submittal dates for shop drawings, product data, and samples, including Owner furnished products and products identified under Allowances, and dates reviewed submittals will be required from Architect. Indicate decision dates for selection of finishes.

I. Indicate delivery dates for Owner furnished products and products identified under Allowances.

J. Revisions to Schedules:
   1. Indicate progress of each activity to date of submittal, and projected completion date of each activity.
   2. Identify activities modified since previous submittal, major changes in scope, and other identifiable changes.

3. Prepare narrative report to define problem areas, anticipated delays, and impact on Schedule. Report corrective action taken, or proposed, and its effect including effect of changes on schedules of separate contractors.

1.4 PROPOSED PRODUCTS LIST

A. Within 15 days after date of Owner-Contractor Agreement, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.5 PRODUCT DATA

A. Product Data: Submit to Architect/Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.

B. Submit electronically.

C. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

D. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

E. After review, produce copies and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents described in Section 01 70 00 - Execution and Closeout Requirements.

1.6 SHOP DRAWINGS

A. Any drawings provided by the Architect or Engineer to be used in the preparation of shop drawings will be at the cost of $100 per sheet.

B. Shop Drawings: Submit to Architect for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.

C. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

D. When required by individual specification sections, provide shop drawings signed and sealed by professional engineer responsible for designing components shown on shop drawings.
1. Include signed and sealed calculations to support design.
2. Submit drawings and calculations in form suitable for submission to and approval by authorities having jurisdiction.
3. Make revisions and provide additional information when required by authorities having jurisdiction.

E. Submit electronically.

F. After review, produce copies and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents described in Section 01 70 00 - Execution and Closeout Requirements.

1.7 SAMPLES

A. Samples: Submit to Architect for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.

B. Samples For Selection as Specified in Product Sections:
   1. Submit to Architect for aesthetic, color, or finish selection.
   2. Submit samples of finishes in selected colors, textures, and patterns for Architect selection.

C. Submit samples to illustrate functional and aesthetic characteristics of Products, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

D. Include identification on each sample, with full Project information.

E. Submit number of samples specified in individual specification sections; Architect will retain one sample.

F. Reviewed samples which may be used in the Work are indicated in individual specification sections.

G. Samples will not be used for testing purposes unless specifically stated in specification section.

H. After review, produce duplicates and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents purposes described in Section 01 70 00 - Execution and Closeout Requirements.

1.8 DESIGN DATA

A. Submit for Architect's knowledge as contract administrator or for Owner.

B. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.9 TEST REPORTS

A. Submit for Architect's knowledge as contract administrator or for Owner.

B. Submit test reports for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.10 CERTIFICATES

A. When specified in individual specification sections, submit certification by manufacturer, installation/application subcontractor, or Contractor to Architect, in quantities specified for Product Data.

B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Architect.

1.11 MANUFACTURER'S INSTRUCTIONS

A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to Architect for delivery to Owner in quantities specified for Product Data.

B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

1.12 MANUFACTURER'S FIELD REPORTS

A. Submit reports for Architect/Engineer's benefit as contract administrator or for Owner.

B. Submit report within 5 days of observation to Architect for information.

C. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.13 CONSTRUCTION PHOTOGRAPHS

A. Provide photographs of site and construction throughout progress of Work.

B. Twice monthly submit photographs with Application for Payment.

C. Identify each print on back. Identify name of Project, orientation of view, date and time of view.

D. Deliver negatives to Owner with project record documents. Catalog and index negatives in chronological sequence; include typed table of contents.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 40 00

QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Superintendent.

B. Quality control and control of installation.

C. Tolerances.

D. References.

E. Labeling.

F. Mock-up requirements.

G. Testing and inspection services.

H. Manufacturers' field services.

I. Examination.

J. Preparation.

1.2 SUPERINTENDENT

A. The Superintendent assigned to this project must be competent and satisfactory to the Architect.

B. Do not change superintendents except with the consent of the Architect, unless he proves to be unsatisfactory, or ceases to be in his employ.

1.3 QUALITY CONTROL AND 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. When 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. Perform Work by persons qualified to produce required and specified quality.

F. Verify field measurements are as indicated on Shop Drawings or as instructed by manufacturer.

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

1.4 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. When manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

1.5 REFERENCES

A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by date of issue current on date of Contract Documents, except where specific date is established by code.

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

D. When specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.

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

1.6 LABELING

A. Attach label from agency approved by authority having jurisdiction for products, assemblies, and systems required to be labeled by applicable code.

B. Label Information: Include manufacturer's or fabricator's identification, approved agency identification, and the following information, as applicable, on each label.
   1. Model number.
   2. Serial number.
   3. Performance characteristics.

1.7 MOCK-UP REQUIREMENTS

A. Tests will be performed under provisions identified in this section and identified in 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 comparison standard for remaining Work.

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

1.8 TESTING AND INSPECTION SERVICES

A. Employ and pay for services of an independent testing agency or laboratory acceptable to Owner to perform specified testing.
   1. Prior to start of Work, submit testing laboratory name, address, and telephone number, and names of full time registered Engineer and responsible officer.
   2. Submit copy of report of laboratory facilities inspection made by Materials Reference Laboratory of National Bureau of Standards during most recent inspection, with memorandum of remedies of deficiencies reported by inspection.

B. The independent firm will perform tests, inspections and other services specified in individual specification sections and as required by Architect.
   1. Laboratory: Authorized to operate at Project location.
   2. Laboratory Staff: Maintain full time registered Engineer on staff to review services.
   3. Testing Equipment: Calibrated at reasonable intervals with devices of an accuracy traceable to National Bureau of Standards or accepted values of natural physical constants.

C. Testing, inspections and source quality control may occur on or off project site. Perform off-site testing as required by Architect or Owner. Refer to Section 01 40 10.

D. Reports will be submitted by independent firm to Architect and Contractor, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.
   1. Submit final report indicating correction of Work previously reported as non-compliant.

E. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.
   1. Notify Architect and independent firm 2 weeks prior to expected time for operations requiring services.
   2. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.

F. Testing and employment of testing agency or laboratory shall not relieve Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

G. Re-testing or re-inspection required because of non-conformance to specified requirements shall be performed by same independent firm on instructions by Architect/Engineer. Payment for re-testing or re-inspection will be charged to Contractor by deducting testing charges from Contract Sum/Price.

H. Agency Responsibilities:
   1. Test samples of mixes submitted by Contractor.
   2. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
   3. Perform specified sampling and testing of products in accordance with specified standards.
   4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
   5. Promptly notify Architect and Contractor of observed irregularities or non-conformance of Work or products.
   6. Perform additional tests required by Architect.
   7. Attend preconstruction meetings and progress meetings.

I. Agency Reports: After each test, promptly submit four copies of report to Architect, Contractor, and authority having jurisdiction. When requested by Architect, provide interpretation of test results. Include the following:
   1. Date issued.
   2. Project title and number.
   3. Name of inspector.
   4. Date and time of sampling or inspection.
   5. Identification of product and specifications section.
   6. Location in Project.
   7. Type of inspection or test.
   8. Date of test.
   9. Results of tests.
   10. Conformance with Contract Documents.

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

1.9 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, and test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.

B. Submit qualifications of observer to Architect 2 weeks in advance of required observations.

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

D. Refer to Section 01 33 00 - Submittal Procedures, MANUFACTURERS' FIELD REPORTS article.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.

B. Verify 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. Verify utility services are available, of correct characteristics, and in correct locations.

3.2 PREPARATION

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

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

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

D. Beginning of Work constitutes acceptance of substrate and conditions.

END OF SECTION

SECTION 01 40 10

SPECIAL INSPECTIONS

PART 1 GENERAL

1.1 SUMMARY

A. Special Inspection is the monitoring of the materials and workmanship critical to the integrity of the building structure. It is a review of the work of the contractors and their employees to ensure that the approved plans and specifications are being followed and that the relevant codes and referenced standards are being observed. The Special Inspection process is *in addition* to the inspections conducted by the Building Official or authority having jurisdiction, Structural Observation by the Design Professional and any other test or inspections required by the Construction Documents.

B. Refer to the Statement of Special Inspections at the end of this Section, as well as the Schedule of Special Inspection Services.

C. Special inspections and tests are required to be performed by qualified, independent agents with special expertise as approved by the Building Official.

D. Special Inspections per Building Code Section 1704 are required to be provided on all professionally designed projects not meeting the exceptions described in Section 1704.2 or as determined by the Building Official.

1.2 SUBMITTALS

A. Submit a *Statement of Special Inspections,* including a *Schedule of Special Inspection Services* prepared by the Registered Design Professional in Responsible Charge, to the Building Official at time of permit application, as part of the general requirements Section 1704 of the Building Code, Special Inspections.

B. Include the following, in accordance with Section 1704.3 of the Building Code:
   1. *Schedule of Special Inspection Services*, containing the following items:
      a. The materials, systems, components and work required to have special inspection or testing by the building official or by the registered design professional responsible for each portion of the work.
      b. The type and extent of each special inspection.
      c. The type and extent of each test.
      d. Additional requirements for special inspection or testing for seismic or wind resistance as specified in Section 1705.10, 1705.11 and 1705.12.
      e. For each type of special inspection, identification as to whether it will be continuous special inspection or periodic special inspection.
   2. Additional special inspection and testing requirements for seismic resistance where required by Building Code Sections 1705.10, 1705.11 or 1705.12.

a. Submit a written statement of responsibility to the building official and Design Professional in Responsible Charge prior to the commencement of work on the system or component. This is required for each contractor responsible for the construction of a seismic resistant system or component listed in the *Statement of Special Inspections.*

C. Maintain the *Schedule of Special Inspection Services* during the course of the construction project and reflect any changes.

D. At the completion of work and prior to the issuing the Certificate of Occupancy, submit a *Final Report of Special Inspections* in accordance with *Building Code* Section 1704.2.4 to the Building Official. This report shall document the completion of all required special inspections and testing.

1.3 SPECIAL INSPECTION RESPONSIBILITIES

A. Special Inspectors Responsibilities:
1. Notify the contractor of their presence and responsibilities at the job site.
2. Observe assigned work for which they are responsible for conformance with the plans and specifications.
3. Report nonconforming items to the immediate attention of the contractor for correction.
4. Write a discrepancy notice about each nonconforming item containing:
   a. Description and exact location.
   b. Reference to applicable drawings and specifications.
   c. Resolution or corrective action taken and the date.
5. Provide timely reports and furnish these reports directly to the Design Professional and the contractor.
   a. Describe the special inspection and tests made, with locations.
   b. Indicate nonconforming items and their resolution.
   c. List unresolved items and parties notified.
   d. Itemize any changes authorized by the Design Professional.
6. Furnish interim reports to the Building Official and Design Professional at the frequency indicated on the *Statement of Special Inspections*.
7. Initial and date the “Date Completed” box in the *Schedule of Special Inspection Services* as the inspection and testing activities are completed.
8. Submit a signed *Final Report of Special Inspections* stating that all required special inspections and testing were fulfilled and reported and that any outstanding discrepancies have been corrected.

B. Contractor Responsibilities:
1. Engage the Special Inspector(s).
2. Submit to the Building Official a list of the individuals, approved agencies or firms intended to be retained for conducting special inspections.
3. Submit all *Statement(s) of Responsibility* (pg C1) where required by the *Statement of Special Inspections.*
4. Maintain the Schedule of Special Inspection Services at the project site and submit a copy to the Design Professional and the Building Official when all the services are complete.
5. Notify the Special Inspector(s) when special inspections are needed.
6. Coordinate the scheduling and timely notification of the specific individuals needed for the Special Inspection.

7. Provide direct access to the approved design drawings and specifications for the project, as well as any revisions.
8. Provide safe access to the work to be inspected.
9. Maintain at the project site for use by the Special Inspectors at least one copy of:
    a. All required manufacturer's equipment Certificates of Compliance.
    b. All shop drawings/submittals indicating seismic restraint design for all designated seismic systems.
10. Remedy deficient work as construction progresses and prior to final inspection.
11. Each approved fabricator that is exempt from Special Inspection of shop fabrication and implementation procedures per section 1704.2.5.2 of the *Building Code* must submit *Fabricator's Certificate of Compliance* at the completion of fabrication to the contractor.
12. Remedy deficient work as construction progresses and prior to final inspection.

1.4 FORMS

A. The following forms are included at the end of this section for use in meeting these requirements.
    1. Statement of Special Inspections
    2. Schedule of Special Inspection Services
    3. Contractor's Statement of Responsibility
    4. Special Inspection Report
    5. Special Inspection Discrepancy Notice
    6. Fabricator's Certificate of Compliance
    7. Statement of Special Inspections for Seismic Resistance
    8. Final Report of Special Inspections: Submit when all the special inspection requirements for a project have been fulfilled and all noted deficiencies have been corrected. Each special inspector corresponding to an agent number in the *Schedule of Special Inspection Services* will be required to complete a copy of this form for submittal to the Design Professional and the Building Official for their scope of work. The special inspection program will not be considered complete until forms from all agents have been submitted and received.

PART 2 PRODUCTS – Not Used

PART 3 EXECUTION – Not Used

END OF SECTION

STATEMENT OF SPECIAL INSPECTIONS

(Completed by the Registered Design Professional in Responsible Charge)

PROJECT: First Community Branch Bank

LOCATION: Brookland, AR

PERMIT APPLICANT:

APPLICANT'S ADDRESS:

ARCHITECT OF RECORD: Roark Perkins Perry & Yelvington Architects

STRUCTURAL ENGINEER OF RECORD: Robert E. Gatlin

MECHANICAL ENGINEER OF RECORD: Douglas F. Bown

ELECTRICAL ENGINEER OF RECORD: Robert D. Merriott

REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE: David W. Perry

This Statement of Special Inspections is submitted in accordance with Section 1704.3 of the 2012 Arkansas Fire Prevention Code. It includes a *Schedule of Special Inspection Services* applicable to the above-referenced Project as well as the identity of the individuals, agencies, or firms intended to be retained for conducting these inspections. If applicable, it includes *Requirements for Seismic Resistance* and/or *Requirements for Tornado Resistance*.

Are *Requirements for Seismic Resistance* included in the *Statement of Special Inspections*?	☒ Yes	☐ No
Are *Requirements for Tornado Resistance* included in the *Statement of Special Inspections*?	☐ Yes	☒ No

The Special Inspector(s) shall keep records of all inspections and shall furnish interim inspection reports to the Building Official and to the Registered Design Professional in Responsible Charge at a frequency agreed upon by the Design Professional and the Building Official prior to the start of work. Discrepancies shall be brought to the immediate attention of the Contractor for correction. If the discrepancies are not corrected, the discrepancies shall be brought to the attention of the Building Official and the Registered Design Professional in Responsible Charge prior to completion of that phase of work. A *Final Report of Special Inspections* documenting required special inspections and corrections of any discrepancies noted in the inspections shall be submitted to the Building Official and the Registered Design Professional in Responsible Charge at the conclusion of the project.

Frequency of interim report submittals to the Registered Design Professional in Responsible Charge:

__Weekly __Bi-Weekly _x_Monthly Other; specify:_____

The Special Inspection program does not relieve the Contractor of the responsibility to comply with the Contract Documents. Jobsite safety and means and methods of construction are solely the responsibility of the Contractor.

Statement of Special Inspections Prepared by:

Preparer's Seal

Type or print name

Signature Date

Building Official's Acceptance:

Signature Date

Permit Number:

Frequency of interim report submittals to the Building Official:

__Monthly __Bi- Monthly _x_Upon Completion Other; specify:_____

Statement of Special Inspections
Requirements for Seismic Resistance

See the Schedule of Special Inspections for inspection and testing requirements.

Seismic Design Category: D

Statement of Special Inspection for Seismic Resistance Required (Yes/No): YES

Description of seismic force-resisting system subject to special inspection and testing for seismic resistance:
(Required for Seismic Design Categories C, D, E or F in accordance with Building Code Section 1705.11.1 through 1705.11.3, 1705.12.1 and 1705.12.2.)

1. Light framed ply wall shear walls
2. Special cantilever column at drive thru canopy

Description of designated seismic systems subject to special inspection, testing and qualification for seismic resistance:
(Required for architectural, electrical and mechanical systems and their components that require design in accordance with ASCE 7-10 Chapter 13, have a component importance factor, *Ip*, greater than one and are in Seismic Design Categories C, D, E or F, in accordance with Building Code Section 1705.11.4 and 1705.12.3.)

Description of additional components and systems requiring special inspections, testing and qualification for seismic resistance:
(Required for systems noted in Building Code Section 1705.11, cases 3, 4 & 5 ***or*** Section 1705.12, cases 3 & 4, in Seismic Design Category C,D,E or F)

Statement of Responsibility:

Each contractor responsible for the construction or fabrication of a system or component described above must each submit a Statement of Responsibility (pg C1) in accordance with Building Code Section 1704.4.

FINAL REPORT OF SPECIAL INSPECTIONS

(Completed by each Special Inspector)

PROJECT: _____

LOCATION: _____

PERMIT APPLICANT: _____

APPLICANT'S ADDRESS: _____

_____

ARCHITECT OF RECORD: _____

STRUCTURAL ENGINEER OF RECORD: _____

MECHANICAL ENGINEER OF RECORD: _____

ELECTRICAL ENGINEER OF RECORD: _____

REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE: _____

To the best of my information, knowledge, and belief, which are based upon observations or diligent supervision of our inspection services for the above-referenced Project, I hereby state that the special inspections or testing required for this Project, and designated for this Agent in the *Schedule of Special Inspection Services*, have been completed in accordance with the Contract Documents and approved design revisions.

The Special Inspection program does not relieve the Contractor of the responsibility to comply with the Contract Documents. Jobsite safety and means and methods of construction are solely the responsibility of the Contractor.

Interim reports submitted prior to this final report and numbered ___ to ___ form a basis for, and are to be considered an integral part of this final report. The following discrepancies that were outstanding since the last interim report dated _____ have been corrected:

_____

_____

_____

_____

_____

(Attach 8 ½"x11" continuation sheet(s) if required to complete the description of corrections)

Prepared By:

_____

Special Inspection Agent/Firm

_____

Type or print name of Special Inspector

_____

Signature Date

SCHEDULE OF SPECIAL INSPECTION SERVICES					
PROJECT	(Completed by the Registered Design Professional in Responsible Charge)				
		APPLICABLE TO THIS PROJECT			
MATERIAL / ACTIVITY	**SERVICE**	**Y/N**	**EXTENT**	**AGENT***	**DATE COMPLETED**
1704.2.5 Inspection of Fabricators					
Verify fabrication/quality control procedures.	In-plant review (3)	Y	Periodic		
1705.1.1 Special Cases (work unusual in nature, including but not limited to alternative construction materials, unusual design applications, systems or materials with special manufacturer requirements. Attach 8 1/2x11 if needed).	Submittal review, shop(3) inspection and/or field inspection.	N			
1705.2 Structural Steel Construction					
1. Review the material test reports and certificates as listed in AISC 360-10, Section N3.2 for compliance with the construction documents	Submittal review	Y	Each submittal		
2. Material verification of structural steel	Shop (3) and field inspection	Y	Periodic		
3. Anchor Rods and other Embedment(s) (Verify diameter, grade, type, length, embedment. See 1705.3 for anchors)	Field inspection	Y	Continuous		
4. Verify member locations, braces, stiffeners, and application of joint details at each connection comply with construction documents	Field inspection	Y	Periodic		

SCHEDULE OF SPECIAL INSPECTION SERVICES					
PROJECT	(Completed by the Registered Design Professional in Responsible Charge)				
		APPLICABLE TO THIS PROJECT			
MATERIAL / ACTIVITY	**SERVICE**	**Y/N**	**EXTENT**	**AGENT***	**DATE COMPLETED**
5. Structural steel welding:					
a. Inspection tasks Prior to Welding (Observe, or perform for each welded joint or member, the QA tasks listed in AISC 360, Table N5.4-1)	Shop (3) and field inspection	Y	Observe or Perform as noted (4)		
b. Inspection tasks During Welding (Observe, or perform for each welded joint or member, the QA tasks listed in AISC 360, Table N5.4-2)	Shop (3) and field inspection	Y	Observe (4)		
c. Inspection tasks After Welding (Observe, or perform for each welded joint or member, the QA tasks listed in AISC 360, Table N5.4-3)	Shop (3) and field inspection	Y	Observe or Perform as noted (4)		
d. Nondestructive testing (NDT) of welded joints: *see Commentary*					
1) Complete penetration groove welds at joints in materials 5/16" thick or greater in Risk Category III or IV	Shop (3) or field ultrasonic testing - 100%	N	Periodic		
2) Complete penetration groove welds at joints in materials 5/16" or greater in Risk Category II	Shop (3) or field ultrasonic testing - 10% of welds minimum	Y	Periodic		
3) Thermally cut surfaces of access holes when material t > 2"	Shop (3) or field magnetic Particle or Penetrant testing	Y	Periodic		

SCHEDULE OF SPECIAL INSPECTION SERVICES					
PROJECT	(Completed by the Registered Design Professional in Responsible Charge)				
		APPLICABLE TO THIS PROJECT			
MATERIAL / ACTIVITY	**SERVICE**	**Y/N**	**EXTENT**	**AGENT***	**DATE COMPLETED**
4) Welded joints subject to fatigue when required by AISC 360, Appendix 3, Table A-3.1	Shop (3) or field radiographic or Ultrasonic testing	N	Periodic		
5) Fabricator's NDT reports when fabricator performs NDT	Verify reports	Y	Each submittal (5)		
6. Structural steel bolting:	Shop (3) and field inspection				
a. Inspection tasks Prior to Bolting (Observe, or perform tasks for each bolted connection, in accordance with QA tasks listed in AISC 360-10, Table N5.6-1)		Y	Observe or Perform as noted (4)		
b.Inspection tasks During Bolting (Observe the QA tasks listed in AISC 360-10, Table N5.6-2)		Y	Observe (4)		
1) Pre-tensioned and slip-critical joints					
a) Turn-of-nut with matching markings		Y	Periodic		
b) Direct tension indicator		Y	Periodic		
c) Twist-off type tension control bolt		Y	Periodic		
d) Turn-of-nut without matching markings		Y	Continuous		
e) Calibrated wrench		Y	Continuous		
2) Snug-tight joints			Periodic		

SCHEDULE OF SPECIAL INSPECTION SERVICES					
PROJECT	(Completed by the Registered Design Professional in Responsible Charge)				
		APPLICABLE TO THIS PROJECT			
MATERIAL / ACTIVITY	**SERVICE**	**Y/N**	**EXTENT**	**AGENT***	**DATE COMPLETED**
c. Inspection tasks After Bolting (Perform tasks for each bolted connection in accordance with QA tasks listed in AISC 360, Table N5.6-3)		Y	Perform (4)		
7. Inspection of steel elements of composite construction prior to concrete placement in accordance with QA tasks listed in AISC 360-10, Table N6.1 and Section N6	Shop (3) and field inspection and testing		Observe or Perform as noted (4)		
a. Placement and installation of steel deck		N	Periodic		
b. Placement and installation of steel headed stud anchors		N	Periodic		
1705.2.2 Steel Construction Other Than Structural Steel					
1. Material verification of cold-formed steel deck:					
a. Identification markings	Field inspection	N	Periodic		
b. Manufacturer's certified test reports	Submittal Review	N	Each submittal		
2. Connection of cold-formed steel deck to supporting structure:	Shop (3) and field inspection				
a. Welding		N	Periodic		
b. Other fasteners (in accordance with AISC 360,Section N6)					
1) Verify fasteners are in conformance with approved submittal		N	Periodic		

SCHEDULE OF SPECIAL INSPECTION SERVICES					
PROJECT	(Completed by the Registered Design Professional in Responsible Charge)				
		APPLICABLE TO THIS PROJECT			
MATERIAL / ACTIVITY	**SERVICE**	**Y/N**	**EXTENT**	**AGENT***	**DATE COMPLETED**
2) Verify fastener installation is in conformance with approved submittal and manufacturer's recommendations		N	Periodic		
3. Welding reinforcing steel	Shop (3) and field inspection				
a. Verification of weldability of steel other than ASTM A706		N	Periodic		
b. Reinforcing steel resisting flexural and axial forces in intermediate and special moment frames, boundary elements of special concrete structural walls and shear reinforcement		N	Continuous		
c. Shear reinforcement		N	Continuous		
d. Other reinforcing steel		N	Periodic		
4. Cold-formed steel trusses spanning 60 feet or greater					
a. Verify temporary and permanent restraint/bracing are installed in accordance with the approved truss submittal package	Field inspection	N	Periodic		
1705.3 Concrete Construction					
1. Inspection of reinforcing steel placement	Field inspection	Y	Periodic		
2. Inspection of prestressing steel placement	In-plant or field review	N	Periodic		
3. Inspection of anchors cast in concrete where allowable loads have been increased or where strength design is used	Shop (3) and field inspection	N	Continuous		

SCHEDULE OF SPECIAL INSPECTION SERVICES					
PROJECT	(Completed by the Registered Design Professional in Responsible Charge)				
		APPLICABLE TO THIS PROJECT			
MATERIAL / ACTIVITY	**SERVICE**	**Y/N**	**EXTENT**	**AGENT***	**DATE COMPLETED**
4. Inspection of anchors and reinforcing steel post-installed in hardened concrete: Per research reports requirements	Field inspection	Y	Periodic or as required by the research report issued by an approved source		
5. Verify use of approved design mix	Shop (3) and field inspection	Y	Periodic		
6. Fresh concrete sampling, perform slump and air content tests and determine temperature of concrete	Shop (3) and field inspection	Y	Continuous		
7. Inspection of concrete and shotcrete placement for proper application techniques	Shop (3) and field inspection	Y	Continuous		
8. Inspection for maintenance of specified curing temperature and techniques	Shop (3) and field inspection	Y	Periodic		
9. Inspection of prestressed concrete:	In-plant or field review				
a. Application of prestressing forces		N	Continuous		
b. Grouting of bonded prestressing tendons in the seismic-force-resisting system		N	Continuous		
10. Erection of precast concrete members					
a. Inspect in accordance with construction documents	Field inspection	N	Periodic		
b. Perform inspections of welding and bolting in accordance with Section 1705.2	Field inspection	N	In accordance with Section 1705.2		

SCHEDULE OF SPECIAL INSPECTION SERVICES					
PROJECT	(Completed by the Registered Design Professional in Responsible Charge)				
		APPLICABLE TO THIS PROJECT			
MATERIAL / ACTIVITY	**SERVICE**	**Y/N**	**EXTENT**	**AGENT***	**DATE COMPLETED**
11. Verification of in-situ concrete strength, prior to stressing of tendons in post tensioned concrete and prior to removal of shores and forms from beams and structural slabs.	Field testing and review of laboratory reports	N	Periodic		
12. Inspection of formwork for shape, lines, location and dimensions	Field inspection	Y	Periodic		
13. Concrete strength testing and verification of compliance with construction documents	Field testing and review of laboratory reports	Y	Periodic		
1705.4 Masonry Construction					
(A) Level A, B and C Quality Assurance:					
1. Verify compliance with approved submittals	Field Inspection	Y	Periodic		
(B) Level B Quality Assurance:					
1. Verification of f'_m and f'_{AAC} prior to construction	Testing by unit strength method or prism test method	Y	Periodic		
(C) Level C Quality Assurance:					
1. Verification of f'_m and f'_{AAC} prior to construction and for every 5,000 SF during construction	Testing by unit strength method or prism test method	N	Periodic		
2. Verification of proportions of materials in premixed or preblended mortar, prestressing grout, and grout other than selfconsolidating grout, as delivered to the project site	Field inspection	N	Continuous		
3. Verify placement of masonry units	Field Inspection	N	Periodic		

SCHEDULE OF SPECIAL INSPECTION SERVICES

PROJECT	(Completed by the Registered Design Professional in Responsible Charge)				
		APPLICABLE TO THIS PROJECT			
MATERIAL / ACTIVITY	SERVICE	Y/N	EXTENT	AGENT*	DATE COMPLETED
(D) Levels B and C Quality Assurance:					
1. Verification of Slump Flow and Visual Stability Index (VSI) of selfconsolidating grout as delivered to the project	Field testing	Y	Continuous		
2. Verify compliance with approved submittals	Field inspection	Y	Periodic		
3. Verify proportions of site-mixed mortar, grout and prestressing grout for bonded tendons	Field Inspection	N	Periodic		
4. Verify grade, type, and size of reinforcement and anchor bolts, and prestressing tendons and anchorages	Field Inspection	Y	Periodic		
5. Verify construction of mortar joints	Field Inspection	Y	Periodic		
6. Verify placement of reinforcement, connectors, and prestressing tendons and anchorages	Field Inspection	Y	Level B - Periodic		
		N	Level C - Continuous		
7. Verify grout space prior to grouting	Field Inspection	Y	Level B - Periodic		
		N	Level C - Continuous		
8. Verify placement of grout and prestressing grout for bonded tendons	Field Inspection	N	Continuous		
9. Verify size and location of structural masonry elements	Field Inspection	Y	Periodic		
10. Verify type, size, and location of anchors, including details of anchorage of masonry to structural members, frames, or other construction.	Field inspection	Y	Level B - Periodic		
		N	Level C - Continuous		

SCHEDULE OF SPECIAL INSPECTION SERVICES					
PROJECT	(Completed by the Registered Design Professional in Responsible Charge)				
		APPLICABLE TO THIS PROJECT			
MATERIAL / ACTIVITY	**SERVICE**	**Y/N**	**EXTENT**	**AGENT***	**DATE COMPLETED**
11. Verify welding of reinforcement (see 1705.2.2)	Field inspection	N	Continuous		
12. Verify preparation, construction, and protection of masonry during cold weather (temperature below 40^{o} F) or hot weather (temperature above 90^{o} F)	Field inspection	Y	Periodic		
13. Verify application and measurement of prestressing force	Field Inspection	N	Continuous		
14. Verify placement of AAC masonry units and construction of thin-bed mortar joints (first 5000 SF of AAC masonry)	Field inspection	N	Continuous		
15. Verify placement of AAC masonry units and construction of thin-bed mortar joints (after the first 5000 SF of AAC masonry)	Field inspection	N	Level B - Periodic		
		N	Level C - Continuous		
16. Verify properties of thin-bed mortar for AAC masonry (first 5000 SF of AAC masonry)	Field inspection	N	Continuous		
17. Verify properties of thin-bed mortar forAAC masonry (after the first 5000 SF of AAC masonry)	Field inspection	N	Level B - Periodic		
		N	Level C - Continuous		
18. Prepare grout and mortar specimens	Field testing	Y	Level B - Periodic		
		N	Level C - Continuous		
19. Observe preparation of prisms	Field inspection	Y	Level B - Periodic		
		N	Level C - Continuous		
1705.5 Wood Construction					

SCHEDULE OF SPECIAL INSPECTION SERVICES					
PROJECT	(Completed by the Registered Design Professional in Responsible Charge)				
		APPLICABLE TO THIS PROJECT			
MATERIAL / ACTIVITY	**SERVICE**	**Y/N**	**EXTENT**	**AGENT***	**DATE COMPLETED**
1. Inspection of the fabrication process of wood structural elements and assemblies in accordance with Section 1704.2.5	In-plant review (3)	Y	Periodic		
2. For high-load diaphragms, verification of grade and thickness of structural panel sheathing.	Field inspection	Y	Periodic		
3. For high-load diaphragms, verify nominal size of framing members at adjoining panel edges, nail or staple diameter and length, number of fastener lines, and that spacing between fasteners in each line and at edge margins agrees with approved bldg plans.	Field inspection	Y	Periodic		
4. Metal-plate-connected wood trusses spanning 60 feet or greater: verify temporary and permanent restraint/bracing are installed in accordance with the approved truss submittal package	Field inspection	Y	Periodic		
1705.6 Soils					
1. Verify materials below shallow foundations are adequate to achieve the design bearing capacity.	Field inspection	Y	Periodic		
2. Verify excavations are extended to proper depth and have reached proper material.	Field inspection	Y	Periodic		
3. Perform classification and testing of controlled fill materials.	Field inspection	Y	Periodic		
4. Verify use of proper materials, densities, and lift thicknesses during placement and compaction of compacted fill	Field inspection	Y	Continuous		

SCHEDULE OF SPECIAL INSPECTION SERVICES					
PROJECT	(Completed by the Registered Design Professional in Responsible Charge)				
		APPLICABLE TO THIS PROJECT			
MATERIAL / ACTIVITY	**SERVICE**	**Y/N**	**EXTENT**	**AGENT***	**DATE COMPLETED**
5. Prior to placement of controlled fill, observe subgrade and verify that site has been prepared properly	Field inspection	Y	Periodic		

SCHEDULE OF SPECIAL INSPECTION SERVICES					
PROJECT	(Completed by the Registered Design Professional in Responsible Charge)				
		APPLICABLE TO THIS PROJECT			
MATERIAL / ACTIVITY	**SERVICE**	**Y/N**	**EXTENT**	**AGENT***	**DATE COMPLETED**
1705.7 Driven Deep Foundations					
1. Verify element materials, sizes and lengths comply with requirements	Field inspection	N	Continuous		
2. Determine capacities of test elements and conduct additional load tests, as required	Field inspection	N	Continuous		
3. Observe driving operations and maintain complete and accurate records for each element	Field inspection	N	Continuous		
4. Verify placement locations and plumbness, confirm type and size of hammer, record number of blows per foot of penetration, determine required penetrations to achieve design capacity, record tip and butt elevations and document any damage to foundation element	Field inspection	N	Continuous	`	
5. For steel elements, perform additional inspections per Section 1705.2	See Section 1705.2	N	See Section 1705.2		
6. For concrete elements and concrete-filled elements, perform additional inspections per Section 1705.3	See Section 1705.3	N	See Section 1705.3		
7. For specialty elements, perform additional inspections as determined by the registered design professional in responsible charge	Field inspection	N	In accordance with construction documents		

SCHEDULE OF SPECIAL INSPECTION SERVICES					
PROJECT	(Completed by the Registered Design Professional in Responsible Charge)				
		APPLICABLE TO THIS PROJECT			
MATERIAL / ACTIVITY	**SERVICE**	**Y/N**	**EXTENT**	**AGENT***	**DATE COMPLETED**
1705.8 Cast-in-Place Deep Foundations					
1.Observe drilling operations and maintain complete and accurate records for each element	Field inspection	N	Continuous		
2. Verify placement locations and plumbness, confirm element diameters, bell diameters (if applicable), lengths, embedment into bedrock (if applicable) and adequate end-bearing strata capacity. Record concrete or grout volumes	Field inspection	N	Continuous		
3. For concrete elements, perform additional inspections in accordance with Section 1705.3	See Section 1705.3	N	See Section 1705.3		
1705.9 Helical Pile Foundations					
1. Verify installation equipment, pile dimensions, tip elevations, final depth, final installation torque and other data as required	Field inspection	N	Continuous		
2. Perform additional inspections and tests in accordance with the construction documents	Field Inspection and testing	N	In accordance with construction documents		
1705.10.1 Structural Wood Special Inspections For Tornado Resistance					
1. Inspection of field gluing operations of elements of the main windforce-resisting system	Field inspection	N	Continuous		

SCHEDULE OF SPECIAL INSPECTION SERVICES					
PROJECT	(Completed by the Registered Design Professional in Responsible Charge)				
		APPLICABLE TO THIS PROJECT			
MATERIAL / ACTIVITY	**SERVICE**	**Y/N**	**EXTENT**	**AGENT***	**DATE COMPLETED**
2. Inspection of nailing, bolting, anchoring and other fastening of components within the main windforce-resisting system	Shop (3) and field inspection	N	Periodic		
1705.10.2 Cold-formed Steel Special Inspections For Wind Resistance					
1.Inspection during welding operations of elements of the main windforce-resisting system	Shop (3) and field inspection	N	Periodic		
2.Inspections for screw attachment, bolting, anchoring and other fastening of components within the main windforce-resisting system	Shop (3) and field inspection	Y	Periodic		
1705.10.3 Wind-resisting Components					
1. Roof cladding	Shop (3) and field inspection	Y	Periodic		
2. Wall cladding	Shop (3) and field inspection	Y	Periodic		

SCHEDULE OF SPECIAL INSPECTION SERVICES					
PROJECT	(Completed by the Registered Design Professional in Responsible Charge)				
		APPLICABLE TO THIS PROJECT			
MATERIAL / ACTIVITY	**SERVICE**	**Y/N**	**EXTENT**	**AGENT***	**DATE COMPLETED**
1705.11.1 Structural Steel Special Inspections for Seismic Resistance					
1. Fabricator and erector documents (Verify reports and certificates as listed in AISC 341-10,Section J2 for compliance with construction documents)	Submittal Review	N	Each submittal		
2. Structural steel welding:					
a. Inspection tasks Prior to, During and After Welding (Observe, or perform for each welded joint or member, the QA tasks listed in AISC 341-10, Table J6-1, J6-2 & J6-3)	Shop (3) and field inspection	N	Observe or Perform as noted (4)		
b. Nondestructive testing (NDT) of welded joints in accordance with AISC 341-10, Section J6.2.	Shop (3) and field testing	N	Periodic		
3. Structural steel bolting:					
a. Inspection tasks Prior to, During and After Bolting (Observe, or perform tasks for each bolted connection, in accordance with QA tasks listed in AISC 341-10, Table J7-1, J7-2 & J7-3)	Shop (3) and field inspection	N	Observe or Perform as noted (4)		
4. Other Steel Structure Inspections, in accordance with QA tasks listed in AISC 341-10, Table J8-1:					
a. RBS requirements	Shop (3) and field inspection	N	Observe (4)		
b. Protected zones	Shop (3) and field inspection	N	Observe (4)		

SCHEDULE OF SPECIAL INSPECTION SERVICES					
PROJECT	(Completed by the Registered Design Professional in Responsible Charge)				
		APPLICABLE TO THIS PROJECT			
MATERIAL / ACTIVITY	**SERVICE**	**Y/N**	**EXTENT**	**AGENT***	**DATE COMPLETED**
5. Composite construction:					
a. Inspection tasks Prior to, During and After Concrete Placement (Observe, or perform tasks, in accordance with QA tasks listed in AISC 341-10, Table J9-1, J9-2 & J9-3)	Field inspection	N	Observe (4)		
1705.11.2 Structural Wood Special Inspections for Seismic Resistance					
1. Inspection of field gluing operations of elements of the seismic-force resisting system	Field inspection	N	Continuous		
2. Inspection of nailing, bolting, anchoring and other fastening of components within the seismic-force-resisting system	Shop (3) and field inspection	Y	Periodic		
1705.11.3 Cold-formed Steel Light-Frame Construction Special Inspections for Seismic Resistance					
1. Inspection during welding operations of elements of the seismic force-resisting system	Shop (3) and field inspection	N	Periodic		
2. Inspections for screw attachment, bolting, anchoring and other fastening of components within the seismic force-resisting system	Shop (3) and field inspection	Y	Periodic		

SCHEDULE OF SPECIAL INSPECTION SERVICES					
PROJECT	(Completed by the Registered Design Professional in Responsible Charge)				
		APPLICABLE TO THIS PROJECT			
MATERIAL / ACTIVITY	**SERVICE**	**Y/N**	**EXTENT**	**AGENT***	**DATE COMPLETED**
1705.11.4 Designated Seismic System Verification					
Inspect and verify that that the component label, anchorage or mounting conforms to the certificate of compliance in accordance with 1705.12.3	Field inspection		Periodic		
1. Architectural Designated Seismic Systems (per ASCE 7-10)					
a. Interior non-structural partition walls and connections	Field Inspection		Periodic		
b. Parapets	Field Inspection		Periodic		
c. Chimneys	Field Inspection		Periodic		
d. Exterior non-structural walls elements and connections	Field Inspection		Periodic		
e. Veneer	Field Inspection		Periodic		
f. Suspended Ceiling Systems	Field Inspection		Periodic		
g. Cabinets	Field Inspection		Periodic		
h. Storefront and curtainwall framing	Field Inspection		Periodic		
i. Access Floors	Field Inspections		Periodic		
j. Glass in glazed interior and exterior storefront and curtainwall systems	Field Inspection		Periodic		
k. Laboratory Equipment	Field Inspection		Periodic		
2. Mechanical & Electical Designated Seismic Systems (per ASCE 7-10)					
a. Mechanical and Electrical Components					
1) Air-side HVAC fans, air handlers, air conditioning units, air distribution boxes, and other mechanical components constructed of sheet metal	Field Inspection	Y	Periodic		

SCHEDULE OF SPECIAL INSPECTION SERVICES					
PROJECT	(Completed by the Registered Design Professional in Responsible Charge)				
		APPLICABLE TO THIS PROJECT			
MATERIAL / ACTIVITY	**SERVICE**	**Y/N**	**EXTENT**	**AGENT***	**DATE COMPLETED**
2) Wet side HVAC, boilers, furnaces, atmospheric tanks and bins, chillers, water heaters, heat exchangers, air separators, manufacturing or process equipment and other mechanical components constructed of high-deformability materials	Field Inspection	Y	Periodic		
3) Engines, turbines, pumps, compressors, and pressure vessels	Field Inspection	N	Periodic		
4) Elevator and escalator components	Field Inspection	N	Periodic		
5) Generators, batteries, invertors, motors, transformers, and other electrical components constructed of high deformability materials	Field Inspection		Periodic		
6) Motor control centers, panel boards, switch gear, instrumentation cabinets, and other components constructed of sheet metal framing	Field Inspection		Periodic		
7) Communication equipment, computers, instrumentation and controls	Field Inspection		Periodic		
8) Roof mounted stacks, cooling and electical towers	Field Inspection	N	Periodic		
9) Light fixtures	Field Inspection		Periodic		
b. Vibration Isolated Components & Systems		N			

SCHEDULE OF SPECIAL INSPECTION SERVICES					
PROJECT	(Completed by the Registered Design Professional in Responsible Charge)				
		APPLICABLE TO THIS PROJECT			
MATERIAL / ACTIVITY	**SERVICE**	**Y/N**	**EXTENT**	**AGENT***	**DATE COMPLETED**
1) Components and systems isolated using neoprene elements and neoprene isolated floors with built-in or separate elastomeric snubbing devices or resilient perimeter stops	Field Inspection	N	Periodic		
2) Spring isolated components and systems closely restrained using built in or separate elastomeric snubbing devices or resilient perimeter stops	Field Inspection	N	Periodic		
3) Internally isolated systems and supports	Field Inspection	N	Periodic		
4) Suspended vibration isolation equipment including in-line duct devices and suspended internally isolated components	Field Inspection	N	Periodic		
c. Distribution Systems					
1) Piping and tubing including in-line components	Field Inspection	N	Periodic		
2) Ductwork, including in–line components	Field Inspection	N	Periodic		
3) Electrical conduit and cable trays	Field Inspection		Periodic		
4) Bus ducts					
5) Plumbing	Field Inspection	N	Periodic		
6) Manufacturing or Process Conveyors	Field Inspection	N	Periodic		
7) Fire Protection Sprinkler Pipe System	Field Inspection	N	Periodic		

SCHEDULE OF SPECIAL INSPECTION SERVICES					
PROJECT	(Completed by the Registered Design Professional in Responsible Charge)				
		APPLICABLE TO THIS PROJECT			
MATERIAL / ACTIVITY	**SERVICE**	**Y/N**	**EXTENT**	**AGENT***	**DATE COMPLETED**
1705.11.5 Architectural Components Special Inspections for Seismic Resistance					
1. Inspection during the erection and fastening of exterior cladding and interior and exterior veneer.	Field inspection		Periodic		
2. Inspection during the erection and fastening of interior and exterior non load bearing walls.	Field inspection		Periodic		
3. Inspection during anchorage of access floors	Field inspection		Periodic		
1705.11.6 Mechanical and Electrical Components Special Inspections for Seismic Resistance					
1. Inspection during the anchorage of electrical equipment for emergency or standby power systems.	Field inspection		Periodic		
2. Inspection during the anchorage of other electrical equipment.	Field inspection		Periodic		
3. Inspection during installation and anchorage of piping systems designed to carry hazardous materials, and their associated mechanical units	Field inspection	N	Periodic		
4. Inspection during the installation and anchorage of ductwork designed to carry hazardous materials	Field inspection	N	Periodic		

SCHEDULE OF SPECIAL INSPECTION SERVICES					
PROJECT	(Completed by the Registered Design Professional in Responsible Charge)				
		APPLICABLE TO THIS PROJECT			
MATERIAL / ACTIVITY	**SERVICE**	**Y/N**	**EXTENT**	**AGENT***	**DATE COMPLETED**
5. Inspection during the installation and anchorage of vibration isolation systems.	Field inspection	N	Periodic		

SCHEDULE OF SPECIAL INSPECTION SERVICES					
PROJECT	(Completed by the Registered Design Professional in Responsible Charge)				
		APPLICABLE TO THIS PROJECT			
MATERIAL / ACTIVITY	**SERVICE**	**Y/N**	**EXTENT**	**AGENT***	**DATE COMPLETED**
1705.11.7 Storage Racks for Seismic Resistance					
Inspection during the anchorage storage racks 8 feet or greater in height.	Field inspection		Periodic		
1705.11.8 Seismic Isolation Systems		N			
Inspection during the fabrication and installation of isolator units and energy dissipation devices used as part of the seismic isolation system.	Shop and field inspection		Periodic		
1705.12.1 Concrete Reinforcement Testing and Qualification for Seismic Resistance					
Review certified mill test reports	Field review	N	Each shipment		
Verify reinforcing steel weldability	Review test reports	N	Each shipment		
1705.12.2 Structural Steel Testing and Qualification for Seismic Resistance					
Test in accordance with the quality assurance requirements of AISC 341-10	Shop (3) and field testing	N	Per AISC 341		
1705.12.3 Seismic Certification of Nonstructural Components					

SCHEDULE OF SPECIAL INSPECTION SERVICES					
PROJECT	(Completed by the Registered Design Professional in Responsible Charge)				
		APPLICABLE TO THIS PROJECT			
MATERIAL / ACTIVITY	**SERVICE**	**Y/N**	**EXTENT**	**AGENT***	**DATE COMPLETED**
Review certificate of compliance for designated seismic system components.	Certificate of compliance review	Y	Each submittal		

SCHEDULE OF SPECIAL INSPECTION SERVICES					
PROJECT	(Completed by the Registered Design Professional in Responsible Charge)				
		APPLICABLE TO THIS PROJECT			
MATERIAL / ACTIVITY	**SERVICE**	**Y/N**	**EXTENT**	**AGENT***	**DATE COMPLETED**
1705.12.4 Seismic Isolation Systems					
Test seismic isolation system in accordance with ASCE 7 Section 17.8	Prototype testing	N	Per ASCE 7		
1705.13 Sprayed Fire-resistant Materials					
1. Verify surface condition preparation of structural members.	Field inspection		Periodic		
2. Verify application of sprayed fire-resistant materials.	Field inspection		Periodic		
3. Verify average thickness of sprayed fire-resistant materials applied to structural members.	Field inspection		Periodic		
4. Verify density of the sprayed fire-resistant material complies with approved fire-resistant design.	Field inspection and testing		Per Building Code section 1705.13.5		
5. Verify the cohesive/adhesive bond strength of the cured sprayed fire-resistant material.	Field inspection and testing		Per Building Code section 1705.13.6		
1705.14 Mastic and Intumescent Fire-Resistant Coatings					
Inspect mastic and intumescent fire-resistant coatings applied to structural elements and decks, in accordance with AWCI 12-B.	Field inspection		Periodic		
1705.15 Exterior Insulation and Finish Systems (EIFS)					
1. Verify materials, details and installations are per the approved construction documents	Field inspection		Periodic		

SCHEDULE OF SPECIAL INSPECTION SERVICES

PROJECT	(Completed by the Registered Design Professional in Responsible Charge)				
		APPLICABLE TO THIS PROJECT			
MATERIAL / ACTIVITY	SERVICE	Y/N	EXTENT	AGENT*	DATE COMPLETED
2. Inspection of water-resistive barrier coating over sheathing substrate	Field inspection		Periodic		
1705.16 Fire-Resistant Penetrations and Joints					
1. Inspect penetration firestop	Field testing		Per ASTM E 2174		
2. Inspect fire-resistant joint systems	Field testing		Per ASTM E 2393		
1705.17 Smoke Control Systems		N			
1. Leakage testing and recording of device locations prior to concealment.	Field testing	N	Periodic		
2. Prior to occupancy and after sufficient completion, pressure difference testing, flow measurements, and detection and control verification.	Field testing	N	Periodic		

* INSPECTION AGENTS	FIRM	ADDRESS	TELEPHONE NO.
1.			
2.			
3.			
4.			
5.			

Notes: 1. The inspection and testing agent(s) shall be engaged by the Owner or the Owner's Agent, and not by the Contractor or Subcontractor whose work is to be inspected or tested. Any conflict of interest must be disclosed to the Building Official prior to commencing work. The qualifications of the Special Inspector(s) and/or testing agencies are subject to the approval of the Building Official and/or the Design Professional.

2. The list of Special Inspectors may be submitted as a separate document, if noted so above.

3. Special Inspections as required by Section 1704.2.5 are not required where the fabricator is approved in accordance with IBC Section 1704.2.5.2

4. Observe on a random basis, operations need not be delayed pending these inspections. Perform these tasks for each welded joint, bolted connection, or steel element.

5. NDT of welds completed in an approved fabricator's shop may be performed by that fabricator when approved by the AHJ. Refer to AISC 360, N7.

Circle "Yes" or "No" as appropriate and date this document below:

Are *Requirements for Seismic Resistance* included in the *Statement of Special Inspections*? **Yes**

Are *Requirements for Tornado Resistance* included in the *Statement of Special Inspections*? **No**

DATE:

COMMENTARY ON SCHEDULE OF SPECIAL INSPECTION SERVICES	
MATERIAL / ACTIVITY	**COMMENTARY**
General	Other items may be added to the Schedule of Special Inspection Services at the discretion of the Design Professional and/or the Owner.
Definition: Special Inspection	Inspection of construction requiring the expertise of an approved special inspector in order to ensure compliance with this code and the approved construction documents.
Definition: Special Inspector	A qualified person employed or retained by an approved agency and approved by the building official as having the competence necessary to inspect a particular type of construction requiring special inspection.
Definition: Continuous Special Inspection	Special inspection by the special inspector who is present when and where the work to be inspected is being performed.
Definition: Periodic Special Inspection	Special inspection by the special inspector who is intermittently present where the work to be inspected has been or is being performed.
1704.2.5 Inspection of Fabricators	Required where structural load-bearing members are fabricated in a shop, except not required where fabricator is approved in accordance with section 1704.2.5.2. Where this exception is utilized, at the completion of fabrication, the fabricator shall submit a certificate of compliance stating that the work was performed in accordance with the approved construction documents.
1705.2 Steel Construction	
5.d. Non destructive testing (NDT) of welded joints	As a minimum for special inspections, AISC 360 Chapter N requires UT testing of complete joint penetration groove welds (CJP) subject to transversely applied tension loading in butt, T- and corner joints, in materials 5/16" (8mm) thick or greater. Further NDT testing, including UT testing of partial penetration groove welds (PJP) and magnetic particle or penetrant testing of fillet welds, may be added at the option of the engineer of record as a project requirement. AISC 360 Chapter N also allows reduction or increase in the rate of UT testing if approved by the engineer of record and by the authority having jurisdiction.
5.d. 3), Non destructive testing of thermally cut surfaces of access holes.	This requirement is intended to apply when the flange thickness of rolled shapes exceeds 2" or when the web thickness of built up shapes exceeds 2". Any crack shall be deemed unacceptable regardless of size or location.
5.d. 5), Review of fabricator's NDT reports.	NDT of welds completed in an approved fabricator's shop may be performed by that fabricator only when approved by the authority having jurisdiction. Special Inspections include review of reports of all NDT testing done by the fabricator.
1705.2.2 Steel Construction Other Than Structural Steel	
2.a. Floor and roof cold-formed steel deck welds.	Per AWS D1.3.
3. Reinforcing Steel	Per AWS D1.4 and ACI 318 Section 3.5.2.
1705.3 Concrete Construction	Special Inspections are not required for certain isolated spread concrete footings, certain continuous concrete footings, nonstructural concrete slabs supported directly on the ground, and concrete foundation walls constructed in accordance with Table 1807.1.6.2. See Section 1705.3 for these specific exceptions. Special inspections are not required for any concrete patios, driveways and sidewalks, on grade.

COMMENTARY ON SCHEDULE OF SPECIAL INSPECTION SERVICES	
MATERIAL / ACTIVITY	**COMMENTARY**
10. Erection of precast concrete members.	Inspection of the erection of precast concrete has always been included in IBC, but no specific inspections have been indicated. Inspection of bolts and welds for precast concrete are covered in Section 1705.2 Steel Construction. Any specific precast erection inspection requirements should either be added to the project Special Inspection Schedule or Construction Documents. The following are some inspections that the Design Professional should consider: a. Verify member locations and joint details comply with construction and erection documents b. Verify proper bearing pad type and placement c. Verify placement of grout (including hot and cold weather procedures and that maximum specified number of levels to be placed before grouting are not exceeded) d. Verify joint widths are within specified tolerance where joints are to receive sealant e. Verify thread engagement and torque for mechanical connections
1705.4 Masonry Construction	Masonry construction shall be inspected and verified in accordance with TMS 402/ACI 530/ASCE 5 and TMS 602/ACI 530.1/ASCE 6 quality assurance program requirements. Exceptions: See 1705.4 Risk Categories: See 1604.5
Level A Quality Assurance	Masonry in Risk Category I, II, or III structures and designed in accordance with ACI 530 Chapter 5, 6, or 7 (Empirical Design, Veneer, Glass Unit Masonry)
Level B Quality Assurance	1. Masonry in Risk Category IV structures and designed in accordance with ACI 530 Chapter 6 or 7 (Veneer, Glass Unit Masonry) 2. Masonry in Risk Category I, II, or III structures and designed in accordance with ACI 530 Chapter 2, 3, 4, 8 or Appendix B (Allowable Stress Design, Strength Design, Prestressed Masonry, AAC Masonry, Masonry Infill)
Level C Quality Assurance	Masonry in Risk Category IV structures and designed in accordance with ACI 530 Chapter 2, 3, 4, 8 or Appendix B (Allowable Stress Design, Strength Design, Prestressed Masonry, AAC Masonry, Masonry Infill)
1705.5 Wood Construction	Special inspections of the fabrication process of prefabricated wood structural elements and assemblies shall be in accordance with Section 1704.2.5. High-load diaphragms designed in accordance with Section 2306.2 shall be installed with special inspections as indicated in Section 1704.2. Exception: Special inspections are not required for portions of structures designed and constructed in accordance with IBC Section 2308 unless the approved construction documents indicate otherwise.

COMMENTARY ON SCHEDULE OF SPECIAL INSPECTION SERVICES	
MATERIAL / ACTIVITY	**COMMENTARY**
1705.6 Soils	The approved geotechnical report and the construction documents prepared by the registered design professionals shall be used to determine compliance. Where Section 1803 does not require reporting of materials and procedures for fill placement, the special inspector shall verify that the in place dry density of the compacted fill is not less than 90 percent of the maximum dry density at optimum moisture content determined in accordance with ASTM D 1557.
1705.7 Driven Deep Foundations	The approved geotechnical report, and the construction documents prepared by the registered design professionals, shall be used to determine compliance.
1705.8 Cast-in-Place Deep Foundations	The approved geotechnical report, and the construction documents prepared by the registered design professionals, shall be used to determine compliance.
1705.9 Helical Pile Foundations	The approved geotechnical report, and the construction documents prepared by the registered design professional, shall be used to determine compliance.
1705.10 Special Inspections for Tornado Resistance	Special inspection for Wind Resistance per IBC is typically only required in coastal areas subject to huricanne winds. In Arkansas, these design wind speeds (V_{asd} > 110 mph) would only be applicable to tornado resistant design.
1705.11.1 Structural Steel Special Inspections for Seismic Resistance	Mandatory in accordance with AISC 341 for the seismic force-resisting systems in Seismic Design Category C, D, E or F. Exceptions: 1. Structures assigned to Seismic Design Category C with structural steel systems not specifically detailed for seismic resistance with a Response Modification Coefficient, R, of 3 or less, excluding cantilever column systems.
1705.11.2 Structural Wood Special Inspections for Seismic Resistance	Mandatory for the seismic force-resisting systems in Seismic Design Category C, D, E or F. Exceptions: 1. Special inspection is not required for wood shear walls, shear panels and diaphragms, including nailing, bolting, anchoring and other fastening to other components of the seismic force-resisting system, where the fastener spacing of the sheathing is more than 4 inches on center.

COMMENTARY ON SCHEDULE OF SPECIAL INSPECTION SERVICES	
MATERIAL / ACTIVITY	**COMMENTARY**
1705.11.3 Cold-formed Steel Light-Frame Special Inspections for Seismic Resistance	Mandatory for the seismic-force-resisting systems in Seismic Design Category C, D, E or F. Exceptions: 1. Sheathing is gypsum board or fiberboard. 2. Sheathing is wood structural panel or steel sheet on only one side and the fastener spacing of the sheathing is more than 4 inches on center.
1705.11.4 Designated Seismic Systems Verification	Definition, Designed Seismic Systems: Those nonstructural components that require design in accordance with ASCE 7 Chapter 13 and for which the component importance factor, Ip, is greater than 1 in accordance with ASCE 7 Section 13.1.3. The Schedule of Special Inspections lists all of the nonstructural components described in ASCE Chapter 13. Only those components that are Designated Seismic Systems require Speical Inspections.
Inspect and verify that that the component label, and anchorage or mounting conforms to the certificate of compliance in accordance with 1705.12.3.	Mandatory for Designated Seismic System components in structures assigned to Seismic Design Category C, D, E or F.
1705.11.5 Architectural Components Special Inspections for Seismic Resistance	
1. Inspection during the erection and fastening of exterior cladding, interior and exterior nonbearing walls and interior and exterior veneer.	Mandatory for structures assigned to Seismic Design Category D, E or F. Exceptions: 1. Not required for exterior cladding, interior and exterior nonbearing walls, and interior and exterior veneer 30 feet or less in height above grade or walking surface. 2. Not required for exterior cladding and interior and exterior veneers weighing 5 psf or less. 3. Not required for interior nonbearing walls weighing 15 psf or less.
2. Inspection during anchorage of access floors.	Mandatory for structures assigned to Seismic Design Category D, E or F.
1705.11.6 Mechanical and Electrical Components Special Inspections for Seismic Resistance	
1. Inspection during the anchorage of electrical equipment for emergency or standby power systems.	Mandatory for buildings assigned to Seismic Design Category C, D, E or F.
2. Inspection during the anchorage of other electrical equipment	Mandatory for buildings assigned to Seismic Design Category E or F.
3. Inspection during installation and anchorage of piping systems designed to carry hazardous materials and their associated mechanical units.	Mandatory for buildings assigned to Seismic Design Category C, D, E or F.
4. Inspection during the installation and anchorage of ductwork designed to carry hazardous materials.	

COMMENTARY ON SCHEDULE OF SPECIAL INSPECTION SERVICES	
MATERIAL / ACTIVITY	**COMMENTARY**
5. Inspection during the installation and anchorage of vibration isolation systems.	Mandatory for structures assigned to Seismic Design Category C, D, E or F, where the construction documents require a nominal clearance of 0.25 inches or less, between the equipment support frame and restraint.
1705.11.7 Storage Racks Special Inspections for Seismic Resistance	Mandatory for buildings assigned to Seismic Design Category D, E or F.
1705.11.8 Seismic Isolation Systems	Mandatory for all Seismically Isolated Structures. See ASCE 7 Section 17 for additional inspection and quality control requirements.
1705.12 Testing and Qualification for Seismic Resistance	
1705.12.1 Concrete Reinforcement Testing and Qualification for Seismic Resistance	Mandatory for special moment frames, special structural walls, and coupling beams connecting special structural walls in structures assigned to Seismic Design Category B, C, D, E or F. The reinforcement shall comply with ACI 318 Section 21.1.5.2, and if it is to be welded, also determine weldability in accordance with ACI 318 Section 3.5.2.
1705.12.2 Structural Steel Testing and Qualification for Seismic Resistance	Mandatory in accordance with AISC 341 for the seismic force-resisting systems in Seismic Design Category C, D, E or F. Exceptions: 1. Structures assigned to Seismic Design Category C with structural steel systems not specifically detailed for seismic resistance with a Response Modification Coefficient, R, of 3 or less, excluding cantilever column systems.
1705.12.3 Seismic Certification of Nonstructural Components	Applies to architectural, mechanical and electrical components in structures assigned to Seismic Design Category C, D, E or F and where the requirements of ASCE 7 Section 13.2.1 are met by submittal of manufacturer's certification, in accordance with Item 2.
Review certificate of compliance.	Review the construction documents for the requirements for certification by analysis, testing or experience data for nonstructural components and designated seismic systems in accordance with ASCE 7 Section 13.2.
1705.12.4 Seismic Isolation Systems	Mandatory for all Seismically Isolated Structures. Test in accordance with ASCE 7 Section 17.8.
1705.13 Sprayed Fire-resistant Materials	Special inspection shall be based on the fire-resistance design as designated in a approved construction documents. See Section 1705.13 for specific inspection and testing requirements.
1705.14 Mastic and Intumescent Fire-Resistant Coatings	Special inspection shall be based on the fire-resistance design as designated in a approved construction documents and in accordance with the Association of the Wall and Ceiling Industry Technical Manual AWCI 12-B..
1705.15 Exterior Insulation and Finish Systems (EIFS)	Mandatory except for applications installed over masonry or concrete walls, or where installed over a water-resistive barrier with means of draining moisture to the exterior. Special inspection is required for the water-resistive barrier coating if installed over sheathing substrate.
1705.16 Fire-Resistant Penetrations and Joints	Mandatory in high-rise buildings or in buildings assigned to Risk Category III or IV.
1705.17 Smoke Control Systems	Mandatory by special inspection agencies having expertise in fire protection engineering, mechanical engineering and certification as air balancers.

Contractor's Statement of Responsibility

Each contractor responsible for the construction or fabrication of a main wind- or seismic force-resisting system, designated seismic system or a wind- or seismic-resisting component listed in the Statement of Special Inspections (Requirements for Seismic or Tornado Resistance) must submit a Statement of Responsibility, in accordance with the Building Code, Section 1704.4.

Project: _____

Contractor's Name: _____

Address: _____

License No.: _____

Description of building systems and components included in Statement of Responsibility:

_____
_____
_____
_____
_____
_____
_____

Contractor's Acknowledgement of Special Requirements

I hereby acknowledge that I have received, read, and understand the Statement of Special Inspections and Special Inspection program:

I hereby acknowledge that control will be exercised to achieve conformance with the approved construction documents.

_____
Name and Title (type or print)

_____ _____
Signature Date

Contractor's Provisions for Quality Control

Procedures for exercising control within the contractor's organization, the method and frequency of reporting and distribution of reports is attached to this Statement.

Identification and qualifications of the person(s) exercising such control and their position(s) in the organization are attached to this Statement

Fabricator's Certificate of Compliance

Each approved fabricator that is exempt from Special Inspection of shop fabrication and implementation procedures per section 1704.2.5.2 of the Building Code must submit *Fabricator's Certificate of Compliance* at the completion of fabrication.

Project: _____

Fabricator's Name: _____

Address: _____

Certification or Approval Agency: _____

Certification Number: _____

Date of Last Audit or Approval: _____

Description of structural members and assemblies that have been fabricated:

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

I hereby certify that items described above were fabricated in strict accordance with the approved construction documents.

_____
Name and Title (type or print)

_____ _____
Signature Date

Attach copies of fabricator's certification or building code evaluation service report and fabricator's quality control manual.

SPECIAL INSPECTION REPORT

(Completed by Special Inspector)

PROJECT NAME / ADDRESS:
DATE OF INSPECTION:
INSPECTION TYPE(S) COVERAGE ☐ CONTINUOUS ☐ PERIODIC TIME BEGINNING INSPECTION: TIME ENDING INSPECTION:
DESCRIBE INSPECTIONS MADE, INCLUDING LOCATIONS:
LIST TESTS MADE:
LIST ITEMS REQUIRING CORRECTIONS, CORRECTIONS OF PREVIOUSLY LISTED ITEMS AND PREVIOUSLY LISTED UNCORRECTED ITEMS: PROVIDE COPIES OF DISCREPANCY NOTICES:
COMMENTS:
TO THE BEST OF MY KNOWLEDGE, WORK INSPECTED WAS IN ACCORDANCE WITH THE APPROVED DESIGN DRAWINGS, AND SPECIFICATIONS, EXCEPT AS NOTED ABOVE.

PRINTED FULL NAME	
NOTE BY "SPECIAL INSPECTOR" OR PROVIDE NAME OF TESTING AGENCY	

SIGNED:	DATE:
CERTIFICATION:	NUMBER:

One copy of this report to remain at job site with the contractor for review upon request.

DISCREPANCY NOTICE No. _____

SPECIAL INSPECTION DISCREPANCY NOTICE

(Completed by Special Inspector)

PROJECT NAME / ADDRESS:		
INSPECTION TYPE(S) COVERAGE ☐ CONTINUOUS ☐ PERIODIC		
AREA INSPECTED	TYPE OF INSPECTION	
APPLICABLE DRAWING SHEET NUMBER(S) AND/OR SPECIFICATION SECTION:		
NOTICE DELIVERED TO: O CONTRACTOR O ENGINEER/ARCHITECT O OWNER	DATE:	TIME:
MAKE THE FOLLOWING CORRECTIONS AND SECURE INSPECTION APPROVAL PRIOR TO PROCEEDING WITH THIS PHASE OF THE WORK.		
PRINTED FULL NAME		
NOTE BY "SPECIAL INSPECTOR" OR PROVIDE NAME OF TESTING AGENCY		
SIGNED:	DATE:	
CERTIFICATION:	NUMBER:	
DATE RE-INSPECTED AND APPROVED AND SIGNATURE OF SPECIAL INSPECTOR:		

One copy of this report to remain at job site with the contractor for review upon request.

MINIMUM SPECIAL INSPECTOR QUALIFICATIONS

Category of Testing and Inspection	Minimum Qualifications (refer to key at end of Table)			
	Shop Inspection	**Field Testing /Inspection**	**Review Submittals**	**Review Testing, Certification, & Lab Reports**
1704.2.5 Inspection of Fabricators				
Pre-cast concrete	A, C, E			
Structural steel construction	C, F, G			
Wood construction	A, N			
Cold formed metal construction	A, N			
1705.2 & 1705.11.1 Steel Construction				
Welding	C, F, G	C, F, G	A	A
High strength bolting, inspection of steel frame joint details		A, C	A	A
1705.2.2, 1705.10.2 & 1705.11.3 Steel Construction other than Structural Steel				
Welding	C, F, G	C, F, G	A	A
Screw attachment, bolting, anchoring and other fastening		A, C	A	A
1705.3 & 1705.12.1 Concrete Construction				
Reinforcing placement, cast-in-place bolts, post installed anchors, concrete and shotcrete placement and curing operations		A, C, H		
Pre-stressing steel installation		A, C, D, E		
Erection of pre-cast concrete members		A, C, H, Q		
Concrete field testing		A, C, H, I, J		
Review certified mill reports and design mixes			A	
Verify use of required design mix		A, C, H, I, J		
Pre-stressed (pre-tensioned) concrete force application	A, C, E			
Post-tensioned concrete force application		A, C, D, H		
Review of in-situ concrete strength, prior to stressing of tendons in post-tensioned concrete and prior to removal of shores and forms from beams and structural slabs		A, C, D		
Reinforcing steel weldability, reinforcing welding, weld filler material		C, F, G		
1705.4 Masonry				
Review f'_m prior to construction			A	
Mortar joint construction, grout protection and placement, materials proportion, type/size/location of reinforcement, structural elements, anchorage, and connectors		A, C, K		
Sampling/testing of grout/mortar specimens		A, C, K		
Observe preparation of masonry prisms for testing of compressive strength of masonry, f'_m		A, C, K		
Inspection of welding of reinforcing steel		C, F, G		
1705.6 Soils				
Observe site preparation, fill placement and testing of compaction for compliance with the construction documents for the project		A, C, I, R		
Observe and test bearing materials below shallow foundations for ability to achieve design bearing capacity		A, L		
Review compaction testing for compliance with the construction documents for the project				A

(Table continued on next page)

MINIMUM SPECIAL INSPECTOR QUALIFICATIONS *(continued)*				
Category of Testing and Inspection	**Minimum Qualifications (refer to key at end of Table)**			
	Shop Inspection	**Field Testing /Inspection**	**Review Submittals**	**Review Testing, Certification, & Lab Reports**
1705.5, 1705.10.1 & 1705.11.2 Wood Construction				
Observe structural panel sheathing, size of framing members, fastener diameter and length, number of fastener lines, and spacing of fastener lines and fasteners for compliance with construction documents for the project		A, N		
1705.7, 1705.8 & 1705.9 Driven Deep, Cast-in-place Deep, and Helical Pile Foundations				
Observe installation		A, L, I		
Observe load tests		A, I		
1705.10.3 Wind Resisting Components				
Inspect roof cladding		A, B, C		
Inspect wall cladding		A, B, C		
1705.11.4 Designated Seismic Systems				
Examine designated seismic systems requiring seismic qualification and verify that the label, anchorage or mounting conform to the certificate of compliance		A	A	A
1705.11.5 & 1705.11.7 Architectural Components				
Inspection of exterior cladding, non-load bearing walls, veneer, access floors and storage racks		A, B	A, B	A, B
1705.11.6 & 1705.12.3 Mechanical and Electrical Components				
Inspection of anchorage of mechanical and electrical components		A	A	A
1705.13 Sprayed Fire-Resistant Materials				
Observe surface conditions, application, average thickness and density of applied material, and cohesive/adhesive bond		A, C		
1705.14 Mastic and intumescent fire-resistant coatings				
Observe application compliance with AWCI 12-B		A, C		
1705.15 Exterior Insulation and Finish Systems				
Inspect EIFS systems		A, B, C, M		
1705.16 Fire-resistant penetrations and joints				
Inspection of Penetration firestops		A, C, P		
Inspection of Fire-resistant joint systems		A, C, P		
[F] 1705.17 Smoke Control	*See Requirements of Building Code Section [F] 1705.17.2.*			

(Table continued on next page)

MINIMUM SPECIAL INSPECTOR QUALIFICATIONS *(continued)*

KEY:

A. Arkansas Professional Engineer (AR PE) competent in the specific task area or graduate of accredited engineering/engineering technology program under the direct supervision of an AR PE.
B. Arkansas Registered Architect (AR RA) competent in the specific task area or graduate of accredited architecture/architecture technology program under the direction of an AR RA.
C. International Code Council (ICC) Special Inspector Certification specific to the particular material and testing methodology applicable to each Category of Testing and Inspection listed in the table.
D. Post-tensioning Institute (PTI) Certification, Level 2.
E. Pre-stressed Concrete Institute (PCI) Plant Quality Personnel Certification – Level III.
F. American Welding Society (AWS) Certified Welding Inspector (CWI) or AWS Certified Associate Welding Inspector working under the direct on-site supervision of a CWI.
G. American Society for Nondestructive Testing (ASNT) Level II certification, or a Level III certification if previously certified as a Level II in the particular material and testing methodology applicable to each Category of Testing and Inspection listed in the table.
H. American Concrete Institute (ACI) Concrete Construction Special Inspector.
I. National Institute for Certification in Engineering Technologies (NICET) Level II or higher certification specific to the particular material and testing methodology applicable to each Category of Testing and Inspection listed in the table.
J. ACI Concrete Field Testing Technician with Grade 1 certification or Center for Training Transportation Professionals (CTTP) Certified Concrete Field Testing Technician.
K. National Concrete Masonry Association (NCMA) Certified Concrete Masonry Testing Technician.
L. NICET Certified Engineering Technologist (CT) competent in the specific task area.
M. Association of the Wall and Ceiling Industry (AWCI) EIFS Inspector Certification.
N. International Code Council (ICC) Commercial Building Inspector Certification.
O. International Code Council (ICC) Mechanical Inspector Certification.
P. Inspector has passed either the Underwriters Laboratory (UL) Firestop Contractor Program Examination or the Factory Mutual (FM) Firestop Examination.
Q. Pre-stressed Concrete Institute (PCI) Certified Field Auditor
R. Center for Training Transportation Professionals (CTTP) Certified Soil Testing Technician.

Notes:

1. *The Special Inspector shall meet one of the minimum qualifications listed for the applicable Category of Testing and Inspection.*
2. *Materials testing shall be done by an Approved Testing Agency meeting the requirements of the Building Code Section 1703 and ASTM E 32*9.

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Temporary Utilities:
   1. Temporary electricity.
   2. Temporary lighting for construction purposes.
   3. Temporary heating.
   4. Temporary cooling.
   5. Temporary ventilation.
   6. Telephone service.
   7. Facsimile service.
   8. Temporary water service.
   9. Temporary sanitary facilities.

B. Construction Facilities:
   1. Field offices and sheds.
   2. Vehicular access.
   3. Parking.
   4. Progress cleaning and waste removal.
   5. Project identification.
   6. Fire prevention facilities.

C. Temporary Controls:
   1. Barriers.
   2. Enclosures and fencing.
   3. Security.
   4. Water control.
   5. Dust control.
   6. Erosion and sediment control.
   7. Noise control.
   8. Pollution control.

D. Removal of utilities, facilities, and controls.

1.2 TEMPORARY ELECTRICITY

A. Provide and pay for power service required from utility source as needed for construction operation. Refer to electrical specifications for additional requirements.

B. Provide power outlets, with branch wiring and distribution boxes located as required for construction operations. Provide flexible power cords as required for portable construction tools and equipment.

C. Permanent convenience receptacles may be utilized during construction.

1.3 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

A. Provide and maintain lighting for construction operations and to exterior staging and storage areas after dark for security purposes.

B. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps for specified lighting levels.

C. Maintain lighting and provide routine repairs.

D. Permanent building lighting may be utilized during construction.

1.4 TEMPORARY HEATING

A. Provide and pay for heating devices and heat as needed to maintain specified conditions for construction operations.

B. Prior to operation of permanent equipment for temporary heating purposes, verify installation is approved for operation, equipment is lubricated and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.

C. Maintain minimum ambient temperature of 50 degrees F in areas where construction is in progress, unless indicated otherwise in product sections.

1.5 TEMPORARY COOLING

A. Provide and pay for cooling devices and cooling as needed to maintain specified conditions for construction operations.

B. Prior to operation of permanent equipment for temporary cooling purposes, verify installation is approved for operation, equipment is lubricated and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.

C. Maintain maximum ambient temperature of 80 degrees F in areas where construction is in progress, unless indicated otherwise in specifications.

1.6 TEMPORARY VENTILATION

A. Ventilate enclosed areas to achieve curing of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

1.7 TELEPHONE SERVICE

A. Provide, maintain, and pay for telephone service to field office at time of project mobilization.

1.8 FACSIMILE SERVICE

A. Provide, maintain and pay for facsimile service and dedicated telephone line to field office at time of project mobilization.

1.9 TEMPORARY WATER SERVICE

A. Provide and pay for suitable quality water service as needed to maintain specified conditions for construction operations.

B. Extend branch piping with outlets located so water is available by hoses with threaded connections. Provide temporary pipe insulation to prevent freezing.

1.10 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required facilities and enclosures. Existing facility use is not permitted. Provide facilities at time of project mobilization.

1.11 FIELD OFFICES AND SHEDS

A. Office: Weather tight, with lighting, electrical outlets, heating, cooling and ventilating equipment, and equipped with sturdy furniture and drawing display table.

B. Provide space for Project meetings, with table and chairs to accommodate 6 persons.

C. When permanent facilities are enclosed with operable utilities, relocate offices and storage into building, with written agreement of Owner, and remove temporary buildings.

D. Storage Spaces: Heating and ventilation as needed to maintain products in accordance with Contract Documents; lighting for maintenance and inspection of products.

E. Storage Areas and Sheds: Size to storage requirements for products of individual Sections, allowing for access and orderly provision for maintenance and for inspection of products to requirements of Section 01 60 00 - Product Requirements.

F. Preparation: Fill and grade sites for temporary structures sloped for drainage away from buildings.

G. Removal: At completion of Work remove buildings, foundations, utility services, and debris. Restore areas.

1.12 VEHICULAR ACCESS

A. Construct temporary access roads from public thoroughfares to serve construction area, of width and load bearing capacity to accommodate unimpeded traffic for construction purposes.

B. Construct temporary bridges and culverts to span low areas and allow unimpeded drainage.

C. Extend and relocate vehicular access as Work progress requires, provide detours as necessary for unimpeded traffic flow.

D. Provide unimpeded access for emergency vehicles.

E. Provide and maintain access to fire hydrants and control valves free of obstructions.

F. Provide means of removing mud from vehicle wheels before entering streets.

1.13 PARKING

A. Provide surface parking areas to accommodate construction personnel.

B. When site space is not adequate, provide additional off-site parking.

C. Use of existing on-site streets and driveways, and parking areas used for construction traffic is not permitted.

D. Do not allow heavy vehicles or construction equipment in parking areas.

E. Permanent Pavements and Parking Facilities:
1. Prior to Substantial Completion, bases for permanent roads and parking areas may be used for construction traffic.
2. Avoid traffic loading beyond paving design capacity. Tracked vehicles not allowed.
3. Use of permanent parking structures is permitted.

F. Maintenance:
1. Maintain traffic and parking areas in sound condition, free of excavated material, construction equipment, products, mud, snow, and ice.
2. Maintain permanent paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original, or specified, condition.

G. Removal, Repair:
1. Remove temporary materials and construction at Substantial Completion.
2. Repair permanent facilities damaged by use, to specified condition.

H. Mud from Site Vehicles: Provide means of removing mud from vehicle wheels before entering streets.

1.14 PROGRESS CLEANING AND WASTE REMOVAL

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in 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 spaces.

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 rubbish from site periodically and dispose off-site.

E. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.15 PROJECT IDENTIFICATION

A. Project Identification Sign: Erect sign identifying project, GC and any other pertinent information. In addition, erect Architect furnished sign, as directed.

B. Installation:
   1. Install project identification sign within 15 days after date fixed by Notice to Proceed.
   2. Erect supports and framing on secure foundation, rigidly braced and framed to resist wind loadings.
   3. Install sign surface plumb and level, with butt joints. Anchor securely.

C. Maintenance: Maintain signs and supports clean, repair deterioration and damage.

D. Removal: Remove signs, framing, supports, and foundations at completion of Project and restore area.

1.16 FIRE PREVENTION FACILITIES

A. Prohibit smoking with buildings under construction. Designate area on site where smoking is permitted. Provide approved ashtrays in designated smoking areas.

B. Establish fire watch for cutting and welding and other hazardous operations capable of starting fires. Maintain fire watch before, during, and after hazardous operations until threat of fire does not exist.

C. Portable Fire Extinguishers: NFPA 10; 10 pound capacity, 4A-60B: C UL rating.
   1. Provide one fire extinguisher at buildings under construction.
   2. Provide minimum one fire extinguisher in every construction trailer and storage shed.
   3. Provide minimum one fire extinguisher on roof during roofing operations using heat producing equipment.

1.17 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations.

B. Provide barricades and covered walkways required by authorities having jurisdiction for public rights-of-way.

C. Provide protection for plants designated to remain. Replace damaged plants.

1.18 ENCLOSURES AND FENCING

A. Construction: Contractor's option.

B. Exterior Enclosures: Provide temporary weather tight closure of exterior openings to accommodate acceptable working conditions and protection for products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

C. Interior Enclosures: Provide temporary partitions as indicated on Drawings to prevent penetration of dust and moisture, and to prevent damage to existing materials and equipment.

1.19 SECURITY

A. Security Program: Protect from theft, vandalism, and unauthorized entry.

B. Entry Control:
1. Restrict entrance of persons and vehicles into Project site.
2. Allow entrance only to authorized persons with proper identification.
3. Maintain log of workers and visitors, make available to Owner on request.

1.20 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.

1.21 DUST CONTROL

A. Execute Work by methods to minimize raising dust from construction operations.

B. Provide positive means to prevent air-borne dust from dispersing into atmosphere.

1.22 EROSION AND SEDIMENT CONTROL

A. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation. Refer also to requirements stated in Civil Drawing and specifications.

B. Minimize surface area of bare soil exposed at one time.

C. Provide temporary measures including berms, dikes, and drains, and other devices to prevent water flow.

D. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.

E. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

1.23 NOISE CONTROL

A. Provide methods, means, and facilities to minimize noise from construction operations.

1.24 POLLUTION CONTROL

A. 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.

B. Comply with pollution and environmental control requirements of authorities having jurisdiction.

1.25 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

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

B. Remove underground installations to minimum depth of 2 feet. Grade site as indicated on Drawings.

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

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

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Products.

B. Product delivery requirements.

C. Product storage and handling requirements.

D. Product options.

E. Product substitution procedures.

1.2 PRODUCTS

A. Furnish products of qualified manufacturers suitable for intended use. Furnish products of each type by single manufacturer unless specified otherwise.

B. Furnish interchangeable components from same manufacturer for components being replaced.

1.3 PRODUCT DELIVERY REQUIREMENTS

A. Transport and handle products in accordance with manufacturer's instructions.

B. Promptly inspect shipments to ensure products comply with requirements, quantities are correct, and products are undamaged.

C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

1.4 PRODUCT STORAGE AND HANDLING REQUIREMENTS

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

B. Store with seals and labels intact and legible.

C. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.

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

E. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.

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

G. Store loose granular materials on solid flat surfaces in well-drained area. Prevent mixing with foreign matter.

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

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

1.5 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Products of one of manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with Provision for Substitutions: Submit request for substitution for any manufacturer not named in accordance with the following article.

1.6 PRODUCT SUBSTITUTION PROCEDURES

A. Architect will consider requests for Substitutions only within 30 days after date of Owner-Contractor Agreement.

B. Substitutions may be considered when a product becomes unavailable through no fault of Contractor.

C. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.

D. A request constitutes a representation that Contractor:
   1. Has investigated proposed product and determined that it meets or exceeds quality level of specified product.
   2. Will provide same warranty for Substitution as for specified product.
   3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
   4. Waives claims for additional costs or time extension which may subsequently become apparent.
   5. Will reimburse Owner and Architect for review or redesign services associated with re-approval by authorities having jurisdiction.

E. Substitutions will not be considered when they are indicated or implied on Shop Drawing or Product Data submittals, without separate written request, or when acceptance will require revision to Contract Documents.

F. Substitution Submittal Procedure:
   1. Submit three copies of request for Substitution for consideration. Limit each request to one proposed Substitution.
   2. Submit Shop Drawings, Product Data, and certified test results attesting to proposed product equivalence. Burden of proof is on proposer.
   3. Architect will notify Contractor in writing of decision to accept or reject request.

PART 2 PRODUCTS – Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 70 00

EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Closeout procedures.

B. Final cleaning.

C. Starting of systems.

D. Demonstration and instructions.

E. Testing, adjusting and balancing.

F. Protecting installed construction.

G. Substantial Completion.

H. Project record documents.

I. Operation and maintenance data.

J. Manual for materials and finishes.

K. Manual for equipment and systems.

L. Spare parts and maintenance products.

M. Product warranties and product bonds.

N. Maintenance service.

1.2 CLOSEOUT PROCEDURES

A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Architect's review.

B. Provide submittals to Architect required by authorities having jurisdiction.

C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

1.3 FINAL CLEANING

A. Execute final cleaning prior to final project assessment.

B. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.

C. Clean equipment and fixtures to sanitary condition with cleaning materials appropriate to surface and material being cleaned.

D. Replace filters of operating equipment.

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

F. Clean site; sweep paved areas, rake clean landscaped surfaces.

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

1.4 STARTING OF SYSTEMS

A. Coordinate schedule for start-up of various equipment and systems.

B. Notify Architect seven days prior to start-up of each item.

C. Verify each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.

D. Verify tests, meter readings, and specified electrical characteristics agree with those required by equipment or system manufacturer.

E. Verify wiring and support components for equipment are complete and tested.

F. Execute start-up under supervision of applicable Contractors' personnel in accordance with manufacturers' instructions.

G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

H. Submit a written report in accordance with Section 01 33 00 - Submittal Procedures that equipment or system has been properly installed and is functioning correctly.

1.5 DEMONSTRATION AND INSTRUCTIONS

A. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of final inspection.

B. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

C. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.

D. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed time, at equipment location.

E. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

1.6 TESTING, ADJUSTING AND BALANCING

A. Reports will be submitted by independent firm to Architect/Engineer indicating observations and results of tests and indicating compliance or non-compliance with requirements of Contract Documents.

1.7 PROTECTING INSTALLED CONSTRUCTION

A. Protect installed Work and provide special protection where specified in individual specification sections.

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

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

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

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

F. Prohibit traffic from landscaped areas.

1.8 SUBSTANTIAL COMPLETION

A. Notify the Architect when the Work is considered to be substantially complete. Within a reasonable time after such notification, the Architect will examine the Work to determine the status of completion.

B. When the Architect determines that the Work is substantially complete, he will conduct a punch list observation and prepare a certificate of substantial completion accompanied by a list of the items to be completed or corrected. Architect will submit the certificate to the Owner and Contractor for their signatures.

C. Should the Architect determine that the Work is not substantially complete, he will promptly notify the Contractor, giving reasons therefore. Contractor shall remedy the deficiencies in the Work and contact Architect to re-examine.

D. The Architect reserves the right to add items to the punch list found during punch list check-off.

1.9 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.

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, not less than weekly.

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.
   2. Product substitutions or alternates utilized.
   3. Changes made by Addenda and modifications.

F. Record Drawings: Legibly mark each item to record actual construction including:
   1. Measured depths of foundations in relation to finish 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. Details not on original Contract drawings.

G. Submit three CD’s and one hard copy to Architect with claim for final Application for Payment.

1.10 OPERATION AND MAINTENANCE DATA

A. Submit in CD format.

B. Prepare printed title sheet "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project.

C. Internally subdivide contents with dividers, logically organized as described below.

D. Drawings: Include in CD.

E. Contents: Prepare Table of Contents for each system, with each product or system description identified, in three parts as follows:
   1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect, Engineers, Contractor, Subcontractors, and major equipment suppliers.
   2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names,

addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:

a. Significant design criteria.
b. List of equipment.
c. Parts list for each component.
d. Operating instructions.
e. Maintenance instructions for equipment and systems.
f. Maintenance instructions for finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.

3. Part 3: Project documents and certificates, including the following:
   a. Shop drawings and product data.
   b. Air and water balance reports.
   c. Certificates.
   d. Photocopies of warranties.

1.11 MANUAL FOR MATERIALS AND FINISHES

A. Submit two CDs of completed data 15 days prior to final inspection.

B. Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations.

C. Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

D. Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Include recommendations for inspections, maintenance, and repair.

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

F. Include listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

1.12 MANUAL FOR EQUIPMENT AND SYSTEMS

A. Submit two copies of CDs 15 days prior to final inspection.

B. Each Item of Equipment and Each System: Include description of unit or system, and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.

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 special operating instructions.

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

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

K. Include control diagrams by controls manufacturer as installed.

L. Include Contractor's coordination drawings, with color coded piping diagrams as installed.

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

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

O. Include test and balancing reports as specified in Section 01 40 00 - Quality Requirements.

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

Q. Include listing in Table of Contents for design data.

1.13 SPARE PARTS AND MAINTENANCE PRODUCTS

A. Furnish spare parts, maintenance, and extra products in quantities specified in individual specification sections.

B. Deliver to Project site and place in location as directed by Owner; obtain receipt prior to final payment.

1.14 PRODUCT WARRANTIES AND PRODUCT BONDS

A. Obtain warranties and bonds executed in duplicate by responsible subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.

B. Execute and assemble transferable warranty documents and bonds from subcontractors, suppliers, and manufacturers.

C. Verify documents are in proper form, contain full information, and are notarized.

D. Co-execute submittals when required.

E. Include Table of Contents in CDs.

F. Submit prior to final Application for Payment.

G. Time of Submittals:
   1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after acceptance.
   2. Make other submittals within ten 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 ten days after acceptance, listing date of acceptance as beginning of warranty or bond period.

1.15 MAINTENANCE SERVICE

A. Furnish service and maintenance of components indicated in specification sections.

B. Examine system components at frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

C. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by manufacturer of original component.

D. Do not assign or transfer maintenance service to agent or Subcontractor without prior written consent of Owner.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Formwork, reinforcement, accessories, cast-in-place concrete, finishing and curing.

B. Related Sections:
1. Section 31 20 00 - Earthwork
2. Section 31 31 16 - Termite Control
3. Section 32 12 16 - Asphaltic Concrete Paving
4. Section 04 20 00 - Unit Masonry
5. Section 07 10 00 - Waterproofing

1.2 SUBMITTALS

Submit (1) set of a hard copies and (1) electronic copy of shop drawings under provisions of section 01 33 00.

A. Shop Drawings:
1. Indicate pertinent dimensioning, methods of construction, form materials, arrangement of joints and ties, location of bracing and temporary supports, schedule of erection and stripping.
2. Indicate reinforcement sizes, spacing, locations, and quantities, bending and cutting schedules, supporting and spacing devices.
3. Do not submit unchecked shop drawings.

B. Submit mix design to Architect/Engineer for approval fourteen days before placing any concrete. If fly ash is used in the project, mix deigns with and without fly ash shall be submitted for every specified compressive strength of concrete used for on project.

C. Concrete Testing: Refer to paragraph 3.9. Testing laboratory to submit results directly to Architect/Engineer.

D. Concrete Delivery Truck Ticket: List amount of allowable field water which may be added (with Architect's approval) without exceeding water/cement ratio. If approved and added, volume of water added must be noted on field and signed by Project Superintendent.

1.3 QUALITY ASSURANCE

A. Construct and erect concrete formwork in accordance with ACI 301 and 347R, unless otherwise specified in this section.

B. Perform concrete reinforcing work in accordance with ACI 301 and ACI 315.

C. Perform cast-in-place work in accordance with ACI 301.

1.4 SITE CONDITIONS

A. Maintain concrete above 50 degrees F. and in a moist condition for one week minimum after placement. Refer to paragraph 3.7B for curing conditions.

B. Place no concrete on soft or frozen ground.

C. Concrete with fly ash shall NOT be placed when anticipated ambient temperature will be less than 60º F when concrete is placed and for 24 hours after placement.

PART 2 PRODUCTS

2.1 FORM MATERIALS AND ACCESSORIES

A. Plywood: PS 1, Class I and II, B/B Exterior or H/DO Exterior; sound undamaged sheets with clean, sealed, true edges.

B. Form Ties: Snap-off, metal type of required length.

C. Form Release Agent: Colorless mineral oil which will not stain concrete or impair natural bonding characteristics of coating intended for use on concrete.

D. Vapor Retarder: 15 mil by STEGO with tape.

E. Waterstops:
1. Center Bulb - polyvinyl chloride, 6 inch wide, maximum possible lengths; split ribbed with galvanized steel hog rings installed at one foot intervals, such as Model RSB6-38R as manufactured by Vinylex Corp.
2. Bentonnite - Volclay Waterstop-RX Preformed Waterstop System by American Colloid Company (708-392-4600). Provide waterstop -RX 101RH and WB adhesive.

F. Slab Edge Joint Filler: ASTM D1751, premolded asphaltic board, 1/2 inch thick.

G. Waterstops for construction joints shall be center bulb, serrated type, 4’ wide x 3/16” thick, with a 5/8” O.D. center bulb. All waterstops shall be polyvinylcholride (PVC) plastic waterstops similar or equal to waterstops as manufactured by Vinylex Corporation, P.O. Box 7187, Knoxville, TN. Waterstops shall meet the Corps of Engineers specification for PVC waterstops (No. CRD-C-572-63).

H. Dovetail anchors and anchor slots shall be provided along concrete walls with masonry shelves 1’-2” or deeper.

1. Dovetail anchor slots shall be of 22 gage, hot dipped galvanized steel and foam filled as required. They shall be 1” wide x 1” deep with a 5/8” throat. Space at 24” o.c. horizontal unless noted.
2. Dovetail anchors shall be as per specification Section 04 20 00. Provide at 16” o.c. vertically unless noted.

2.2 REINFORCEMENT MATERIALS

A. Reinforcing Steel: ASTM A615, 60 ksi yield grade; deformed billet steel bars, plain finish.

B. Welded Steel Wire Fabric: ASTM A185 Plain type, in flat sheets, plain finish, free from rust, in sizes shown on Drawings.

C. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for support of reinforcing.

D. Fabricate concrete reinforcing in accordance with ACI 318.

2.3 CONCRETE MATERIALS

A. Cement: ASTM C150, Normal-Type I Portland type.

B. Fly Ash: Approved Class C.

C. Fine Aggregate: ASTM C33; clean, fresh water, sand graded uniformly to conform to paragraph 4 of Specification C33.

D. Coarse Aggregate: ASTM C33; standard grading size 1 - 1 1/4" to No. 4 of washed gravel or crushed stone.

E. Water: Clean and not detrimental to concrete, supplied direct from the city water main.

F. Non-Shrink Grout: Pre-mixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.

2.4 COMPOUNDS AND SEALERS

A. Chemical Sealer: Liquid acrylic styrene type such as Kure & Seal as manufactured by ProSo Co, or approved equal.

2.5 BONDING AGENT

Polyvinyl acetate or acrylic base.

A. Polyvinyl Acetate (Interior Only): Euclid “Euco Weld”, L&M “Everweld”, or approved equal.

B. Acrylic or Styrene Butadiene: Euclid ASBR Latex”, L&M “Everbond”, Master Builders “Acryl-Set”, Sonneborn “Sonnocrete”, or approved equal.

2.6 EPOXY ADHESIVE

A. ASTM C881. Two component material suitable for use on dry or damp surfaces. Provide material type, grade, and class to suit project requirements.
   1. Conspec: Spec-Bond 100, Euclid “Euco Epoxy System #452 or #620, L&M “Epabond”, Master Builders “Concresive Standard Liquid”, or approved equal.

2.7 CONCRETE MIX

A. Mix Design:
   1. Prepare mix designs for each type of concrete, in accordance with ACI 301 & ACI 318.
   2. Mix designs are to be performed by an independent testing lab.

B. Mix and deliver concrete in accordance with ASTM C94.

C. Provide concrete of the following strength:
   1. Minimum Compressive Strength 3000 psi @ 28 days, 4,000 psi for exterior concrete with air.
   2. Maximum Slump:
      a. Footings, Foundations: 4 inches
      b. Slab: 4 inches

D. Do not mix salt, chemicals, or other foreign materials for the purpose of preventing freezing. Use no admixtures without prior approval of the Architect/Engineer.

E. Fly ash content shall be no more than 20% of the total cement content measured by weight.

F. Add air entraining agent to concrete mix for concrete work exposed to exterior.

G. Job-Site Mixing: Not allowed.

PART 3 EXECUTION

3.1 FORMWORK ERECTION

A. Erect formwork, shoring and bracing to achieve design requirements. Erect formwork for grade beams - do not place concrete in earth-formed trenches.

B. Camber slabs and framing to achieve ACI 301 tolerances.

C. Provide bracing to ensure stability of formwork. Forms are not to deflect under weight of we concrete or construction loads.

D. Provide chamfer strips on external corners of curbs, walls & columns.

E. Apply form release agent to formwork in accordance with manufacturer's instructions, prior to placing for accessories and reinforcement.

F. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings which are affected by agent.

G. Clean forms as erection proceeds, to remove foreign matter.

H. Complete steel placement and foundation forming promptly after excavations are exposed to reduce the possibility of changes in strength and compressibility characteristics of the soil.

I. Coordinate with Section 07 10 00 for waterproofing.

3.2 INSERTS, EMBEDDED COMPONENTS, AND OPENINGS

A. Provide formed openings where required for work to be embedded in and passing through concrete members.

B. Coordinate work of other sections in forming and setting openings, waterstops, slots, recesses, chases, sleeves, bolts, anchors, and other inserts.

C. Install concrete accessories straight, level, and plumb.

D. Install center bulb waterstops continuous without displacing reinforcement. Heat seal joints watertight.

E. Install Bentonite waterstops continuous as per manufacturer's written instructions

F. Clean existing surfaces and apply adhesive prior to placing waterstop. Place joint filler at perimeter of floor slab, penetrations, and isolation joints.

3.3 REINFORCEMENT PLACEMENT

A. Place reinforcement, supported and secured against displacement.

B. Ensure reinforcing is clean, free of loose scale, dirt, or other foreign coatings.

C. Support footing reinforcement on snap-on paving chair/base.

D. Wire dowels to longitudinal bars. Align top of bars with wood templates placed 2 inches from the top.

E. Support wire mesh on snap-on mesh chair/base.

F. Bar supports snap-on paving chair/base.

G. Top bars in footing hang - do not float.

H. Notify Architect 48 hours before placing any concrete.

3.4 PLACING CONCRETE

A. Comply with ACI 304 "Recommended Practice For Measuring, Mixing, Transporting & Placing Concrete"; and as specified below.

B. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent. Apply bonding agent in accordance with manufacturer's instructions.

C. Separate slabs-on-grade from vertical surfaces with 2 inch thick joint filler, extended from bottom of slab to within 1/4 inch of finished slab surface.

D. Place concrete continuously between predetermined expansion, control and construction joints. Do not break or interrupt successive pours such that cold joints occur.

E. Place floor slabs in checkerboard or saw cut pattern indicated.

F. Provide expansion joints as detailed, in concrete walks at 20 feet maximum and where walks terminate at other Work. Provide control joints at equal intervals, at 5 feet

maximum. Construct joints straight and perpendicular to the finished surface. Elevations on adjacent sides of joints must not vary more than 0.10".

G. Where new concrete is dowelled to existing work, drill holes in existing concrete, insert steel dowels and pack with non-shrink grout.

H. Dampen exposed grades in hot weather.

I. Do not add any field water without Architect's approval.

J. Screed floors or slabs-on-grade level.

K Conveying: Convey concrete from the mixer to the place of final deposit by methods which will prevent the separation or loss of materials. Provide equipment for chuting, pumping, and pneumatically conveying concrete of proper size and design as to insure a practically continuous flow of concrete at the point of delivery and without segregation of the materials.

L. Depositing: Deposit concrete continuously or in layers of such thickness that no concrete will be placed on hardened concrete so as to cause seams or planes of weakness. Deposit concrete near or in its final location to avoid segregation due to rehandling or flowing, and displacement of the reinforcement.

M. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers not deeper than 24" and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.

1. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, roding, or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI 309.
    a. Do not use vibrators to transport concrete inside forms.

N. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed. Maintain reinforcing in proper position during concrete placement.

O. Cold Weather Placing: Comply with the requirements of ACI 306 and as follows:

1. Protect concrete work from physical damage and reduced strength that could be caused by frost, freezing actions, and low temperatures.
2. Do not use calcium chloride and other materials containing antifreeze agents or chemical accelerators unless otherwise accepted for mix design.

P. Hot Weather Placing: When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with the requirements of ACI 305.

3.5 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.

B. Remove formwork progressively and in accordance with code requirements.

C. Remove forms at exposed walls as soon as possible and break back metal form ties. Wet and fill voids with cement mortar.

3.6 FLOOR FINISHING

A. Finish concrete floor surfaces in accordance with ACI 301.

B. Uniformly spread, screed, and float concrete.

C. Steel trowel surfaces which will receive flooring materials or which will be left exposed.

D. Maintain surface flatness, with maximum variation of 1/8 inch in 10 ft.

E. In areas with floor drains, maintain floor level at walls and slope surfaces uniformly to drains.

F. Provide medium broom finish at exterior walks and steps. Provide rough broom finish at exterior ramps.

G. Provide vertical concrete surfaces to be left exposed with smooth rubbed finish.

H. Apply concrete sealer on floor surfaces as scheduled. Apply in accordance with manufacturer's instructions.

3.7 CURING

Perform curing of concrete and sealing compound, by moist curing, by moisture-retaining cover curing, and by combinations thereof, as specified. Cure all concrete a minimum of 7 days.

A. Provide moisture curing by keeping concrete surface continuously wet by covering with water, by water-fog spray, or by covering concrete surface with specified absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4" lap over adjacent absorptive covers.

B. Provide moisture-cover curing by covering concrete surface with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

C. Provide curing and sealing compound on interior slabs; and to exterior slabs, walks, and curbs, as follows:
   1. Apply specified curing and sealing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours). Apply uniformly in continuous operation by power-spray or roller in accordance with manufacturer's directions. Maintain continuity of coating and repair damage during curing period.
   2. Use membrane curing compounds that will not affect surfaces to be covered with finish materials applied directly to concrete.
   3. Do not use curing and sealing compounds to receive special floor finishes (poured epoxy finishes, synthetic sports flooring, etc.).

D. Curing Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces, by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.

3.8 DEFECTIVE CONCRETE

A. Replace concrete not conforming to required density lines, details and elevations, as directed by Architect/Engineer.

3.9 FIELD SAMPLING AND TESTING

A. The following samples and tests will be performed by an independent testing laboratory approved by Owner and Architect. The contractor is for responsibility for payment of test.

B. Samples:
1. Field samples shall be made and cured in accordance with ASTM C31, for each concrete strength, at the rate of 6 test cylinders and one slump test for each 50 cubic yards of concrete from each day's pour. In accordance with ASTM C-138, ASTM C 173 Volumetric Method, or ASTM C 231 Pressure Method, make one unit weight and air content check for each set of test cylinders. Air content and slump shall be checked and recorded at both truck discharge and point of placement for pumped concrete from the first load each day.
2. Test cylinders as follows for compressive strength: one at 7 days, two at 28 days, and one reserve for testing after a longer period as required by Architect, if the 28 day tests do not meet the required strength. Test one cylinder, tested at 24 hours and one cylinder at 28 days for oven dry density per ASTM C-567.
3. The taking of samples from small pours of 10 cubic yards or less may be omitted at the discretion of the Architect.
4. Additionally, test slump every 25 cu. yds., recording location for report.
5. When early form removal is requested, field cure cylinders tested at 7 or less days to determine sufficient strength.

C. Testing:
1. Where average strength of any group of 3 cylinders falls below the minimum compressive strength or of individual cylinder falls more than 500 psi below minimum compressive strength specified, the Architect shall have the right to require that test specimens be cut from the structure. Specimens shall be selected by Architect from location in structure represented by that specimen or specimens which failed.
2. Specimens shall be secured, prepared, and tested in accordance with ASTM C 42, within a period of 60 days after placing concrete.
3. Concrete shall be considered to meet the strength requirement of this specification if it meets the strength requirements of paragraph 5.6.5 of ACI 318.
4. Should laboratory analysis indicate that the proper concrete mix has not been used by the Contractor, all such concrete poured using the improper mix shall be subject to rejection.
5. The cost of cutting specimens from the structure, patching the resulting holes, and making the laboratory analysis shall be borne by the Contractor. Even if

test specimens prove concrete meets project specifications.

6. The holes from which the cored samples are taken shall be packed solid with no lump concrete proportioned in accordance with the ACI 211 “Recommended Practice for Selecting Proportions of No-Slump Concrete”. The patching concrete shall have the same design strength as the specified concrete.
7. If any of the specimens cut from the structure fail to meet the requirements outlined in paragraph 5.6.5 of latest ACI 318, the Architect shall have the right to require any and all defective concrete to be replaced, and all costs resulting there from shall be borne by the Contractor.

D. Contractor Sampling: In addition to the slump tests specified above, the Contractor shall keep a cone (mold) and rod apparatus on the job site for random testing of batches. When concrete does not meet the specified slump requirements, and when directed by the Architect, immediately perform a slump test in accordance with ASTM 143. Concrete not meeting the slump requirements shall be removed from the job site.

3.10 PROTECTION

A. No wheeling, working, or walking on finished surfaces will be allowed for 16 hours after the concrete is placed.

B. Provide plywood or other acceptable protective cover at all traffic areas throughout the job.

END OF SECTION

SECTION 03 45 00

PRECAST ARCHITECTURAL CONCRETE

PART 1 GENERAL

1.1 SUMMARY

A. Section includes architectural precast concrete.

1.2 REFERENCES

A. ASTM International:
   1. ASTM A615/A615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
   2. ASTM C33 - Standard Specification for Concrete Aggregates.
   3. ASTM C150 - Standard Specification for Portland Cement.

B. American Welding Society:
   1. AWS D1.1 - Structural Welding Code - Steel.
   2. AWS D1.4 - Structural Welding Code - Reinforcing Steel.

C. Precast/Prestressed Concrete Institute:
   1. PCI MNL-117 - Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products.
   2. PCI MNL-120 - PCI Design Handbook - Precast and Prestressed Concrete.

1.3 DESIGN REQUIREMENTS

A. Design units to withstand design loads as calculated in accordance with code, and erection forces. Calculate structural properties of units in accordance with ACI 318.

B. Design units to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.

C. Design component connections to accommodate building movement and thermal movement. Provide adjustment to accommodate misalignment of structure without unit distortion or damage.

D. Shop drawings to be prepared by or under supervision of a qualified structural engineer.

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures.

B. Shop Drawings: Indicate layout, dimensions, elevations, shapes, unit locations, configuration, reinforcement, connection details, support items, location of lifting devices, dimensions, openings, and relationship to adjacent materials.
   1. Indicate separate face and back-up mix locations and thicknesses.
   2. Indicate welded connections by AWS standard symbols. Detail loose, coast-in, and field hardware, inserts, connections, and joints, and accessories.

3. Indicate locations and details of anchorage devices that are to be embedded in other constructions.

C. Samples: Submit two panels, illustrating surface finish, color and texture.

D. Product Data: Submit product data and instructions for manufactured materials and products. Include mix designs, certifications, and laboratory test reports.

1.5 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.

B. Operation and Maintenance Data: Procedures for Project closeout submittals. Indicate surface cleaning instructions.

1.6 QUALIFICATIONS

A. Precast Manufacturer and Erectors: Qualified in accordance with PCI MNL-117 Group A1 - Architectural Concrete.

B. Design units under direct supervision of Professional Engineer experienced in design of this Work and licensed at Project location.

C. Welder: Qualified within previous 12 months in accordance with AWS D1.1 and AWS D1.4.

D. Fabricator Qualifications: Experienced in producing architectural precast concrete units similar to those indicated for this project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units without delaying work.

E. Erector Qualifications: Experienced installer who has completed architectural precast concrete work similar in material, design, and extent to that indicated for this project, and with a record of successful in-service performance.

1.7 MOCK-UP

A. Section 01 40 00 - Quality Requirements: Requirements for mockup.

B. Construct mockup panel, 4 feet long by 2 feet high, with lifting device, and attachment points, and finish in accordance with approved sample.

C. Incorporate accepted mockup as part of Work.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.

B. Handle precast units to position, consistent with their shape and design. Lift and support only from support points.

C. Blocking and Lateral Support during Transport and Storage: Clean, non-staining, without causing harm to exposed surfaces. Provide temporary lateral support to prevent bowing and warping.

D. Protect units to prevent staining, chipping, or spalling of concrete.

E. Mark units with date of production in location not visible to view when in final position in structure.

PART 2 PRODUCTS

2.1 MATERIALS

A. Cement: ASTM C150, Type I - Normal Portland type; no fly ash.

B. Concrete Materials: ASTM C33; water and sand graded uniformly to conform to paragraph 4 of Specification C33.

C. Reinforcement: ASTM A615/A615M, deformed60 ksi yield grade steel billet bars, plain finish; strength and size commensurate with precast unit design.

D. Fine Aggregate: Clean, fresh water, sand graded uniformly to conform to paragraph 4 of Specification C33.

E. Welded Wire Steel Fabric: 4 x 4 x 3 with additional deformed reinforcing bars according to design criteria. Reinforcing with less than 3'-4" cover must be galvanized.

F. Coarse Aggregate: ASTM C33; standard grading size 1-1/2 inches to No. 4 of washed gravel or crushed stone.

G. Water: Clean and not detrimental to concrete, supplied direct from the city water main.

H. Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.

I. Miscellaneous: Provide connection materials including steel plates, shapes, bolts, washers, and angles cast into units. Hot dip galvanized all plates, inserts, bolts and other accessories.

2.2 MIX

A. Concrete:
   1. Compressive Strength: Minimum 4,500 psi at 28 days, 28 day strength.
   2. Absorption: Maximum 5% when tested in accordance with ASTM C97.
   3. Water/cement ratio not to exceed 5 gallons per sack of cement.

2.3 FABRICATION

A. Fabricate in conformance with PCI MNL-117 and applicable code.

B. Reinforcement: Reinforce architectural precast concrete units to resist handling, transportation, and erection stresses.

C. Maintain plant records and quality control program during production of precast units. Make records available upon request.

D. Fabricate connecting devices, plates, angles, items fit to steel framing members, inserts, bolts, and accessories. Fabricate to permit initial placement and final attachment.

E. Weld steel fabrications in accordance with AWS D1.1. Weld reinforcing steel in accordance with AWS D1.4. Do not tack weld reinforcing.

F. Accurately position cast-in anchors, inserts, plates, angles, and other anchorage hardware for attachment of loose hardware and secure in place during precasting operation. Locate anchorage hardware where it does not affect position of main reinforcement or placing of concrete

G. Supply loose steel plates, clip angles, seat angles, anchors, dowels, cramps, hangers, and other hardware shapes not provided by other trades necessary for securing architectural precast concrete and cast stone units to supporting and adjacent members

H. Cast-in reglets, slots, holes, and other accessories in architectural precast concrete and cat stone units to receive dowels, reglets, and other similar work indicated. Coordinate with other trades for installation of cast-in items

I. Cast-in openings larger than 10" in any dimension according to final shop drawings. Other smaller holes may be field cut by trades requiring them when approved by Architect.

J. Reinforcement: Comply with recommendations of CRTSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcements.

K. Reinforce architectural precast concrete units to resist handling, transportation, and erection stresses.

L. Identify pickup points of units and orientation in structure with permanent markings, complying with markings indicated on shop drawings. Imprint casting date on each unit on a surface that will not show in finished structure.

M. Fabricate units straight and true to size and shape, with exposed edges and corners precise and square. Units which are warped, cracked, broken, spalled, stained or otherwise defective will not be acceptable.

N. Locate hoisting devices to permit removal after erection.

O. Cure units to develop concrete quality, and to minimize appearance blemishes including non-uniformity, staining, or surface cracking.

P. Minor patching in plant is acceptable, providing structural adequacy and appearance of units is not impaired.

2.4 FABRICATION TOLERANCES

A. Overall height and width measured at face adjacent to mold at time of casting:
   1. 10 feet or less: Plus or minimum 1/8 inch.
   2. 10 feet to 20 feet: Plus or minus 3/16 inch

3. 20 feet to 40 feet: Plus or minus 1.4 inch.
4. Each Additional 10 feet: Plus or minus 1/16 inch per 10 feet.
5. Angular deviation of Plane of Side Mold: 1/32 per 3 inches depth or 1/16 inch total, whichever is greater.
6. Openings with One Unit: Plus or minus 1/4 inch, except plus or minus 1/8 inch per 6 feet or 1/4 inch total, whichever is greater.
7. Thickness: Minus 1/8 inch, plus 1/4 inch.
8. Locations of Reveals and Architectural Features: Plus or minus 1/8".
9. Tolerances of Other Dimensions Not Otherwise Indicated: Numerically greater of plus or minus 1/16 inch per 10 feet, or plus or minus 1/8 inch.
10. Position Tolerances: For cast-in-items measured from datum line, locations as shown on final shop drawings as follows:
    a. Inserts: Plus or minus 1/2".
    b. Weld Plates: Plus or minus 1".
    c. Handling Devices: Plus or minus 3".
    d. Blocks Outs and Reinforcements: within 1/4" of position shown on final shop drawings, where such positions have structural implications or affect concrete cover; otherwise plus or minus 1/2".

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify building structure, anchors, devices, and openings are ready to receive work of this Section.

C. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Install clips, hangers, and other accessories required for connecting architectural precast concrete units to supporting members and back-up materials.

B. Provide for erection procedures and induced loads during erection. Maintain temporary bracing in place until final support is provided.

3.3 ERECTION

A. Perform Work in accordance with PCI MNL-120 and MNL-117, including manufacturing procedures and testing requirements, quality-control recommendations, and dimensional tolerances for types of units indicated.

B. Erect units without damage to shape or finish. Replace or repair damaged panels. Provide temporary supports and bracing as required to maintain position, stability, and alignment as members are being permanently erected.

C. Erect units level and plumb within allowable tolerances.

D. Align and maintain uniform horizontal and vertical joints as erection progresses.

E. When units require adjustment beyond design or tolerance criteria, discontinue affected work; advise Architect/Engineer.

F. Anchor units in final position by bolting, welding, grouting and as required by project conditions Remove temporary shims, wedges, and spacers as soon as possible after anchoring and grouting is completed.
   1. Perform welding in compliance with AWS D1.1 and AWS D1.4 with qualified welders.
   2. At bolted connections use lock washers and other acceptable means to prevent loosening of nuts.
   3. Grouting Connection: Grout connections where required and indicated.

G. Touch-up field welds and scratched or damaged surfaces.

H. Seal joints in accordance with Section 07 90 00.

3.4 ERECTION TOLERANCES

A. Tolerances: MNL-117.

B. Maximum Variation from Plane of Location: 1/8 inch in 6 feet.

C. Maximum Offset from Indicated Alignment between Two Connecting Units: 1/4 inch.

D. Joint Tolerance: Plus or minus 1/4 inch.

3.5 FIELD QUALITY CONTROL

A. Welding: Inspect welds in accordance with AWS D1.1.

3.6 PROTECTION OF INSTALLED CONSTRUCTION

A. Section 01 70 00 - Execution and Closeout Requirements: Protecting installed construction.

B. Use non-combustible shields during welding operations to protect adjacent Work.

C. Protect units from staining during installation and after installation.

D. Rake back and seal joints complying with sealant specifications and details.

3.7 CLEANING

A. Clean precast units with mild masonry cleaner as specified in Section 04 20 00 as necessary to remove all dirt, efflorescence or foreign matter.

END OF SECTION

SECTION 04 05 03

MASONRY MORTARING AND GROUTING

PART 1 GENERAL

1.1 SUMMARY

A. Section includes mortar and grout for masonry.

1.2 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 530 Building Code Requirements for Masonry Structures and ACI 530.1 Specification for Masonry Structures.

1.3 ENVIRONMENTAL REQUIREMENTS

A. Cold Weather Requirements: In accordance with ACI 530.1 when ambient temperature or temperature of masonry units is less than 40 degrees F.

B. Hot Weather Requirements: In accordance with ACI 530.1 when ambient temperature is greater than 100 degrees F or ambient temperature is greater than 90 degrees F with wind velocity greater than 8 mph.

PART 2 PRODUCTS

2.1 COMPONENTS

A. Portland Cement: ASTM C150, Type I, gray color.

B. Mortar Aggregate: ASTM C144, standard masonry type.

C. Hydrated Lime: ASTM C206, Type S.

D. Integral Water Repellant: Master Builder's "Rheomix 235" or approved equal.

E. Grout Aggregate: ASTM C404, fine and coarse.

F. Water: Clean and potable.

G. Calcium chloride is not permitted.

2.2 MIXES

A. Mortar Mixes: ASTM C270, Type S consisting of 1 part volume Portland cement and ½ part hydrated lime to 4-1/2 parts aggregate.

B. Mortar Mixing:
1. Thoroughly mix mortar ingredients in accordance with ASTM C270 in quantities needed for immediate use.

C. Grout Mixes:
   1. Lintels: 3,000 psi strength at 28 days; 8-10 inches slump; mixed in accordance with ASTM C476 Course grout.

D. Grout Mixing:
   1. Thoroughly mix grout ingredients in quantities needed for immediate use in accordance with ASTM C476.
   2. Do not use anti-freeze compounds to lower freezing point of grout.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install mortar and grout in accordance with Sections 04 20 00 and 03 45 00.

END OF SECTION

SECTION 04 20 00

UNIT MASONRY

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Brick and concrete masonry units.
   2. Reinforcement, anchorage, and accessories.

B. Related Sections:
   1. Section 04 05 03 – Masonry Mortaring and Grouting
   2. Section 03 45 00 – Precast Architectural Concrete

C. Product Data: Submit product date for reinforcement, wall ties, cell vents, and other accessories.

D. Samples: Submit four samples of face brick units to illustrate color, texture and extremes of color.

E. Manufacturer's Certificate: Submit certificate for block requirements.

1.2 QUALITY ASSURANCE

A. Perform Work in accordance with TMS MSJC Code and TMS MSJC specification, unless noted otherwise.

B. Reinforced CMU Construction: Conform to the provisions of ANSI A41.2 (NBS Handbook 74) and ACI/ASCE 530.

1.3 MOCKUP

A. Construct masonry wall mockup including masonry, precast, mortar and accessories, flashings, and weather barrier.

1.4 DELIVERY, STORAGE AND HANDLING

A. Section 01 60 00 – Product Requirements: Product storage and handling requirements.

B. Cement: Furnish in original packages. Discard any damaged or deteriorated material.

C. Aggregate: Store to prevent inclusion of dirt and other foreign matter.

D. Brick: Store in bundles and on delivery pallets or on platforms off the ground.

E. Concrete Masonry Units: Deliver to jobsite dry. Store on platforms until ready for use. Keep dry at all times. Wet or damp blocks are unacceptable and shall be removed from the site and replaced at no extra cost or delay.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Do not lay any masonry when the temperature is below 40 degrees F. and rising, or below 50 degrees F. and falling. Do not lay any masonry on frozen soil or masonry.

PART 2 PRODUCTS

2.1 BRICK

A. Brick Units: Acme Brick.
   1. Triple Brick for the Top and Base of the Main Portion of the Building (excluding accents): Slate Gray.
   2. Water Table, Window Sills and Headers, Triple Brick Band and Accents: Dove Gray.
   3. Field Brick for Main Portion of the Building: Blend 137 Burgundy, Heritage.
   4. Tower Brick (modular and triple): Blend 157 Roxbury, velour texture.

B. Special Brick Shape: Furnish special brick shapes at window sills.

2.2 CONCRETE MASONRY UNITS

A. Hollow Load Bearing Concrete Masonry Units: ASTM C90, type I Moisture controlled; light weight. Provide integrally colored units.

B. Minimum face shell thickness:
   1. 8 inch block: 1-1/4 inches.

2.3 ACCESSORIES

A. Single Wythe Joint Reinforcement: ASTM A951; ladder type; high tensile strength steel; No. 9 steel rods with eye and wire pintles; hot dip galvanized.

B. Reinforcing Steel: ASTM A615/A615M, 60 ksi yield grade, deformed billet bars, galvanized finish.

C. Wall Ties: Hohmann & Barnard, HB213 Seismic Veneer anchor; hot dip galvanized.

D. Anchor Rods: ASTM A307; Grade C; J-shaped or L-shaped; complete with washers and heavy hex nuts; sized for minimum 15 inch embedment; galvanized finish.

E. Mortar and Grout: As specified in Section 04 05 03.

F. Reinforced Flashings: Hyload Flashing System; polymeric membrane reinforced with DuPont's Elvaloy KEE polymer, 40 mil thick. Provide preformed corners, end dams, other special shapes, and seaming materials by same manufacturer.

G. Pre-coated Galvanized Steel: Refer to Section 07 62 00.

H. Preformed Control Joints: Closed cell neoprene material, 3" wide x maximum length.

I. Building Paper: ASTM D226; Type II, No. 30 unperforated asphalt felt.

J. Weeps/Vents : Hohmann & Barnard Series 341; round plastic weep holes.

K. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

PART 3 EXECUTION

3.1 PREPARATION

A. Furnish temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent support.

3.2 INSTALLATION

A. Establish lines, levels, and coursing indicated. Protect from displacement.

B. Maintain masonry courses to uniform dimension. Form bed and head joints of uniform thickness.

C. Coursing of Brick Units:
1. Bond: Running.
2. Coursing: Three units and three mortar joints to equal 8 inches.
3. Mortar Joints: Concave.

D. Coursing of Concrete Masonry Units:
1. Bond: Running.
2. Coursing: One unit and one mortar joint to equal 8 inches.
3. Mortar Joints: Tooled slightly concave.

E. Joint Reinforcement and Anchorage - Masonry Veneer:
1. Install horizontal joint reinforcement 16 inches oc.
2. Place masonry joint reinforcement in horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
3. Place joint reinforcement continuous in joint below top of walls.
4. Lap joint reinforcement ends minimum 6 inches.
5. Secure wall ties to stud framed backing and embed into masonry veneer at maximum 16 inches oc vertically and horizontally.
6. Place wall ties at maximum 8 inches oc vertically within 8 inches of jamb of wall openings.
7. Place wall ties at maximum 8 inches on center horizontally within 8 inches of head and sill of wall openings.

F. Placing and Bonding:
1. Lay solid masonry units in full bed of mortar, with full head joints.
2. Lay hollow masonry units with face shell bedding on head and bed joints.
3. Remove excess mortar as work progresses.
4. Interlock intersections and external corners.
5. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment is required, remove mortar and replace.
6. Perform job site cutting of masonry units with proper tools to assure straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

7. Isolate masonry from vertical structural framing members with movement joint.
8. Isolate top of masonry from horizontal structural framing members and slabs or decks with compressible joint filler.

G. Weeps and Vents:
1. Furnish weeps and vents in outer wythe at maximum 32 inches oc above thru-wall flashing, above shelf angles and lintels, and at bottom of walls.
2. Install weeps and vents at brick units at 16” o.c. with additional vents as shown on Drawings.

H. Cavity Wall: Do not permit mortar to drop or accumulate into air space or to plug weeps.

I. Masonry Flashings:
1. Extend flashings horizontally through outer wythe at foundation walls, above ledge or shelf angles and lintels, at bottom of walls, and turn down on outside face to form drip.
2. Turn flashing up minimum 8 inches and bed into mortar joint of backing.
3. Lap end joints minimum 6 inches and seal watertight.
4. Turn flashing, fold, and seal at corners, bends, and interruptions.

J. Lintels:
1. Install lintels over openings.
2. Maintain minimum 8 inch bearing on each side of opening.

K. Grouted Components:
1. Place and consolidate grout fill without displacing reinforcing.
2. Place grout in accordance with TMS MSJC Specification.

L. Control and Expansion Joints:
1. Install control and expansion joints at 20 feet on center and within 24 inches on one side of each interior and exterior corner.
2. Install preformed control joint device in continuous lengths. Seal butt and corner joints.
3. Size control joint in accordance with Section 07 90 00 for sealant performance.

3.3 CLEANING

A. Remove excess mortar and mortar smears as work progresses.

B. Replace defective mortar. Match adjacent work.

C. Clean soiled surfaces with cleaning solution.

D. Use non-metallic tools in cleaning operations.

3.4 TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.

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 from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.

F. Maximum Variation of Joint Thickness: 1/8 inch in 3 ft.

G. Maximum Variation for Steel Reinforcement:
   1. Plus or minus 1/2 inch when distance from centerline of steel to opposite face of masonry is 8 inches or less.
   2. Plus or minus 1 inch when distance is between 8 and 24 inches.
   3. Plus or minus 1-1/4 inch when distance is greater than 24 inches.
   4. Plus or minus 2 inches from location along face of wall.

3.5 CLEANING

A. Remove excess mortar and mortar smears as work progresses.

B. Replace defective mortar. Match adjacent work.

C. Clean soiled surfaces with non-acidic cleaning solution.

D. Use non-metallic tools in cleaning operations.

3.6 PROTECTION OF FINISHED WORK

A. Section 01 70 00 - Execution Requirements: Requirements for protecting finished Work.

B. Protect exposed external corners subject to damage.

C. Protect base of walls from mud and mortar splatter.

D. Protect masonry and other items built into masonry walls from mortar droppings and staining caused by mortar.

E. Protect tops of masonry work with waterproof coverings secured in place without damaging masonry. Provide coverings where masonry is exposed to weather when work is not in progress.

END OF SECTION

SECTION 05 12 00

STRUCTURAL STEEL

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Structural steel framing members, base plates, plates, anchor bolts, grouting under base plates, steel lintels and miscellaneous steel shapes.

B. Related Sections:
1. Cast-In-Place-Concrete: Section 03 30 00
2. Metal Fabrications: Section 05 50 00
3. Painting Section 09 90 00

1.2 SUBMITTALS:

A. Shop Drawings:
1. Submit (1) set of a hard copy and (1) electronic copy of Shop Drawings for review of general conformance to design concept in accordance with Section 01 33 00.
2. Indicate sizes, spacing, and locations of structural members, openings, connections, cambers, loads, and welded connections. Indicate welds by standard AWS symbols and show size, length, and type. Provide setting drawings and templates for installing A bolts and other anchorages installed by others.

B. Certificates: Certify welders employed on Work, verifying AWS qualification within previous 12 months.

1.3 QUALITY ASSURANCE

A. Codes And Standards: Comply with the provisions of the following:
1. AISC “Code of Standard Practice for Steel Buildings and Bridges”.
2. AISC “Specifications for Structural Steel Buildings”, including “Commentary”.
3. AISC “Specifications for Structural Joints Using ASTM A325 or A490 Bolts” approved by the Research Council on Structural Connections.
4. AWS D1.1 “Structural Welding Code - Steel”.

B. Welding operators shall be qualified in accordance with AWS Standard Qualification Procedures. Provide certification that welders employed in work have satisfactorily passed AWS qualification tests within previous months. If recertification of welders is required, provide without additional cost to Owner.

1.4 PERFORMANCE REQUIREMENT

A. Connection Design: Engineer and fabricate all “simple framed” shear connections to meet requirements shown on plans unless otherwise noted.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to site at such intervals to insure uninterrupted progress of work.

B. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete or masonry, in ample time to not delay work.

C. Store materials to permit easy access for inspection and identification. Keep steel members off ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration. If bolts or nuts become dry or rusty, clean and re-lubricate before using.

1.6 INSPECTION OF FABRICATORS

A. Approved fabricators are not required to have special inspections as required by Section 1704.2.5 of the IBC 2012 code.

B. Fabricators that are in good standing members of AISC are considered approved. Other fabricators not members of AISC shall submit the fabricator's written procedural and quality control manual and periodic auditing of fabrication practices by an approved special inspection agency prior the start of fabrication. This shall be at the fabricator's expense.

C. Approved fabricators shall submit a certification of compliance found in Section 01 40 10 "Special Inspections" to the building official at the completion of fabrication.

D. All fabricators that not approved shall undergo special inspection as required by Section 1704.2.5 of the IBC 2012.

PART 2 PRODUCTS

2.1 MATERIALS

A. Rolled Structural Steel Members, Wide flange: ASTM A992, Grade 50.

B. Channel, Angles and Bent Plates Less than ½" Thick: ASTM A36 grade 36ksi

C. Bars, Bent Plates ½" Thick or Greater and Flat Plates ½" Thick or Greater: ASTM A572, Grade 50 ksi.

D. Structural Tubing: ASTM A500, Grade C, Fy = 50 ksi.

E. Pipe: ASTM A53, Type E or S, Grade B, seamless.

F. High Strength, Threaded Fasteners (Bolts, Nuts, and Washers): ASTM A325, Type 1.

G. Unfinished Threaded Fasteners (Anchor Bolts): ASTM F1554, Grade 36 ksi, Grade A.

H. Threaded Rod: ASTM A36.

I. Welding Materials: AWS D1.1; E70XX. Welding rods used in shop and field for welding on lateral columns, beams and braces shall be "seismic rods".

J. Headed Stud-Type Shear Connectors: ASTM A108, cold-finished carbon steel with dimensions complying with AISC specifications. Minimum tensile strength shall be 60 ksi and minimum yield strength is 50 ksi.

K. Grout: Non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing additives, capable of developing a minimum compressive strength of 7,000 psi at 28 days. Euclid “Euco N.S.”, Master-Builders Master Flow 713", Conspec “100 Non-Shrink Grout (Non Metallic)” or approved equal.

L. Shop and Touch-Up Primer: Meet performance required of TT-P-86, lead free, alkyd primer.

M. Sleeve Anchors in Masonry: Federal Specifications A-A-1922A.

N. Expansion Anchors in Concrete and Grouted CMU:
1. In concrete: ICC-ES AC193. Acceptable anchors are Hilti KWIK Bolt-TZ (ICC-ESR-1917) or Simpson Strong-Bolt 2 (ICC-ES ESR-3037) or Powers Power-Stud+SD2 (ICC-ES-ESR 2502) or Powers Power Stud+SD1 (ICC-ES-ESR 2818).
2. In Solid Grouted Concrete Masonry Units: ICC-ES AC01. Acceptable anchors are Hilti KWIK Bolt 3 (ICC-ESR-1385) or Simpson Wedge-All (ICC-ES ESR-1396) or Simpson Strong-Bolt 2 (IAPMO-ES ER240) or Powers Power –Stud+SD1(ICC-ES-ESR 2966).

O. Screw Anchors in Concrete, Grouted CMU, and Hollow CMU:
1. In concrete: ICC-ES AC193. Acceptable anchors are Hilti KWIK HUS-EZ and KWIK HUS-EZ I (ICC-ESR-3027) or Simpson Titen HD and Titen HD Rod hanger (ICC-ESR-2713) or Powers Power Wedge Bolt+ (ICC-ES-ESR 2526)
2. In Solid Grouted Concrete masonry Units: ICC-ES AC106. Acceptable anchors are Hilti KWIK HUS-EZ (ICC-ESR-3056) or Simpson Titen HD (ICC-ESR-1056) or Powers Power Wedge bolt+ (ICC ES-ESR 1678).
3. In Hollow Concrete Masonry Units: Acceptable anchors are Simpson Titen HD.

P. Adhesive Anchors:
1. In Unreinforced Masonry Units: ICC-ES AC60. Acceptable adhesives are Hilti HIT-HY 70 (ICC-ESR-3342) Simpson SET (ICC-ES ESR-1772). AT (ICC-ES ESR-1958) or Powers AC100+Gold (ICC-ES-ESR-3200). Steel anchor element shall be Hilti HAS-E or ASTM F1554 Grade 36 continuously threaded rod.
2. In Hollow Concrete Masonry Units: ICC-ES AC58. Acceptable adhesives are Hilti HIT-HY 70 (ICC-ESR-2682), Simpson SET, Simpson AT or approved equal. Plastic Mesh Screen Tube per Manufacturer recommendations required. In Solid Grouted Masonry Units: ICC-ES AC58. Acceptable adhesives are Hilti HIT-HY 70 (ICC-ESR-3342), Simpson SET-XP (IAPMO UES-ER 265), or Simpson AT-XP (IAPMO UES-ER 281) or Powers AC+Gold (ICC ES-ESR -3200). Steel anchor element shall be Hilti HAS-E, ASTM F1554 Grade 36, or ASTM A193, Grade B6, B8, or B8M continuously threaded rod.
3. In concrete: ICC-ES AC308. Acceptable anchors are Hilti HIT-HY 200 SAFE Set fast cure (ICC-ESR-3187), Hilti HIT-RE 500-SD slow cure (ICC-ESR-2322), Simpson SET-XP (ICC-ESR-2508), Simpson AT-XP (IAPMO UES-ER263), Powers Pure 110+ Epoxy System for standard cure (ICC-ES-ESR 3298) or Powers AC100+Gold+ Acrylic System for Fast cure (ICC-ES-ESR-2582) or approved equal. Steel anchor

element shall be Hilti HAS-E, ASTM F1554 Grade 36, or ASTM A193, Grade B6, B8, or B8M continuously threaded rod.

Q. Undercut Anchors:
1. In Concrete: ICC-ES AC193. Acceptable anchors are Hilti HDA (ICC-ESR-1546) or Simpson Torq-cut (ICC-ESR-2705) or Powers Atomic+ Undercut anchor (ICC-ES-ESR 3067).

2.2 Connector shall conform to the following:

A. Headed Stud Shear Connectors: ASTM A108, Fy=51ksi, Fu=65 ksi minimum ultimate tensile strength. Studs shall be solid fluxed attached with appropriate stud gun capable of meeting the strengths set forth in Table 1.11.4 AISC Specification.

B. Headed Concrete Anchors: ASTM A108, Fy=49 ksi, Fu=65ksi minimum ultimate tensile strength.

C. Threaded Studs: ASTM A108, Fy=49ksi, Fu=61 ksi minimum ultimate tensile strength.

2.3 MECHANICAL EQUIPMENT FRAMES

All mechanical equipment frames or miscellaneous steel required to complete the mechanical equipment installation shall be provided and detailed by the structural steel fabricator. The mechanical equipment contractor shall provide all necessary weights and dimensions to the structural steel fabricator. Shop drawings for mechanical and equipment frames must be submitted and accepted by the Architect.

2.4 FABRICATION

A. Shop Fabrication and Assembly: Fabricate and assemble structural assemblies in shop to greatest extent possible. Fabricate items of structural steel in accordance with AISC specifications and as indicated on final shop drawings. Provide camber in structural members where indicated.
1. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence that will expedite erection and minimize field handling of materials.
2. Where shop finishing is required, complete assembly, including welding of units, before start of finishing operations. Provide finish surfaced of members exposed in final structure free of markings, burrs, and other defects.

B. Connections: Weld or bolt shop connections, as indicated.
1. Bolt field connections, except where welded connections or other connections are indicated.
2. Provide high-strength threaded fasteners for principal bolted connections, except where otherwise indicated.
3. High-Strength Bolted Construction:
a. Install high-strength threaded fasteners in accordance with AISC "Specifications for Structural Joints Using ASTM A325 or A490 Bolts".
b. Alternate High Strength Bolts: Standard Specification Twist Off Type Tension Control Structural Bolt/Nut/Washer Assembly ASTM F-1852-08. 120/105 min. tensile strength.
4. Welded Construction: Comply with AWS Code for procedures, appearance and

quality of welds, and methods used in correcting welding work.

5. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Weld shear connectors in field, spaced as shown, to beams and girders in composite construction. Use automatic end of welding of headed stud shear connectors in accordance with manufacturer's printed instructions.
6. Holes For Other Work: Provide holes for securing other work to structural steel framing and for passage of other work through steel framing members, as indicated on final shop drawings.
   a. Provide threaded nuts welded to framing and other specialty items as indicated to receive other work.
   b. Cut, drill, or plumb holes perpendicular to metal surfaces. Do not flame -cut holes or enlarge holes by burning. Drill holes in bearing plates.

2.5 SHOP PAINTING

A. Shop paint all structural steel, except as follows:
   1. Members or portions of members to be embedded in concrete or mortar. Paint embedded steel which is partially exposed on the exposed portions and the initial 2" of embedded areas only.
   2. Members to be welded.
   3. Members to be fire proofed.

B. Surface Preparation: Before painting, thoroughly clean all surfaces of all grease, rust, welding droppings and loose mill scale by methods conforming to SSPC-SP-1 and SSPC-SP-3. After erection, wire-brush and touch-up welded or abraded areas. Touch-up with primer.

C. Painting: Immediately after surface preparation, apply structural steel primer paint in accordance with the manufacturer's instructions and at a rate to provide a uniform dry film thickness of 2.0 mils. Use painting methods which will result in full coverage of joints, corners, edges and all exposed surfaces.

PART 3 EXECUTION

3.1 ERECTION

A. Brace and guy members until final connections are made. Structure is not stable until all members, connections, decking, slabs, bracing, and other structural components are in place and secured.

B. Setting Bases and Bearing Plates: Clean bearing surfaces of bond-reducing materials and roughed to improve bond to surfaces. Clean bottom of base and bearing plates.
   1. Set loose and attached bearing plates and bearing plates for structural members on wedges or other adjusting devices.
   2. Tighten anchor bolts after supported members have been positioned and plumbed. Do not remove wedges or shims, but if protruding, cut off flush with edge of base or bearing plate prior to packing with grout.
   3. Pack grout solidly between bearing surfaces and bases or plates to ensure that no voids remain.

C. Field Erection:
   1. Set structural frames accurately to lines and elevations indicated. Align and adjust various members forming part of complete frame or structure before permanently fastening. Clear bearing surfaces and other surfaces that will be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
   2. Level and plumb individual members of structure within specified AISC tolerances.

D. Field Alterations:
   1. Do not field cut or alter structural members without the approval of Architect.
   2. Do not enlarge holes by burning or using a spud wrench or drift pin.

3.2 WELDING

A. Welding in shop and field shall be done by operators who have been previously qualified by tests as prescribed in the American Welding Society, "Standard Qualification Procedure." All operators must have successfully passed the welding qualification tests within a 24-month period preceding erection. The Architect shall be provided a copy of the welding qualification test for each operator at no additional cost to the Owner.

B. Equipment to be of a type which will produce proper current so that operator may produce satisfactory welds. Welding machine shall be of 200-400 ampere, 25-40 volt capacity.

C. Electrodes shall be suitable for positions and other conditions of intended use in accordance with the instructions with each container.

D. Field welding shall be done by direct current.

E. Technique of welding employed, the appearance and quality of welds made and methods of correcting defective work shall conform to American Welding Society "Code for Arc Welding in Building Construction", Section 4, "Workmanship".

F. Surfaces to be welded shall be free from loose scale, rust grease, paint and other foreign material except that mill scale withstanding vigorous wire brushing may remain. A light film of linseed oil may likewise be disregarded. Joint surfaces shall be free from fins and tears.

G. No welding shall be performed when temperature of the base metal is lower than 0 degrees F. At temperatures between 32 degrees F and 0 degrees F., the surfaces of all areas within 3" of a point where a weld is started shall be heated until they are too hot to touch before welding is started.

H. Finished members shall be true to line and free from twists, bends and open joints.

3.3 TESTS

A. Laboratory tests. Methods of testing shall be according to the following:

STRUCTURAL STEEL - ASTM A-36, ASTM A572, or ASTM A992. Two tension tests from each melt. Two bend tests from each melt.

STEEL ELECTRODES - ASTM A-233. As directed.

B. Field Tests. All field and shop welders shall be tested and certified by an approved testing laboratory. The American Welding Society Operator Qualification test shall be used as a basis of qualification.

C. All field and shop operators shall qualify for the following:

Type of Weld	Position of Welding
Groove	Horizontal
Groove	Vertical
Groove	Overhead
Fillet	Vertical
Fillet	Overhead

D. The Architect's Representative may require strap cuts from welds in any supporting member to withstand nick-break test. If strap fails to meet requirements, Contractor shall replace strap cut from member at no charge to Owner. If strap does meet requirements, the Architect shall pay expenses of having metal replaced. In event strap fails, the welder shall be discharged.

3.4 OBSERVATION

The work shall be observed in the shop and the field.

3.5 TOUCH-UP PAINTING

Cleaning and touch-up painting of field welds, bolted connections and abraded areas of the shop paint on structural steel is included in Section 09 90 00.

END OF SECTION

SECTION 05 40 00

COLD-FORMED METAL FRAMING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: All axial or wind loaded light gage steel studs, track, joists, bridging and related accessories are as indicated on the Contract Drawings and specified herein.

B. Related Sections:
Structural Steel: Section 05 12 00
Gypsum Wallboard: Section 09 21 16

1.2 SUBMITTALS

A. General: Comply with Section 01 33 00

B. Product Data: Submit copy of installation instructions for each item of lightgage framing and accessories.

C. Shop Drawings: Submit (1) set of hard copies and (1) electronic copy of fabrication and erection drawings for framing members showing size and gage designations, number, type, location and spacing. Indicate supplemental bracing, accessories, and details as may be required for proper installation.

1.3 QUALITY ASSURANCE

A. Qualifications of manufacturer: products used in the work of this section shall be produced by manufacturers regularly engaged in manufacture of similar items and with a history of successful production acceptable by the Architect.

B. Inspection and Quality Control;

1. Contractor shall provide effective full time quality control over all fabrication and erection activities.
2. As directed by Architect, owner's testing agency may inspect the maintenance of a quality control program including spot checking weldments and welding procedures in accordance with A.W.S. standards.
3. Inspection responsibility for quality control shall remain with contractor.

C. Standards

1. Work shall meet the requirements of the following standards.
   a. American Iron and Steel Institute (A.I.S.I.) "Design of Cold Formed Steel Structural Members," Latest edition.
   b. American Welding Society (A.W.S.) D.1.3, 1981 "Structural Welding Code-Sheet Steel".
   c. American Society for Testing and Materials (A.S.T.M.)
   d. American Institute of Steel Construction (A.I.S.C.) "Manual of Steel Construction," 9th edition.

e. All pertinent Federal, State and Local Codes.

2. The most stringent requirements shall govern in conflicts between specified codes and standards.

1.4 PRODUCT DELIVERY AND STORAGE:

A. Protect metal framing units from rusting and damage. Deliver to the project site in manufacturer's unopened containers or bundles, fully identified with name, brand, type, location and spacing. Indicate supplemental bracing, accessories, and details as may be required for proper installation.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

Clark Steel Framing System or approved equal.

2.2 METAL FRAMING

A. Systems Components: With each type of metal framing required, provide manufacturer's standard steel runners (tracks), blocking, lintels, clip angles, shoes, reinforcements, fasteners, and accessories as indicated and as recommended by manufacturer for applications indicated, as needed to provide a complete metal framing system.

B. Material and Finishes:

1. All galvanized studs and joists shall be formed from steel that corresponds to the minimum requirements of A.I.S.I. Standards.
2. Structural framing members shall conform to ASTM C955, have engineering properties calculated in conformance with AISI “Specification For The Design of Cold-Formed Steel Structural Members” and have minimum properties as published by Clark Steel Framing.
3. All galvanized studs, joists, track, bridging and accessories shall be formed from steel having a galvanized coating meeting the requirements of ASTM A653.
4. Studs and Joists: Minimum 43 mils (18 gage), with 1.625" flange and 0.50" flange return lip. 43 mils (18 gage) units shall have yield stress (Fy)= 33ksi and 54 mils, 64 mils, 97 mils (16,14,12,10) gage units shall have a yield stress (Fy)=50 ksi.
5. Fasteners: Provide nuts, bolts, washers, screws, and other fasteners with corrosion-resistant plated finish.
6. Fasteners: (Unless noted otherwise on drawings)
   a. Light gage metal to light gage metal: Kwik-Pro Self drilling by Hilti. No.8-18 PPH for 18 gage metal. No.10-16 PPH for 16 gage, 14 gage and 12 gage. Minimum of two screws per connection.
   b. Light gage metal to steel: Kwik-Pro Self drilling by Hilti. No.12-24 HWH. Drill thru light gage into steel (16” o.c. maximum spacing).
   c. Light gage to Concrete: DX Powder Actuated Fastener by Hilti. DX Fastener X-DNI Domed Head Nail. Shank .145-inch and minimum penetration of 1 1/8-inch (16” o.c. maximum spacing).
   d. Wood to light gage: Minimum of No. 8 x 1 inch bugle head screws.
7. Electrodes for welding: Comply with AWS Code and as recommended by stud

manufacturer.

8. Galvanizing Repair: Where galvanized surfaces are damaged, prepare surfaces and repair in accordance with procedures specified in ASTM A 780.

2.3 FABRICATION

A. General:

1. Framing components may be prefabricated into panels prior to erection. Fabricate panels plumb, square, true to line and braced against racking with joints welded. Perform lifting of prefabricated panels in a manner to prevent damage or distortion in any members in the assembly.
2. Fabricate units in jig templates to hold members in proper alignment and position and to assure consistent component placement.
3. Splices in studs shall not be permitted.

B. Fastenings:

1. Attach similar components by welding. Attach dissimilar components by welding, bolting, or screw fasteners, as standard with the manufacturer.
2. Wire taping of framing components is not permitted.
3. Welds shall be performed by operators qualified in accordance with section 6.0 of the American Welding Society's "Structural Welding Code-Sheet Metal" (AWS D1.3-81). (Where field welds are anticipated, we suggest that components of 18 gage thickness are not specified). All welds shall be touched up with zinc rich paint.

C. Fabrication Tolerances:

1. Fabricate units to a maximum allowable tolerance variation from plumb, level, and true to line of 1/8" in 10'.
Studs shall have full bearing inside track web (1/16" max. gap), prior to stud and track attachment.

PART 3 EXECUTION

3.1 INSTALLATION: Install metal framing systems in accordance with manufacturer's printed or written instructions and recommendations, and final shop drawings.

A. Runner tracks: Install continuous tracks sized to match studs. Align tracks accurately to the layout at base and top of studs. Secure tracks as recommended by the stud manufacturer for the type of construction involved, except do not exceed 16" o.c. spacing for nail or power-driven fasteners, not 12" o.c. for the other types of attachment. Provide fasteners at corners and ends of tracks.

B. Wall Studs: Space studs 16" o.c.

C. Secure studs to top and bottom runner tracks by either welding or screw fastening at both inside and outside flanges.

D. Set studs plumb, except as needed for diagonal bracing or required for non-plumb walls or warped surfaces and similar requirements.

E. Where stud system abuts structural columns or walls anchor ends or stiffeners to supporting structure.

F. Install supplementary framing, blocking and bracing in the metal framing system wherever walls or partitions are indicated to support fixtures, equipment, services, casework, heavy trim and furnishings, and similar work requiring attachment to the wall or partition. Where type of supplementary support is not otherwise indicated, comply with the stud manufacturer's recommendations and industry standards in each case, considering the weight or loading resulting from the items supported.

G. Frame wall openings larger than 2' square with double stud at each jamb of frame except where more than two are either shown or indicated in manufacturer's instructions. Install runner tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with stud shoes or by welding, and space jack studs same as full-height studs of wall. Secure studs system wall opening frame in manner indicated.

H. Frame both sides of expansion and control joints, as shown for the wall system, with a separate stud; do not bridge the joint with components of the stud system.

I. Install horizontal bridging in stud system, spaced (vertical distance) at not more than 4 ft o.c. Weld at each intersection.

J. Temporary bracing shall be provided until erection is completed.

K. Provide stud walls at locations indicated on plans as “shear walls” for frame stability and lateral load resistance.

L. Erection Tolerances:

1. Bolt or weld wall panels (at both horizontal and vertical junctures) to produce flush, even, true-to-line joints.
2. Maximum variation in plane and true position between prefabricated assemblies should not exceed 1/16".

3.2 FIELD PAINTING: Touch-up shop-applied protective coating damaged during handling and installation. Use galvanizing repair paint for galvanized surfaces.

END OF SECTION

SECTION 05 50 00

METAL FABRICATIONS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes shop fabricated metal items.
   1. Lintels.
   2. Bollards.

1.2 SUBMITTALS

A. Shop Drawings: Required.

B. Welders Certificates: Required.

PART 2 PRODUCTS

2.1 MATERIALS - STEEL

A. Steel Sections: ASTM A36/A36M.

B. Steel Pipe: ASTM A53/A53M, Grade B Schedule 40.

C. Sheet Steel: ASTM A653/A653M, Grade 33 Structural Quality with galvanized coating.

D. Welding Materials: AWS D1.1; type required for materials being welded.

E. Shop Primer Touch-Up Primer: SSPC Paint 15, Type 1, red oxide.

F. Touch-Up Primer for Galvanized Surfaces: SSPC Paint 20.

G. Anchors:
   1. Threaded Type Concrete Inserts: Galvanized malleable iron or cast steel capable of receiving 3/4 inch diameter machine bolts.
   2. Slotted Type Concrete Inserts: Welded box type fabricated with minimum 1/8 inch thick galvanized pressed steel plate with slot to receive 3/4 inch diameter square head bolt and knockout cover.
   3. Expansion Shield for Masonry Anchorage: FS FF-2-325.
   4. Toggle Bolts: FS FF-B-588.

H. Fasteners General:
   1. Bolts, Nuts and Washers for Exterior Locations: ASTM A307, galvanized in accordance with ASTM A153.
   2. Bolts, Nuts and Washers for Interior Locations: ASTM A307, Grade A, regular hexagon head.
   3. Bolts, Round Head: ANSI B-18.5
   4. Wood Screws, Flat Head Carbon Steel: ANSI B-18.6.1.

5. Plain Washers, Helical Spring Type Carbon Steel: FS FF-W-

2.2 BOLLARDS

A. Bollards: Steel pipe, concrete filled, crowned cap, diameter and length as indicated on Drawings; prime paint, one coat.

B. Concrete Fill: 3,000 psi as specified in Section 03 30 00.

C. Anchors: Concealed type as indicated on Drawings.

2.3 FABRICATION

A. Verify dimensions on site prior to shop fabrication.

B. Fabricate items with joints tightly fitted and secured. Fabricate according to approved shop drawings, and to applicable portions of AISC Specifications.

C. Conceal welds where possible; grind exposed welds smooth and flush with adjacent finished surface. Ease exposed edges to small uniform radius.

D. Fit and shop assemble in largest practical sections, for delivery to site.

E. Grind exposed welds flush and smooth with adjacent finished surface. East exposed edges to small uniform radius.

F. Exposed Mechanical Fastenings: Flush countersink screws or bolts; unobtrusively located; consistent with design of structure, except where specifically noted otherwise.

G. Make exposed joints butt tight, flush, and hairline.

H. Supply components required for anchorage of metal fabrications. Fabricate anchorage and related components of same material and finish as metal fabrication, except where specifically noted otherwise.

2.4 FINISH

A. Clean surfaces of rust, scale, grease and foreign matter prior to finishing.

B. Do not prime surfaces in direct contact bond with concrete or where field welding is required.

C. Prime paint interior steel items scheduled with one coat of primer.

D. Galvanize exterior steel items and those touching exterior masonry walls to a minimum 1.25 ounces per square foot zinc coating in accordance with ASTM A123. Finish coating surface to be smooth, without irregularities, drip marks, or other roughness, ready for priming with minimal preparation required.

E. Preparation for Shop Priming: Prepare uncoated ferrous metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications.
1. Interiors (SSPC Zone 1A): SSPC-SP3 Power Tool Cleaning.

2. Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finish or to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated. Comply with requirements of SSPC-PA1 Paint Application Specification No. 1 for shop painting.
3. Lead free, alkyd primer: Manufacturer's standard.

PART 3 EXECUTION

3.1 EXAMINATION/PREPARATION

A. Verify that field conditions are acceptable and ready to receive work. Beginning of installation constitutes that erector accepts existing conditions.

B. Obtain Architect approval prior to site cutting or making adjustments not scheduled.

C. Clean and strip site primed steel items to bare metal where site welding is scheduled.

D. Make provisions for erection loads with temporary bracing. Keep work in alignment.

E. Supply items required to be cast into concrete or embedded in masonry with setting templates, to appropriate Sections.

3.2 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Perform field welding in accordance with AWS D1.1 or ASW D1.3, depending on substrate involved.

C. After installation, touch up field welds, scratched or damaged surfaces with primer.

D. Install stock manufactured items in accordance with manufacturer’s directions.

E. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors as required.

F. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installation of miscellaneous metal fabrications. Set metal fabrication accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

G. Provide temporary bracing or anchors in formwork for items that are to be built into concrete masonry or similar construction.

H. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Do not weld, cut or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.

I. Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, methods used in correcting welding work, and the following:
   1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
   2. Obtain fusion without undercut or overlap.
   3. Remove welding flux immediately.
   4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and contour of welded surface matches those adjacent.

3.3 ERECTION TOLERANCES

A. Maximum Variation from Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset from True Alignment: 1/4 inch.

3.4 FIELD QUALITY CONTROL

A. Welding: Inspect welds in accordance with AWS D1.1.

3.5 CLEANING

A. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC-PA 1 requirements for touch-up of field painted surfaces.
   1. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.

B. For galvanized surfaces clean welds, bolted connections and abraded areas and apply galvanizing repair paint to comply with ASTM A780.

END OF SECTION

SECTION 06 16 43

EXTERIOR GYPSUM SHEATHING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Exterior gypsum sheathing.

1.2 QUALITY ASSURANCE

A. Perform Work in accordance with GA-201 - Gypsum Board for Walls and Ceilings and GA-216 - Recommended Specifications for the Application and Finishing of Gypsum Board.

PART 2 PRODUCTS

2.1 COMPONENTS

A. Exterior Gypsum Sheathing Board: ASTM C1177 and ASTM D3273; 1/2 inch thick, maximum available size in place; ends square cut, square edges; water repellent paper faces, such as Dens Glass Gold by G-P Gypsum, or equal.

2.2 ACCESSORIES

A. Accessories: ASTM C1047; metal; corner beads, edge trim, and expansion joints.
   1. Metal Accessories: Galvanized steel.
   2. Edge Trim: Type U bead.

B. Joint Materials: ASTM C475, GA-201 and GA-216, reinforcing tape, joint compound, and water.

C. Gypsum Board Screws: ASTM C1002.

D. Glass Fiber Mesh Sheathing Tape: ASTM C920, type S.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify site conditions are ready to receive work.

3.2 INSTALLATION

A. Gypsum Sheathing:
   1. Install gypsum sheathing in accordance with GA-253, ASTM C1280 and manufacturer's instructions.
   2. Install boards with tight joints, with a 1/4 inch setback where abutting masonry to prevent wicking.
   3. Coordinate sheathing with flashing and joint sealant installation so materials are

installed in sequence that prevents exterior moisture from passing through completed exterior wall assembly.

4. Apply fasteners so screw heads bear tightly against face of sheathing boards but do not cut into facing.
5. Seal sheathing joints according to manufacturer's recommendations.
6. Cover or protect exterior gypsum sheathing within 30 days after installation, as required by manufacturer.

B. Joint Treatment:

1. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
2. Feather coats onto adjoining surfaces so camber is maximum 1/32 inch.
3. Taping, filling, and sanding is not required at surfaces behind adhesive applied porcelain tile.

C. Tolerances: Maximum Variation from Flat Surface: 1/8 inch in 10 feet in any direction.

END OF SECTION

SECTION 06 17 53

WOOD TRUSSES

PART 1 GENERAL

1.1 GENERAL

Provide manufactured wood trusses, valley trusses and framing anchors.

1.2 REFERENCE STANDARDS

A. TPI-78 "Design Specifications for Light Metal Plate Connected Wood Trusses", Truss Plate Institute, Des Plains, IL.

B. TPI-BWT-76 "Bracing Wood Trusses Commentary and Recommendations."

C. 2012 International Building Code with Arkansas Amendments.

1.3 SUBMITTALS

A. Provide for approval, design calculations for truss design stamped by Registered Engineer in the state of Arkansas.

B. Shop drawings indicating sizes, spacing and location of trusses and connections. Provide one reproducible (sepia) and 2 prints of each sheet.

PART 2 MATERIALS

2.1 TRUSSES

A. Shapes and configuration as shown on the plans.

B. Trusses shall be of sufficient strength to support the imposed live, dead and wind loads and impact loads, without exceeding, in any of its elements, the allowable stresses as required by the "2012 International Building Code" with Arkansas Amendments.

C. Maximum truss spacing 24 inches.

D. Truss design shall be as per "Design Specifications for Light Metal Plate Connected Wood Trusses" TPI-78, published by the Truss Plate Institute, Des Plains, IL.

E. Manufacturer shall provide truss anchors supports to resist the specified uplift.

F. Valley trusses shall distribute load into support trusses uniformly in order to prevent over-stressing the support truss.

2.2 ACCEPTABLE MANUFACTURERS

A. Truss manufacturer must be a member, in good standing, of the Truss Plate Institute, who subscribes to the "TPI In-Plant Quality Control Inspection Program."

PART 3 EXECUTION

3.1 Install in accordance with TPI "Quality Control Manual" QCM-77.

3.2 Brace in accordance with TPI "Bracing Wood Trusses; Commentary and Recommendations" BWT-76.

3.3 Anchorage for roof truss uplift shall resist wind loads as per the IBC code in excess of dead load.

END OF SECTION

SECTION 06 20 00

FINISH CARPENTRY

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Finish carpentry items.
   2. Hardware and attachment accessories.

1.2 SUBMITTALS

A. Shop Drawings: Required.

B. Product Data: Required for all hardware.

C. Samples: Required to show match to prefinished wood doors.

1.3 QUALITY ASSURANCE

A. Perform work in accordance with AWI Quality Standards, Custom Grade.

B. Surface Burning Characteristics: Maximum 24/450 flame spread/smoke developed index when tested in accordance with ASTM E84.

PART 2 PRODUCTS

2.1 STAINED VENEER MILLWORK

A. Exposed and Semi-Exposed Surfaces (stained veneer millwork): AWI Grade Custom.
   1. Species of Wood: Select white birch, to match prefinished wood doors.
   2. Cut or Slicing of Wood: Plain sliced.
   3. Matching of Individual Leaves to Each Other: Book matching.

B. Fully Concealed Surfaces: MDF. Particleboard is NOT acceptable.

2.2 LAMINATE CLAD MILLWORK

A. Laminate: NEMA LD 3, GP50 for horizontal surfaces, GP28 for vertical surfaces, CL20 for cabinet liner surfaces.
   1. Autotellers
      a. Faces: Pionite, Connected Cubes, AT440-SD
      b. Countertops: Nevamar, Aged Elements, EM6001-T
   2. Staff Lounge Faces: Formica, Beluga Beige

B. Particle Board: Industrial Grade.

2.3 ACCESSORIES

A. Adhesive for High Pressure Decorative Laminates: Type recommended by laminate manufacturer to suit application.

B. Concealed Joint Fasteners: Threaded steel.

C. Wood Filler: Tinted to match surface finish color.

D. Hardware:
   1. Hinges: Concealed style, nickel-plated steel finish.
   2. Pulls: Hardware Resources, Elements, Naples, #154SS; satin nickel finish.
      a. Drawers: Install horizontally.
      b. Doors: Install vertically.
   3. Latches: Concealed style, nickel-plated steel finish.
   4. Drawer Glides: Heavy duty, steel ball bearing, 100 lb. minimum, full extension.
   5. Shelf Supports: Change to bored holes and Hafele 5 mm double pin shelf support.
   6. Grommets: EDP with 2-1/2" hole; black finish. Mockett & Co. (800.523.1269)
   7. Waste Bin Glide: Hafele, Euro Cargo 45; pull-out, door mounted, 110 lb. capacity, with telescopic over extension ball bearing slides.

2.4 FABRICATION

A. Fabricate to AWI Custom standards, unless noted otherwise. Millwork is to be face frame only – frameless is NOT acceptable.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install work in accordance with AWI Custom quality standard, unless noted otherwise.

B. Set and secure materials and components in place, plumb and level.

C. Cover exposed edges of millwork with a 3/8 inch thick hardwood edging, where 1 x 2's are not shown. Taped edges are permissible only at edges of reveals.

D. Install hardware and adjust for smooth operation.

E. Preparation for Site Finishing:
   1. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth.
   2. Site Finishing: Refer to Section 09 90 00.

END OF SECTION

SECTION 06 61 16

SOLID SURFACING FABRICATIONS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Cast plastic fabrications.

1.2 SUBMITTALS

A. Shop Drawings: Show location of each item, dimensioned plans and elevations, large scale details, attachment devices and other components.
   1. Show full-size details, edge details, thermoforming requirements, attachments, etc.
   2. Show locations and sizes of furring, blocking, including concealed blocking and reinforcement specified in other Sections.

B. Product Data: Indicate product description, fabrication information and compliance with specified performance requirements.

C. Provide copy of fabricator’s certification from manufacturer.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data:
   1. Submit manufacturer’s care and maintenance data, including repair and cleaning instructions.
   2. Include in project closeout documents.

1.4 WARRANTY

A. Furnish five year manufacturer warranty.

1.5 MAINTENANCE

A. Furnish two containers of polishing cream.

PART 2 PRODUCTS

2.1 PLASTIC FABRICATIONS

A. Manufacturer/Style: Samsung, Adirondack Birch AB144

2.2 COMPONENTS

A. Solid Polymer Components:

1. Cast, nonporous, filled polymer, not coated, laminated or of composite construction with through body colors meeting ANSI Z124.3 or ANSI Z124.6 having minimum physical and performance properties specified.
2. Superficial damage to a depth of 0.010 inch (0.25 mm) shall be repairable by sanding and/or polishing.

B. Polishing Cream: Compatible polishing cream to achieve specified sheen to gel coat.

C. Core Framing: As shown on Drawings.

D. Adhesive: Manufacturer's standard type, cartridge dispensed, to create inconspicuous, nonporous joints.

E. Sealant: Manufacturer's standard mildew-resistant FDA-compliant, NSF 51-compliant, UL-listed silicone sealant in colors matching components.

2.3 FABRICATION

A. Shop Assembly:
1. Fabricate components to greatest extent practical to sizes and shapes indicated, in accordance with approved shop drawings and manufacturer's printed instructions and technical bulletins.
2. Form joints between components using manufacturer's standard joint adhesive without conspicuous joints. Reinforce with strip of solid polymer material, 2" wide.
3. Provide factory cutouts for plumbing fittings and bath accessories as indicated on Drawings.
4. Rout and finish component edges with clean, sharp returns.
   a. Rout cutouts, radii and contours to template.
   b. Smooth edges.
   c. Repair or reject defective and inaccurate work.

B. Thermoforming:
1. Comply with manufacturer's data.
2. Heat entire component. Material shall be uniform, between 275 and 325 degrees Fahrenheit during forming.
3. Form pieces to shape prior to seaming and joining.
4. Cut pieces to finished dimensions.
5. Sand edges and remove nicks and scratches.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with fabricator present for compliance with requirements for installation tolerances and other conditions affecting performance of work.

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

3.2 INSTALLATION

A. Install components plumb, level and rigid, scribed to adjacent finishes, in accordance with approved shop drawings and product data.
   1. Provide product in the largest pieces available.
   2. Form field joints using manufacturer's recommended adhesive, with joints inconspicuous in finished work.
      a. Exposed joints/seams shall not be allowed.
   3. Reinforce field joints with solid surface strips extending a minimum of 1 inch on either side of the seam with the strip being the same thickness as the top.
   4. Cut and finish component edges with clean, sharp returns.
   5. Rout radii and contours to template.
   6. Anchor securely to base cabinets or other supports.
   7. Align adjacent countertops and form seams to comply with manufacturer's written recommendations using adhesive in color to match countertop.
   8. Carefully dress joints smooth, remove surface scratches and clean entire surface.
   9. Install countertops with no more than 1/8-inch (3 mm) sag, bow or other variation from a straight line.

B. Repair or replace damaged work which cannot be repaired to Architect's satisfaction.

3.3 CLEANING AND PROTECTION

A. Keep components clean during installation.

B. Remove adhesives, sealants and other stains.

END OF SECTION

SECTION 06 62 16

QUARTZ SURFACING FABRICATIONS

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes horizontal countertops and bullnoses.

1.2 DEFINITION

A. Homogenous mixture containing 93% pure quartz with additions of high performance polyester resin pigments and special effects.

1.3 SUBMITTALS

A. Product Data: Required.

B. Shop Drawings:
1. Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices and other components.

C. Samples:
1. For each type of product indicated.
a. Submit minimum 6-inch by 6-inch sample in specified gloss.
b. Cut sample and seam together for representation of inconspicuous seam.
c. Indicate full range of color and pattern variation.
2. Approved samples will be retained as a standard for work.

D. Fabricator/Installer Qualifications:
1. Provide copy of certification number.

E. Maintenance Data:
1. Submit manufacturer’s care and maintenance data, including repair and cleaning instructions.
2. Include in project closeout documents.

1.4 QUALITY ASSURANCE

A. Qualifications:
1. Shop that employs skilled workers who custom fabricate products similar to those required for this project and whose products have a record of successful in-service performance.

B. Fabricator/installer qualifications:
1. Work of this section shall be by a certified fabricator/installer, certified in writing by the manufacturer.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver no components to project site until areas are ready for installation.

B. Store components indoors prior to installation.

C. Handle materials to prevent damage to finished surfaces.
   1. Provide protective coverings to prevent physical damage or staining following installation for duration of project.

1.6 WARRANTY

A. Provide manufacturer's warranty against defects in materials.
   1. Warranty shall provide material and labor to repair or replace defective materials.
   2. Damage caused by physical or chemical abuse or damage from excessive heat will not be warranted.
   3. Warranty shall be transferable to subsequent owner for remainder of warranty period.

B. Manufacturer's warranty period:
   1. Ten years from date of substantial completion.

1.7 MAINTENANCE

A. Provide maintenance requirements as specified by the manufacturer.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Manufacturer/Style: Cambria, Bradford.

2.2 MATERIALS

A. Quartz Components: Homogenous mixture containing 93% pure quartz with additions of high performance polyester resin, pigments and special effects.

B. Thicknesses: 2 cm with 4 cm edge.

C. Edge treatment: As indicated on Drawings.

D. Finish: High gloss.

2.3 ACCESSORIES

A. Mounting Adhesive: Structural grade "50 year" silicone or epoxy adhesive.

B. Surface Adhesive: Epoxy or polyester.

C. Joint Sealant: Clear sealant of type recommended by manufacturer for application and use.

2.4 FABRICATION

A. Layout surfaces to minimize joints and avoid L-shaped pieces of quartz surfacing. Layout and fabricate with hairline joints.

B. Inspect materials for defects prior to fabrication.

C. Cut and polish with water cooled powered tools.

D. Cutouts to have minimum of 3/8 inch radius.

E. Where edges of cutouts will be exposed in finished work, polish edges.

F. Laminate layers of quartz surfacing as required to create built up edges following procedures recommended by the manufacturer.

G. Fabrication must be by a certified fabricator, certified in writing by the manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with fabricator present for compliance with requirements for installation tolerances and other conditions affecting performance of work.

B. Verify dimensions by field measurements prior to installation.

C. Verify that substrates supporting quartz surfaces are plumb, level and flat to within 1/8 inch in 10 feet and that all necessary supports and blocking are in place.

D. Clean surfaces prior to installation. Protect finished surfaces from scratches. Apply masking where necessary. Take necessary precautions to prevent dirt, grit, dust and debris from other trades from contacting the surface.

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

3.2 INSTALLATION

A. Installation must be by a certified installer, certified in writing by the manufacturer.

B. Install materials in accordance with manufacturer's instructions and approved shop drawings.

C. Position materials to verify the correct size. If size adjustments or additional fabrication is necessary, use water cooled tools. Protect jobsite and surface from dust and water.

D. Allow gaps for expansion of not less than 1/8 inch per ten feet when installed between walls or other fixed structure.

E. Clean substrate. Remove loose and foreign matter which may interfere with adhesion. Clean backside and joints with denatured alcohol. Apply continuous bead of mounting adhesive around perimeter of structural substrate and supports on horizontal surface. Apply continuous bead of mounting adhesive around perimeter of vertical surfaces. In addition, apply ¼ inch mounting adhesive bead every 8 inches on vertical center.

F. Install quartz surfacing plumb, level, square and flat to within 1/8 inch in ten feet, non-cumulative. Align adjacent pieces in same plane.

G. Joints:
   1. Joints between Adjacent Pieces of Quartz Surfacing:
      a. Joints to be flush, tight fitting, level and neat.
      b. Securely join adjacent pieces with two part acrylic adhesive.
      c. Fill joints level to polished surface.
      d. Secure adjacent quartz surfaces with vacuum clamps until adhesive hardens.

3.3 REPAIR

A. Replace or repair damaged material to like new condition.

3.4 CLEANING AND PROTECTION

A. Remove masking, excessive adhesive and sealants. Clean exposed surfaces with denatured alcohol.

B. Protect installed fabrications with non-staining sheet coverings.

END OF SECTION

SECTION 07 19 00

WATER REPELLENTS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes water repellent coating applied to exterior brick and precast surfaces.

1.2 REFERENCES

A. ASTM International:
1. ASTM D1653 - Standard Test Method for Water Vapor Transmission of Organic Coating Films.
2. ASTM E514 - Standard Test Method for Water Penetration and Leakage Through Masonry.
3. ASTM G154 - Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials.

1.3 SYSTEM DESCRIPTION

A. Applied Penetrant: Material to restrict moisture absorption in material being treated as recommended by manufacturer for specific substrate.

1.4 SUBMITTALS

A. Section 01 33 00: Submittal procedures.

B. Product Data: Submit details of product description, tests performed, limitations to coating, and chemical properties including percentage of solids.

C. Manufacturer's Installation Instructions: Submit special procedures and conditions requiring special attention, and cautionary procedures required during application.

D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Applicator: Company specializing in performing Work of this section with minimum three years experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.

B. Protect coating liquid from freezing.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements.

B. Do not apply coating when ambient temperature is lower than 50 degrees F (10 degrees C) or higher than 100 degrees F (38 degrees C) for 24 hours before and after application.

C. Do not apply coating when wind velocity exceeds manufacturer recommendations.

1.8 WARRANTY

A. Section 01 70 00 - Execution and Closeout Requirements: Product warranties and product bonds.

B. Furnish two year manufacturer warranty for water repellents.

PART 2 PRODUCTS

2.1 WATER REPELLENTS

A. Manufacturers:
   1. Tnemec Chemprobe, Prime –a-Pell 200
   2. ProSoCo, Sure Klean Weather Seal, Pre-mixed.
   3. Substitutions: Section 01 60 00 - Product Requirements.

2.2 COMPONENTS

A. Siloxane Water Repellent: Siloxane penetrating type water repellent.
   1. Moisture Vapor Transmission: Maximum 28.33 perms or 50% compared to untreated surfaces, ASTM D1653.
   2. Resistance to Accelerated Weathering: No loss in repellency after 2,500 hours, ASTM G154.
   3. Reduction of Leakage: Minimum 97 percent water penetration and leakage, ASTM E514.
   4. Apply to clay brick and precast surfaces.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify joint sealants are installed and cured.

C. Verify surfaces to be coated are dry, clean, and free of efflorescence, oil, or other matter detrimental to application of coating.

3.2 PREPARATION

A. Delay Work until masonry mortar and concrete substrate is cured minimum of 60 days.

B. Remove loose particles and foreign matter.

C. Remove oil or foreign substance with chemical solvent which will not affect coating.

D. Scrub and rinse surfaces with water and let dry.

3.3 APPLICATION

A. Apply at rate recommended by manufacturer.

3.4 PROTECTION OF INSTALLED CONSTRUCTION

A. Section 01 70 00 - Execution and Closeout Requirements: Protecting installed construction.

B. Protect adjacent surfaces not scheduled to receive coating.

C. Protect adjacent construction and landscaping, property, and vehicles.

D. When applied to unscheduled surfaces, remove immediately by methods as instructed by coating manufacturer.

END OF SECTION

SECTION 07 21 00

THERMAL INSULATION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Board thermal insulation at perimeter foundation wall, and exterior wall behind wall finish.
2. Batt thermal insulation in ceilings, exterior wall construction.

1.2 SUBMITTALS

A. Product Data: Required.

1.3 QUALITY ASSURANCE

A. Insulation Installed in Concealed Locations Surface Burning Characteristics: 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.

B. Apply label from agency approved by authority having jurisdiction to identify each insulation material.

PART 2 PRODUCTS

2.1 BUILDING INSULATION

A. Extruded Polystyrene Insulation: ASTM C578 Type VI, cellular type.
1. Foundation: Dow Styrofoam Square Edge
a. Thermal Resistance: R of 10.
b. Thickness: 2 inches at foundation.
c. Compressive Strength: Minimum 25 psi.
d. Edges: Square.
e. ASTM C578 Type IV: Meets IBC/IRC requirements for foam plastic insulation.
2. Exterior Walls: Dow Styrofoam Cavity Mate
a. 3/4 inch at exterior walls.
b. R Value: 3.8
c. Edges: Square edges.
d. Compressive Strength: 15 psi.
e. ASTM C578 Type X. Meets IBC/IRC requirements for foam plastic insulation.

B. Batt Insulation: ASTM C665, preformed mineral fiber.
1. Thermal Resistance: R of 19.
2. Facing: Unfaced.

2.2 ACCESSORIES

A. Adhesive: Type recommended by insulation manufacturer for application.

B. Tape: Self-adhering type.

PART 3 EXECUTION

3.1 INSTALLATION

A. Foundation Perimeter - Board Insulation:
   1. Adhere polyethylene sheet over substrate joints.
   2. Apply adhesive and install boards on foundation perimeter.
   3. Place protective boards over exposed insulation surface.

B. Exterior Walls - Board Insulation:
   1. Adhere polyethylene sheet over substrate joints.
   2. Apply adhesive to full bed and install boards on walls.
   3. Tape insulation board joints.

C. Batt Insulation:
   1. Install in exterior walls without gaps or voids.
   2. Attach flanges of facing to framing members.

END OF SECTION

SECTION 07 24 00

EXTERIOR INSULATION AND FINISH SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Drainable exterior insulation and finish system applied to walls over sheathing substrate.

1.2 SUBMITTALS

A. Shop Drawings: Required.

B. Product Data: Required.

C. Samples: Required.

1.3 MOCKUP

A. Construct mock-up including insulation, substrate, surface finish, color, texture, perimeter and control joints, and typical interface with adjacent construction.

PART 2 PRODUCTS

2.1 EXTERIOR INSULATION AND FINISH SYSTEM

A. Manufacturers:
1. Dryvit Systems, Inc., Outsulation Plus MD.
2. Senergy BASF Wall Systems Inc..
3. STO Corporation.
4. Parex
5. Substitutions: Not Permitted.

2.2 COMPONENTS

A. Expanded Polystyrene Board Insulation: ASTM C578, conforming to the following:
1. Thickness: 1 inch thick, or as indicated.
2. Thickness Tolerance: 1/32 inch maximum.
3. Board Size: 24 x 48 inch.
4. Board Size Tolerance: 1/16 inch from square and dimension.
5. Edges: Square.
6. Flame/Smoke Properties: 25/450 in accordance with ASTM E84 and UL 723.

B. Air/Water Barrier: Polymer-based non-cementitious water-resistive coating and air barrier. Provide Grid Tape at all joints and water resistive coating at all screwholes.

C. Flashing Materials: Flexible water-based polymer material, with mesh.

D. Drainage Track: ASTM D 1784; UV treated PVC “J” channel perforated with weep holes, for use at base of system. Provide drainage strip at all other horizontal terminations and manufacturer’s recommended adhesive to adhere drainage strip and track.

E. Primer Base/Adhesive: Compatible with air/water barrier, as recommended by manufacturer.

F. Reinforcing Mesh: Interwoven glass fiber mesh, types as recommended by manufacturer for each location and substrate.
1. Standard Mesh: Minimum 4.0 oz/sq yd; at all other locations excluding columns.
2. Impact-Resistant Mesh: Minimum 15.0 oz/sq yd; for use at columns.

G. Coating: Water - based, acrylic coating, factory mixed, with integral color and texture.

H. Cement: ASTM C 150, Type 1, Portland Cement.

I. Water: Clean and potable.

J. Colors and Texture: To match precast units.

2.3 ACCESSORIES

A. Insulation Adhesive: Recommended by manufacturer.

B. Trim and Control Joints: Extruded plastic.

C. Sealant Materials: As specified in Section 07 90 00.

PART 3 EXECUTION

3.1 INSTALLATION

A. Insulation:
1. Secure boards to substrate by adhesive.
2. Place boards in a method to maximize tight joints. Stagger vertical joints. Butt edges and ends tight to adjacent board and to protrusions.
3. Rout to design as indicated on Drawings.

B. Coatings:
1. Install trim and control joints.
2. Apply primer/adhesive and fully embed reinforcement.
3. Apply finish coat. Finish to uniform texture and color.
4. Seal perimeter and control joints.

END OF SECTION

SECTION 07 53 00

THERMOPLASTIC-POLYOLEFIN ROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Adhered membrane roofing system.
   2. Cover board.
   3. Rigid insulation board.

1.2 DEFINITIONS

A. Roofing Terminology: Refer to ASTM D 1079 “Terminology Relating to Roofing and Waterproofing”; glossary of NRCA's "The NRCA Roofing and Waterproofing Manual"; and the Roof Consultants Institute “Glossary of Roofing Terms” for definition of terms related to roofing work in this Section.

B. Sheet Metal Terminology and Techniques: SMACNA Architectural Sheet Metal Manual.

1.3 PERFORMANCE REQUIREMENTS

A. General: Provide installed roofing membrane and Flashings that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.

B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing membrane manufacturer based on testing and field experience.

C. Jobsite Safety: Execute all operations and provide a safe work environment in accordance to OSHA standards and regulations. This requirement applies to all contractor personnel, associated subcontractors, workers in other trades, and jobsite visitors.
   1. Follow all industry fire prevention guidelines for storage of materials, staging areas, roof access, and application means and methods.
   2. Any applicable local fire codes supersede industry guidelines.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other Work.
   1. Flashings and membrane terminations.
   2. Insulation fastening patterns.
   3. Sheet layout with perimeter and corner defined.

C. Installer Certificates:
   1. Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install roofing system as specified. Provide

documentation complying with “Quality Assurance” as specified in Paragraph 1.6 of this Section.

2. Installer shall submit documentation that there are no undocumented workers being employed by their company and that all workers on this project are covered by workmen’s compensation.

D. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
   1. Submit evidence of meeting performance requirements.

E. Qualification Data: For Installer and manufacturer.

F. Maintenance Data: For roofing system to include in maintenance manuals.

G. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive the specified manufacturer's warranty.

B. Manufacturer Qualifications: A qualified manufacturer for membrane roofing system identical to that used for this Project.

C. Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.

D. Source Limitations: Obtain all components from single source roofing manufacturer.

E. Fire-Test-Response Characteristics: Provide membrane roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, FMG, or another testing and inspecting agency acceptable to authorities having jurisdiction. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.
   1. Exterior Fire-Test Exposure: Class “A”; ASTM E 108, for application and roof slopes indicated.
   2. Fire-Resistance Ratings: ASTM E 119, for fire-resistance-rated roof assemblies of which roofing system is a part.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
   1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

E. Keep all adhesives, sealants, primers and cleaning materials away from all sources of ignition.

F. Consult container labels and material safety data sheets (msds) for specific safety instructions.

1.7 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.8 WARRANTY

A. Comply with all warranty procedures required by manufacturer, including notifications, scheduling, and inspections.

B. Red Shield no dollar limit, non-prorated warranty from the manufacturer of the roofing mem brane as follows with no exceptions.
   1. Warranty coverage: 20-years, no dollar limit.
   2. Warranty shall be transferable and transfer cannot be at manufacturer’s discretion nor require an inspection but shall be transferable upon notification in writing to manufacturer and payment of the standard transfer fee.
   3. Warranty coverage to include: roofing membranes, insulation, fasteners, clips, adhesives, accessories, and edge metal/coping system.
   4. The warranty shall cover metal finishes, materials, labor and correct and incorrect workmanship on system installation, seaming and/or flashing. Manufacturer cannot exclude unapproved details or workmanship. Also includes accidental cuts and punctures
   5. All roofing systems tie-ins, flashing and terminations must be covered under the Waranty.
   6. Warranty will begin upon completion of the project and warranty application procedures and cannot defer warranty coverage to installing contractor for any period of warranty coverage.

C. Inspect roof system at completion of installation. Manufacturer cannot deny coverage for any items not installed in compliance with manufacturer’s application requirements and standards after warranty is issued or as a part of terms and conditions of the warranty. The manufacturer’s technical field representative/inspector will conduct final inspections. The manufacturer field representative must be a non-sales employee of the roofing system manufacturer who is responsible for field quality control and contractor training.

D. General Contractor and Roofing Subcontractor: Required to jointly and separately provide written guarantee that the roofing and flashing will be weathertight and free from defects in materials and workmanship for a period of 2 years from Final Acceptance Date.
   1. Leaks and defects include blistering, fishmouths, ridging, splits, open laps, buckles, wrinkles and slippage. Make corrections at Contractor's expense during guarantee

period.

2. Roofing inspection and written acceptance by manufacturer, Architect, and Owner will be required. In addition, roofing subcontractor is to schedule a joint inspection by above named parties 60 days prior to expiration of 2 year guarantee and correct defects complying with original specifications.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Description: Reinforced, ULTRAPLY TPO synthetic single-ply membrane composed of Thermoplastic Polyolefin polymer, and Ethylene Propylene Rubber.
   1. Membrane Type: .060 Reinforced TPO OR .060 Reinforced TPO SA

Testing	Minimum Values	Typical values (SI Units)
Thickness, min, mm (in.)		
Sheet-overall	1.0 (0.039)	0.060± 10%
Coating over scrim	0.015”	0.021”± 10%
Tensile strength, min, MPa (psi)	NA	
Breaking strength, min, kN (lbf)	220 lbf	390 lbf
Elongation, ultimate, min, %	NA	
Elongation at break, min, %	15%	25%
Tensile set, max, %	NA	
Tear strength, min, kN/m (lbf/in.)	NA	
Tearing strength, min, N (lbf)	55 lbf	120 lbf
Brittleness point, max, °C (°F)	-40	Pass
Ozone resistance, no cracks	Pass	Pass
Properties after heat aging: (retained values)		
Tensile strength, % min	NA	
Breaking strength, % min	90%	90%
Elongation, ultimate, % min	NA	
Elongation at break, % min	90%[A]	90%
Tear strength ,% min	NA	
Tearing strength, % min	60% min	>60%
Weight Change (Mass), max %	±1% max	<1%
Linear dimensional change, max, %	±1% max	<1%
Water absorption, max, mass %	±3%	<3%
Factory seam strength, min, kN/m (lbf/in.)	75% of Sheet strength	75% of Sheet strength

2.2 AUXILIARY MATERIALS

A. Membrane Adhesive: UltraPly Bonding Adhesive; Butyl-based, formulated for compatibility with the ULTRAPLY TPO membrane and a wide variety of substrate materials, including masonry, wood, insulation facings.

B. Curb and Parapet Flashing: Same material as membrane, with encapsulated edge which eliminates need for seam sealing the flashing-to-roof splice; precut to 18 inches (457 mm) wide.

C. Formable Flashing: Non-reinforced, flexible, heat weldable sheet, composed of thermoplastic polyolefin polymer and ethylene propylene rubber.
   1. Thickness: 0.060 inch plus/minus 10 percent.
   2. Tensile Strength: 1550 psi (10.7 MPa), minimum, when tested in accordance with ASTM D 638 after heat aging.
   3. Elongation at Break: 650 percent, minimum, when tested in accordance with ASTM D 638 after heat aging.
   4. Tearing Strength: 12 lbf (53 N), minimum, when tested in accordance with ASTM D 1004 after heat aging.
   5. Color: White.
   6. Acceptable Product: ULTRAPLY TPO Flashing by Firestone.

D. Tape Flashing: 5-1/2 inch (140 mm) nominal wide TPO membrane laminated to cured rubber polymer seaming tape, overall thickness 0.065 inch (1.6 mm) nominal; TPO QuickSeam Flashing by Firestone.

E. Pourable Sealer: Two-part polyurethane, two-color for reliable mixing; Pourable Sealer by Firestone.

F. Seam Plates: Steel with barbs and Galvalume coating; corrosion-resistance complying with FM 4470.

G. Termination Bars: Aluminum bars with integral caulk ledge; 1.3 inches (33 mm) wide by 0.10 inch (2.5 mm) thick; Firestone Termination Bar by Firestone.

H. Cut Edge Sealant: Synthetic rubber-based, for use where membrane reinforcement is exposed; UltraPly TPO Cut Edge Sealant by Firestone.

I. General Purpose Sealant: EPDM-based, one part, white general purpose sealant; UltraPly TPO General Purpose Sealant by Firestone.

J. Molded Flashing Accessories: Unreinforced TPO membrane pre-molded to suit a variety of flashing details, including pipe boots, inside corners, outside corners, etc.; UltraPly TPO Small and Large Pipe Flashing by Firestone.

2.3 ROOF INSULATION AND COVER BOARDS

A. Polyisocyanurate Board Insulation: Closed cell polyisocyanurate foam with glass-reinforced mat laminated to faces, complying with ASTM C 1289 Type I Class 1, with the following additional characteristics:
   1. Thickness: As shown on Drawings.
   2. Size: 48 inches by 96 inches, nominal.
   3. Compressive Strength: 20 psi (138 kPa) when tested in accordance with ASTM C1289.

4. Ozone Depletion Potential: Zero; made without CFC or HCFC blowing agents.
5. Recycled Content: 19 percent post-consumer and 15 percent post-industrial, average.

B. Cover Board: Dens Deck with the following additional characteristics:
1. Size: 48 inches by 96 inches, nominal.
2. Thickness: 1/4".
3. Water Absorption: ASTM C 209.
4. Water Vapor Transmission of Materials: ASTM E 96.
5. Compressive Strength: ASTM D 1621.
6. Density: ASTM D 1622.
7. Dimensional Stability: ASTM D 2126.
8. Flame Spread: ASTM E 84.
9. Attachment: Mechanical fastening thru insulation board.

2.4 INSULATION ACCESSORIES

A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatible with membrane roofing.

B. Provide factory preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

C. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roof insulation to substrate, and provided by roofing system manufacturer.

D. Crickets: ASTM C 1289; provide factory-tapered insulation boards fabricated to slope of ¼" per foot unless otherwise indicated. Product must be manufactured by company providing roofing system warranty.

2.5 ACCESSORY MATERIALS

A. Wood Nailers: PS 20 dimension lumber, Structural Grade No. 2 or better Southern Pine, Douglas Fir; or PS 1, APA Exterior Grade plywood; pressure preservative treated in accordance with Section 06 10 00.
1. Width: 3-1/2 inches nominal minimum, or as wide as the nailing flange of the roof accessory to be attached to it.
2. Thickness: Same as thickness of roof insulation.
3. Reference Standards:
a. Southern Pines: PS 20; SPIB Grading Rules.
b. Western Woods: PS 20; WWPA Grading Rules
c. Plywood: PS 1; APA Grade Stamps.
d. Pressure preservative treatment: AWPB LP2.

B. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer.

C. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, termination reglets, cover strips, and other accessories.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine roof deck to determine that it is sufficiently rigid to support roofers and their mechanical equipment and that deflection will no strain or rupture roof components or deform deck.

B. Verify that surfaces and site conditions are ready to receive work. Correct defects in the substrate before commencing with roofing work.

C. Examine roof substrate to verify that it is properly sloped to drains.

D. Start work with sealants and adhesives at 60□ - 80□ F.

E. Fumes from adhesive solvents may be drawn into the building during installation through rooftop intakes. Appropriate measures must be taken to assure that fumes from adhesive solvents are not drawn into the building through air intakes.

F. The surface must be clean, dry, smooth, free of sharp edges, fins, loose or foreign materials, oil, grease and other materials that may damage the membrane, All roughened surfaces, which could cause damage, shall be properly repaired before proceeding.

G. All surface voids of the immediate substrate greater than 1/4" wide must be properly filled with an acceptable insulation or suitable fill material.

3.2 PROTECTION OF OTHER WORK

A. Protect metal, glass, plastic, and painted surfaces from adhesives and sealants.

B. Protect neighboring work, property, cars, and persons from spills and overspray from adhesives, sealants and coatings and from damage related to roofing work.

C. Protect finished areas of the roofing system from roofing related work traffic and traffic by other trade.

3.3 PREPARATION

A. Proceed with installation only after unsatisfactory conditions have been corrected. Beginning of installation constitutes acceptance of substrate and all conditions.

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

3.4 INSULATION AND COVER BOARD INSTALLATION

A. General:
   1. Install only as much insulation as can be covered with the completed roofing system before the end of the day's work or before the onset of inclement weather.
   2. Lay roof insulation in courses parallel to roof edges.
   3. Neatly fit insulation to all penetrations, projections, and nailers. Fit insulation tightly, with gaps not greater than 1/4". Fill all gaps greater than 1/4" with acceptable insulation. Under no circumstances shall the roofing membrane be left unsupported over a

space greater than 1/4". Install tapered insulation around roof drains so as to provide proper slope for drainage. Miter roof insulation edges at ridge, valley and other similar non-planar conditions.

4. When installing multiple layers of insulation, stagger all joints between layers at least 6 in.

B. Attach base layer, top layer, crickets, and cover board with Firetone Insulation Adhesive at a rate specified by the roofing manufacturer to meet the required Warranty requirements.

C. Comply with membrane roofing system manufacturer's written instructions for installing roof cover board.

D. Install cover board with long joints of cover board in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch (6 mm) with cover board.

1. Cut and fit cover board within 1/4 inch of nailers, projections, and penetrations.

E. Trim surface of cover board where necessary at roof drains so completed surface is flush and does not restrict flow of water.

1. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.

F. Place board into the adhesive while it is still tacky. If adhesive reaches its tack-free state, remove and re-apply adhesive.

G. Press the thermal protective layer into the adhesive to a firm and uniform bearing.

1. Use ballast on all four corners of the board for a minimum of 30 minutes to ensure contact of material and adhesive, if necessary.

3.5 ADHERED ROOFING MEMBRANE INSTALLATION

A. Install roofing membrane over area to receive roofing according to membrane roofing system manufacturer's written instructions. Unroll roofing membrane and allow to relax before installing.

B. Starting at the low point of the roof, place the membrane panels without stretching over the acceptable substrate. Position subsequent membrane sheets in the same manner, overlapping the ends of adjoining sheets a minimum of 3" and side laps a minimum of 6". Install panels to ensure that laps shed water.

C. Where UltraPly TPO Membrane has been cut to expose reinforcing membrane, Firestone's UltraPly TPO Cut Edge Sealant or UltraPly TPO General Purpose Sealant must be used to encapsulate exposed edge.

3.6 MEMBRANE LAP SPLICING

A. Lap splice areas that have been contaminated must be wiped down with a dry or damp (water only) clean cloth prior to heat welding and allow to completely dry.

B. All field and flashing splices on the horizontal surface shall be completed using an automatic heat welder that has been designed for hot air welding of thermoplastic Olefin membranes.

C. Hand held welders are only to be used on vertical welds or where an automatic welder is not practical or cannot be used.

D. Seams made with the automatic welder shall be a minimum of 1-1/2" wide. Seams made with hand welders shall be a minimum of 2" wide. Use 2" side silicone or silicone coated steel hand rollers to assure proper mating of surfaces a s hand heat welding proceeds.

E. Probe all completed welds using a slotted screwdriver or cotter pin puller type tool to verify seam integrity. Do not probe welds until they have had time to cool to ambient conditions. Any welds found to be insufficiently welded need to be repaired on a daily basis.

3.7 MEMBRANE SECUREMENT

A. Secure membrane at all locations where the membrane terminates or goes through an angle change greater than 1" in 12" except for round pipe penetrations less than 18" in diameter and square penetrations less than 4" square.
   1. Mechanically fasten Firestone Seam Plates with Firestone Fasteners in accordance with Firestone Details.
   2. Install UltraPly membrane as flashing.

3.8 FLASHING - PENETRATIONS

A. General:
   1. Flash all penetrations passing through the membrane.
   2. The flashing seal must be made directly to the penetration.

B. Pipes, Round Supports, etc.:
   1. Flash with Firestone Pre-Molded UltraPly TPO Pipe Flashings where practical
   2. Flash using UltraPly TPO unsupported Flashing membrane when Pre-Molded Flashing is not practical.

C. Structural Steel Tubing:
   1. Use a field fabricated pipe-flashing detail provided that the minimum corner radius is greater than1/4" and the longest side of the tube does not exceed 12". When the tube exceeds 12: use a standard curb detail.

D. Roof Drains:
   1. Provide a clean even finish on the mating surfaces between the clamping ring and the drain bowl.
   2. Taper insulation around the drain to provide a smooth transition from the roof surface to the drain. Use pre-manufactured tapered insulation with facer or suitable bonding surface to achieve slope. Slope shall not exceed Firestone recommendations.
   3. Position the UltraPly TPO membrane, then cut a hole for the food drain to allow 1/2" - 3/4" of membrane extending inside the clamping ring past the drain bolts.
   4. Make round holes in the UltraPly TPO membrane to align with clamping bolts. Do not cut the membrane back to the bolt holes.
   5. Place Water Block Seal on top of drain bowl where the clamping ring seats below membrane.
   6. Install the roof drain clamping ring and clamping bolts. Tighten the clamping bolts to achieve constant compression.

E. Pipe Clusters and Unusual Shaped Penetrations:
   1. Fabricate penetration pockets to allow a minimum clearance of 1" between the penetration and all sides.
   2. Secure penetration pockets per Firestone Details.
   3. Fill penetration pockets with Pourable Sealer, so as to shed water.

F. Hot Pipes:
   1. Protect the UltraPly TPO components from direct contact with steam or heat sources when the in-service temperature is in excess of 140 □F. In all such cases flash to an intermediate insulated "cool" sleeve per Firestone details.

G. Flexible Penetrations:
   1. Provide a weather tight gooseneck set in Water Block Seal and secured to the deck.
   2. Flash in accordance with Firestone Details.

3.9 FLASHING - WALLS, PARAPETS, MECHANICAL EQUIPMENT CURBS, SKYLIGHTS, etc.

A. General: Using the longest pieces practical, flash all walls, parapets, curbs, etc., a minimum of 8" high per Firestone Details.

B. Evaluate the substrate and overlay per Firestone specifications as necessary.

C. Apply UltraPly TPO Bonding Adhesive at about the same time to both the membrane flashing and the surface to which it is being bonded so as to allow approximately the same drying time. Apply Bonding Adhesive by rolling the adhesive on to the mating surfaces evenly, avoiding globs or puddles.

D. Allow UltraPly TPO Bonding Adhesive to flash off until tacky. Touch the Bonding Adhesive surface with a clean, dry finger to be certain that the adhesive does not stick or string. As you are touching the adhesive, pushing straight down to check for stringing, also push forward on the adhesive at an angle to ensure that the adhesive is ready throughout its thickness. If either motion exposes wet or stringy adhesive when the finger is lifted, then it is not ready for mating. Flash off time will vary depending on ambient air conditions.

E. Roll the flashing into the adhesive evenly and carefully so as to minimize wrinkles.

F. To ensure proper contact, compress the flashing to the substrate with a stiff push broom.

G. Complete the splice between membrane flashing and the main roof sheet by hot air welding. Provide lap splices in accordance with Firestone Details.

H. Provide termination directly to the vertical substrate as shown in Firestone Details.

I. Install UltraPly TPO T-Joint covers at field and flashing splice intersections as required by Firestone.

J. Install intermediate flashing attachment as required by Firestone Specifications and Details.

3.10 FLASHING - GRAVEL STOPS OR ROOF EDGE METALS

A. Flash all gravel stops or roof edges using as outlined in Firestone Details.

3.11 TEMPORARY CLOSURE (NOT WARRANTED BY FIRESTONE)

A. Temporary closures, which ensure that moisture does not damage any completed section of the new roofing system, are the responsibility of the roofing contractor. Completion of flashings, terminations, and temporary closures shall be completed as required to provide a watertight condition.

3.12 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed as required by the manufacturer.

B. Correct identified defects or irregularities.

3.13 CLEAN-UP

A. Clean all contaminants from building and surrounding areas.

B. Remove trash, debris, equipment from project site and surrounding areas.

C. Repair or replace damaged building components or surrounding areas to the satisfaction of the building owner.

END OF SECTION

SECTION 07 61 00

METAL ROOFING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Pre-finished galvanized sheet steel roofing, associated flashings, and underlayment.
2. Roof insulation.
3. Snow guards.

B. Related Sections:
1. Section 07 62 00 - Sheet Metal Flashing and Trim.

1.2 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures.

B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

C. Product Data: Submit data on metal types, finishes, and characteristics, and roofing accessories.

D. Samples: Submit samples for selection by Architect.

1.3 QUALITY ASSURANCE

A. Perform Work in accordance with SMACNA Architectural Sheet Metal Manual requirements and standard details, except as otherwise noted.

1.4 QUALIFICATIONS

A. Fabricator and Installer: Company specializing in sheet metal roof installations with minimum three years experience.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.

B. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

C. Prevent contact with materials causing discoloration or staining.

1.6 WARRANTY

A. Section 01 70 00 - Execution and Closeout Requirements: Product warranties and product bonds.

B. Installer's and General Contractor's Co-signed Warranty:

1. Furnish, in duplicate, on company's printed letterhead, the following written warranty before final payment will be made:

A New Branch for
1st Community Bank
Brookland, AR

We guarantee to promptly repair and replace without further cost to the Owner, the whole or any part of the materials which prove defective through workmanship or improper materials within two (2) years of the date of final acceptance of the building.

This includes damage to the building caused by defective workmanship and/or improper materials or that which is caused by repair or replacement of defective materials or workmanship.

This guarantee is jointly and severally warranted by:

Signed: _____

(Roofing Subcontractor)

_____

General Contractor)

C. Manufacturer's Warranties:
1. Provide one year materials warranty.
2. Provide 20 year non-prorated warranty for roof panels against rupture, structural failure or perforation.
3. Provide 20 year non-prorated warranty for film integrity – panels will not:
   a. Chalk, crack, check, peel, flake or blister in excess of ASTM D659, #8 rating.
   b. Fade in excess of 5 units per ASTM D2244.

PART 2 PRODUCTS

2.1 SHEET METAL ROOFING

A. Manufacturer: McIlroy Metal, Medallion Lok is specified as a building standard. Equal or superior products will be considered for substation in accordance with Section 01 60 00.

B. Product Description: Standing seam metal roofing; prefinished, ribbed with snap-on seam cap with factory installed vinyl weather seal.

2.2 COMPONENTS

A. Pre-Finished Galvanized Steel Sheet: ASTM A755; structural steel sheet, G90 zinc coating; 24 gage, shop pre-coated with three coat fluoropolymer top coat.

B. Color: Slate Gray.

C. Panel Width: 18”.

D. Striations: Pencil Rib.

2.3 ACCESSORIES

A. Insulation: ASTM C1289; closed cell polystyrene foam core bonded to fiber reinforced facers on one side and 5/8” oriented strand board on other, such as H-Shield NB as manufactured by Hunter Panels (888.746.1114); Minimum R 25.

B. Fasteners: Same material and finish as roofing metal, with soft neoprene washers.

C. Underlayment: ASTM D226; Type II, No. 30 unperforated asphalt felt.

D. Slip Sheet: Rosin sized building paper.

E. Protective Backing Paint: Zinc molybdate alkyd.

F. Sealant: Refer to Section 07 90 00.

G. Plastic Cement: ASTM D4586, Type I.

H. Ice Dam Membrane: Bitec Ice and Water Shield, or approved equal.

I. Ridge Vent (at drive-thru roof only): V400E by Cor-A-Vent, or approved equal. Provide 17 sq. inches per lineal foot net free vent area.

J. Snow Retention System:
   1. Manufacturer: S5!
   2. Snow Retention System: Colorguard, with strip of roofing material to match roofing panels.
   3. Clamp: S5U.

2.4 FABRICATION

A. Form components to shape as indicated on Drawings, accurate in size, square, and free from distortion or defects.

B. Fabricate cleats and starter strips of same material as sheet, to interlock with sheet.

C. Form pieces in longest practical lengths.

D. Hem exposed edges on underside 1/2 inch; miter and seam corners.

2.5 FACTORY FINISHING

A. Fluoropolymer Coating: Multiple coat as specified for sheet metal system, thermally cured, conforming to AAMA 2604.

B. Washcoat: Finish concealed side of metal sheets with washcoat compatible with finish system, as recommended by finish system manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Inspect roof deck to verify deck is clean and smooth, free of depressions, waves, or projections, and properly sloped to valleys.

C. Verify deck is dry and free of snow and ice.

D. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, reglets are in place, and nailing strips located.

E. Verify roofing termination and base flashings are in place, sealed, and secure.

3.2 PREPARATION

A. Fill knot holes and surface cracks with latex filler at areas of bonded eave protection.

B. Broom clean deck surfaces under eave protection and underlayment.

C. Install starter and edge strips, and cleats before starting installation.

D. Install surface mounted reglets to lines and levels indicated on Drawings. Seal top of reglets with sealant.

E. Back paint concealed metal surfaces and surfaces in contact with dissimilar metals with protective backing paint to minimum dry film thickness of 15 mil.

3.3 INSTALLATION

A. Ice Dam Membrane Installation:
1. Place eave edge metal flashings tight with facia boards. Weather lap joints minimum 2 inches and seal with plastic cement. Secure flange with nails at maximum 12 inches on center.
2. Apply 4 inch wide band of plastic cement over deck flange of eave edge flashings, and embed minimum 19 inch wide strip of ice dam membrane. Place underlayment starter strip with eave edge flush with face of flashings. Secure in place. Lap ends minimum 6 inches.

3. Apply lap cement at rate of approximately 1-1/4 gal/100 sq ft over starter strip.
4. Starting from lower edge of starter strip, lay additional 36 inch wide strips of ice dam membrane in lap cement, to produce two ply membrane. Weather lap plies minimum 19 inches and nail in place. Lap ends minimum 6 inches. Stagger end joints of each consecutive ply.
5. Extend ice dam membrane minimum 2 ft up-slope beyond interior face of exterior wall.

B. General Roofing Installation Requirements:
1. Apply underlayment in single layer laid perpendicular to slope; weather lap edges 2 inches and nail in place. Minimize nail quantity.
2. Install insulation in accordance with manufacturer's instructions. Protect from UV exposure until roofing can be installed.
3. Install metal roofing in accordance with manufacturer's instructions. Cleat and seam joints.
4. Use plastic cement for joints between metal and bitumen and for joints between metal and felts.

C. Flashing Installation: Refer to Section 07 62 00.

3.4 PROTECTION OF INSTALLED CONSTRUCTION

A. Section 01 70 00 - Execution and Closeout Requirements: Protecting installed construction.

B. Do not permit traffic over unprotected roof surface.

END OF SECTION

SECTION 07 62 00

SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Flashings and counterflashings.
2. Fabricated sheet metal items.

1.2 DESIGN REQUIREMENTS

A. Sheet Metal Flashings: Conform to the following criteria of SMACNA "Architectural Sheet Metal Manual."

1.3 SUBMITTALS

A. Product Data: Required.

B. Samples: Required.

1.4 WARRANTY

A. Provide manufacturer's guarantee for exterior color finish for a period of 20 years against blistering, peeling, cracking, flaking, checking, chipping and excessive color change and chalking. Color change not to exceed 5 N.B.S. units (per ASTM D-2244.64T) and chalking not less than rating of 8 per ASTM D-659.

B. Guaranty: Guaranty sheet metal work installed under this Section against leakage or defects for 2 years after substantial completion date. Make good at Contractor expense or defects occurring within this period.

PART 2 PRODUCTS

2.1 SHEET METAL FLASHING AND TRIM

A. Manufacturers:
1. PacClad
2. ColorKlad
3. Berridge
4. Substitutions: Permitted.

B. Pre-Finished Galvanized Steel Sheet: ASTM A755/A755M; structural steel sheet, G90 (Z275) zinc coating; 24 gage core steel, shop pre-coated with two coat fluoropolymer top coat; color as selected.

2.2 ACCESSORIES

A. Fasteners: All metal counter flashing and parapet cap flashing shall be attached with galvanized or cadmium plated screws with neoprene washers. Nails, screws and rivets

used at other locations are to be the appropriate type for the purpose as described in the latest edition of the SMACNA Design Manual.

B. Roofing Cement: F.S. SS-C-153, Type I, Class A (summer grade) or Class B (winter grade) as applicable.

C. Underlayment: ASTM D226; Type II, No. 30 unperforated asphalt felt.

D. Protective Backing Paint: FS TT-C-494, Bituminous.

E. Sealant: Type specified in Section 07 90 00.

F. Plastic Cement: ASTM D4586, Type I.

PART 3 EXECUTION

3.1 INSTALLATION

A. General: Form sheet metal accurately to dimensions and shapes required, watertight and weathertight, with angles and broken surfaces true, sharp, and in straight lines. Where intercepting other members, cope to an accurate fit and solder securely. Produce flat surfaces free from waves and buckles.

B. Expansion: Allow a 3/8"-1/2" gap in coping caps between each section. Use 3-1/2" wide prefinished 24 gage cover plate over joints.
   1. Set cover plates in visible bead of polyurethane sealant between the cap and cover plate. Wipe joints of excessive sealant.
   2. Attach cover plate at the front and back with hex head cadmium screws with neoprene washers, installed in the gap between the metal cap sections.
   3. Do not exceed maximum length of 10'-0" for cap, fascia and flashing sections. Furnish with factory formed slots or enlarged holes for fasteners.

C. Paint metal in contact with mortar, concrete, and masonry materials with an alkali resistant coating. Use heavy-bodied bituminous paint or approved equal.

3.2 MISCELLANEOUS FLASHING

A. General:
   1. Where exposed portions are used as a counter-flashings, lap base flashings at least four inches.
   2. Under copings terminate both edges beyond face of wall approximately 1/4-inch with drip edge.
   3. Lap end joints not less than four inches. Seal laps with sealant.
   4. Where ends of flashing terminate turn ends up 1 inch and fold corners to form dam extending to wall face in vertical mortar or veneer joint.
   5. Turn flashing up not less than 8 inches behind exterior veneer.
   6. Secure flashings in place using concealed fasteners.
   7. Seal metal joints watertight.

END OF SECTION

SECTION 07 84 00

FIRESTOPPING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Firestopping and through-penetration protection system materials and accessories.
2. Firestopping tops of fire rated walls.

1.2 PERFORMANCE REQUIREMENTS

A. Conform to applicable code for fire resistance ratings and surface burning characteristics.

1.3 SUBMITTALS

A. Product Data: Required.

B. Schedule: Required.

PART 2 PRODUCTS

2.1 FIRESTOPPING

A. Manufacturers:
1. Hilti Corp.
2. 3M Fire Protection Products.
3. Specified Technologies.
4. Substitutions: Not Permitted.

B. Product Description: As determined by firestop specialist as required to firestop rated partitions and openings and penetrations through those partitions.

2.2 ACCESSORIES

A. Primer: Type recommended by firestopping manufacturer.

B. Installation Accessories: Provide clips, collars, fasteners, temporary stops or dams, and other devices required to position and retain materials in place.

PART 3 EXECUTION

3.1 APPLICATION

A. Install material at fire rated construction perimeters and openings.

B. Apply firestopping material in sufficient thickness to achieve required fire and smoke rating.

C. Label or stencil all firestops installed through penetration firestops. State that the fill material around the penetrating item is a firestop, and that it shall not be disturbed unless by an authorized contractor. Label to include the firestop brand name, and the classified system number for which it was installed.

D. Firestopping material to be flush on both sides of wall after application, neatly applied. Any firestopping surfaces not neat or too messy for painting will be required to be reinstalled.

3.2 FIELD QUALITY CONTROL

A. Keep all areas of work accessible until inspection by the applicable Code Authorities.

3.3 CLEANING

A. Remove spilled and excess materials adjacent to firestopping without damaging adjacent surfaces.

END OF SECTION

SECTION 07 90 00

JOINT PROTECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Sealants and joint backing.
2. Precompressed foam sealers.
3. Hollow gaskets.
4. Accessories.

B. Furnish labor, materials, tools, and equipment required to completely close (with caulking compound or sealant) all joints to give a finished appearance. Items to be caulked or sealed include but are not limited to the following:
1. Hollow metal frames.
2. Exterior doors, louvers, windows and any other openings in exterior walls.
3. Interior fixed glass.
4. Penetrations by piping, conduit and similar items.
5. Plumbing fixtures.
6. Millwork.
7. Flooring, paving and sidewalk joints.
8. Dissimilar finishes.
9. Joints shown on drawings or specified to be caulked or sealed.
10. All joints or gaps between similar or dissimilar materials that do not receive closure trim are to be caulked/sealed with the appropriate material as listed in Part 2 of this Section.

1.2 SUBMITTALS

A. Product Data: Required.

B. Samples: Required.

1.3 ENVIRONMENTAL REQUIREMENTS

A. Maintain temperature and humidity recommended by sealant manufacturer during and after installation.

1.4 WARRANTY

A. Furnish to the Architect, in duplicate, the following written guarantee before final payment will be made for Work under this part of the Contract:

"This firm guarantees to promptly repair and replace, without further cost to the Owner, the whole or any part of the materials which prove defective through workmanship or improper materials within 2 years of the date of final acceptance. This includes damage to the building caused by defective workmanship and/or improper materials or that which is caused by repair or replacement of defective materials or workmanship."

PART 2 PRODUCTS

2.1 JOINT SEALERS

A. Manufacturers:
   1. Dow Corning Corp.
   2. Pecora Corp.
   3. Tremco Sealants & Waterproofing.
   4. Substitutions: Permitted.

B. High Performance General Purpose Exterior (Nontraffic) Sealant (Sealant Type A): Silicone; ASTM C920 non-sag.

C. General Purpose Traffic Bearing Sealant (Sealant Type B): Polyurethane; ASTM C920, pourable. Refer to civil specifications.

D. EIFS Sealant (Sealant Type C): ASTM C920; multi-component, low-modulus silicone sealant, field tintable.

E. Exterior Metal Lap Joint Sealant (Sealant Type D): Butyl or polyisobutylene, non-drying, non-skinning, non-curing.

F. General Purpose Interior Sealant (Sealant Type E): Acrylic emulsion latex; ASTM C834, single component, paintable.

2.2 ACCESSORIES

A. Primer: Non-staining type, recommended by sealant manufacturer.

B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer.

C. Joint Backing: Round foam rod compatible with sealant.

D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify substrate surfaces and joint openings are ready to receive work. Beginning of installation constitutes of conditions.

B. Verify joint backing and release tapes are compatible with sealant.

3.2 PREPARATION

A. Remove loose materials and foreign matter impairing adhesion of sealant.

B. Clean and prime joints.

C. Perform preparation in accordance with ASTM C1193.

D. Protect elements surrounding Work of this section from damage or disfiguration.

3.3 INSTALLATION

A. Perform installation in accordance with ASTM C1193.

B. Perform acoustical sealant application work in accordance with ASTM C919.

C. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.

D. Install bond breaker where joint backing is not used.

E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

F. Tool joints concave.

G. Precompressed Foam Sealant: Install with face 1/8 to 1/4 inch below adjoining surface.

H. Compression Gaskets: Install with face 1/8 to 1/4 inch below adjoining surface.

I. Seal all interior joints where unlike materials meet and joints do not close tight. Finish smooth with adjacent surfaces, suitable for painting.

3.4 SCHEDULE

A. Exterior Joints for Which No Other Sealant Type is Indicated: Sealant Type A.

B. Control and Expansion Joints in Paving: Sealant Type B.

C. Exterior Joints in EIFS: Sealant Type C.

D. Lap Joints in Exterior Sheet Metal Work: Type D.

E. Interior Joints for Which No Other Sealant is Indicated: Sealant Type E.

END OF SECTION

SECTION 08 11 13

HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Steel doors and frames; non-rated and fire rated.
2. Interior borrowed light frames.

1.2 SUBMITTALS

A. Shop Drawings: Required.

B. Product Data: Required.

1.3 QUALITY ASSURANCE

A. Perform Work in accordance with the following:
1. ANSI 250.8 – Recommended Specifications for Standard Steel Doors and Frames.
2. DHI – Door Hardware Institute – The Installation of Commercial Steel doors and Steel Frames, Insulated Steel Doors in Wood Frames, and Builder's Hardware.

B. Conform to requirements of ANSI A250.8.

C. Fire Rated Door and Frame Construction: Conform to NFPA 252.

D. Installed Fire Rated Door and Frame Assembly: Conform to NFPA 80 for fire rated class as indicated on Drawings.

E. Attach label from agency approved by authority having jurisdiction to identify each fire rated door frame.

PART 2 PRODUCTS

2.1 STEEL DOORS AND FRAMES

A. Manufacturers:
1. Amweld Building Products, Inc.
2. Ceco Door Products
3. Republic Doors
4. Steelcraft
5. Substitutions: Not Permitted.

2.2 COMPONENTS

A. Doors (Insulated): ANSI A250.8, SDI 108, 1-3/4 inch thick; 18 gage.
   1. Level 2 - Heavy Duty, Model 1, full flush design.

B. Frames:
   1. Level 2 for Door Models 1, 16 gage/0.053 inch thick.

C. Door Core: Cardboard honeycomb. Polystyrene is NOT acceptable.

D. End Closure: Channel, 0.04 inch thick, inverted.

2.3 ACCESSORIES

A. Silencers: Resilient type.

B. Removable Stops: Rolled steel channel shape.

C. Astragals for Double Doors: Steel, Z shaped.

D. Primer: ANSI A250.10 rust inhibitive type.

E. Weatherstripping: Specified in Section 08 71 00.

2.4 FABRICATION

A. Fabricate frames as face welded units.

B. Fabricate doors and frames with hardware reinforcement welded in place.

C. Configure exterior frames and doors with profile to receive recessed weatherstripping.

D. Reinforce frames wider than 48 inches with roll formed steel channels fitted tightly into frame head, flush with top.

E. Attach fire rating label to each fire rated door and frame.

2.5 SHOP FINISHING

A. Primer: Baked.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify opening sizes and tolerances are acceptable.

3.2 INSTALLATION

A. Install doors and frames in accordance with ANSI A250.8.

B. Install roll formed steel reinforcement channels between two abutting frames.

C. Install fire rated assemblies in accordance with NFPA 80.

D. Adjust door for smooth and balanced door movement.

E. Tolerances:
   1. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

END OF SECTION

SECTION 08 11 25

INTERIOR FRAMES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Steel frames for doors and windows, with prefinished aluminum cap/trim.

1.2 SUBMITTALS

A. Shop Drawings: Required.

B. Product Data: Required.

1.3 DELIVERY, STORAGE AND HANDLING

A. Deliver frames packaged to provide protection during transit and storage at project site.

B. Store frames at project site under cover and as near as possible to final installation location. Do not use covering material that will cause discoloration of aluminum finish.

1.4 WARRANTY

A. Frames: Two year warranty.

PART 2 PRODUCTS

2.1 INTERIOR ALUMINUM FRAMES

A. Manufacturers:
   1. Timely
   2. Substitutions: Permitted.

2.2 FRAMES

A. Interior Frames: Throat size to fit wall opening; 2” profile with flush snap-on aluminum cap/trim. These are NOT storefront frames.

B. Aluminum: ASTM B221; controlled alloy billets of 6063T5, to assure compliance with tight dimensional tolerances and maintain color uniformity. Extruded aluminum thickness of 0.062 in.

2.3 FABRICATION

A. Pre-machine jambs and prepare for hardware, with concealed reinforcement plates, drilled and tapped as required, and fastened within frame.

B. Coordinate with hardware specified in Section 08 71 00.

C. Provide vinyl or mohair mute.

D. Provide corner alignment clips for precise butt or mitered connections.

E. Fabricate all components to allow secure installation without exposed fasteners.

2.4 FACTORY FINISHING

A. Factory Finish extruded frame so that any part exposed to view upon completion of installation to be uniform in finish and color.

B. Clear Anodic Coating: AAMA 611, AAM12C22A21 clear anodized coating, 0.4 mil minimum thickness.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine project conditions and verify that the work of this section may properly commence. Beginning of installation constitutes acceptance of conditions.

3.2 INSTALLATION

A. Install units in accordance with manufacturer's installation instructions. Install plumb and square, securely anchored to substrates with fasteners recommended by manufacturer.

B. Secure concealed installation clips to main structural extrusion, not to snap-in or trim members.

C. Do not use screws or other fasteners that will be exposed to view when installation is complete.

D. Coordinate installation of hardware specified in Section 08 71 00.

3.3 CLEANING

A. Clean frames after installation, using cleaning methods recommended by frame manufacturer.

B. Touch up marred areas so that touch-up is not visible. Remove and replace frames that cannot be satisfactorily adjusted.

C. Provide protection to assure that frames will be without damage or deterioration upon Substantial Completion.

END OF SECTION

SECTION 08 14 16

WOOD DOORS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Wood doors; flush and glazed configurations, non-rated and fire-rated; factory finished.

1.2 SUBMITTALS

A. Shop Drawings: Required.

B. Product Data: Required.

C. Samples: Required.

1.3 QUALITY ASSURANCE

A. Perform Work in accordance with NWWDA I.S.1.

B. Fire Rated Door Construction: Conform to NFPA 252; with neutral pressure level at 40 inches maximum above sill at 5 minutes into test.

C. Installed Fire Rated Door Assembly: Conform to NFPA 80 for fire rated class as indicated on Drawings.

D. Attach label from agency approved by authority having jurisdiction to identify each fire rated door.

1.4 WARRANTY

A. Furnish manufacturer's "Life of Installation" warranty for interior doors.

PART 2 PRODUCTS

2.1 FLUSH WOOD DOORS

A. Manufacturers:
1. Algoma Hardwoods Inc.
2. Eggers Industries.
3. Marshfield Door Systems.
4. Mohawk Flush Doors, Inc..
5. Graham.
6. Substitutions: Permitted.

B. Flush Interior Doors: 1-3/4 inches thick; solid core, five ply construction, fire rated as indicated on Drawings.

2.2 COMPONENTS

A. Solid Core, Non-Rated: AWI Section 1300.
   1. Fully Glazed Doors: Structural composite core.
   2. All Others: Type PC - Particleboard.

B. Solid Core, Fire Rated: AWI Section 1300; Category A for positive pressure fire test.

C. Veneer Facing: AWI Premium quality wood, plain sliced, with book matched grain, for transparent finish.
   1. Species: Select white birch.
   2. Finish: Masonite, Cocoa Bean.

D. Facing Adhesive: Type I - waterproof.

2.3 ACCESSORIES

A. Glazing Stops: Wood, of same species as door facing. Wood with metal clips for rated doors.

2.4 FABRICATION

A. Fabricate doors in accordance with AWI Quality Standards requirements.

B. Furnish lock blocks at lock edge and top of door for closer for hardware reinforcement.

C. Factory machine doors for finish hardware.

2.5 SHOP FINISHING

A. Finish work in accordance with AWI - Section 1500 Factory Finishing; Premium Quality.

B. Seal door top edge with sealer to match door facing.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install doors in accordance with AWI Quality Standards requirements.

B. Adjust door for smooth and balanced door movement.

C. Tolerances: Conform to NWWDA requirements for fit and clearance tolerances and maximum diagonal distortion.

END OF SECTION

SECTION 08 41 13

ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Aluminum-framed storefronts.
2. Aluminum and glass doors and frames.
3. Glass.

1.2 PERFORMANCE REQUIREMENTS

A. System Design: Design and size components to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall, including building corners.

B. Performance Requirements:
1. Air Infiltration: Air leakage through fixed light areas of storefront shall not exceed 0.06 cfm per sq. ft. of surface area when tested in accordance with ASTM E283 at differential static pressure of 6.24 psf.
2. Water Infiltration: No uncontrolled water penetration when tested in accordance with ASTM E331 at test pressure of 10.0 psf.

1.3 SUBMITTALS

A. Shop Drawings: Required.

1.4 WARRANTY

A. Furnish five year manufacturer warranty for glazed units.

B. Furnish 10 year warranty for finish.

C. Provide manufacturer’s standard lifetime warranty for entry doors.

D. Submit a warranty signed by the manufacturer, contractor, installer, agreeing to replace aluminum doors, windows, framing and glazing which fall in materials and workmanship within 2 years of the date of acceptance. Failure of materials or workmanship shall include, but not be limited to, failure in operation of doors, windows, and hardware, excessive leakage of air infiltration, excessive deflections, delamination of panels, deterioration of finish or metal in excess of normal weathering, and defect in accessories, weatherstripping, and other components of the work.

PART 2 PRODUCTS

2.1 ALUMINUM-FRAMED STOREFRONTS

A. Manufacturers:
1. Kawneer North America.
2. Oldcastle.
3. Tubelite
4. YKK AP America.
5. Substitutions: Permitted.

B. Product Description:
1. Aluminum Frame: Thermally broken. Frames for interior glazing need not to be thermally broken.
2. Doors: Medium stile; nominal 10 inch high bottom rail.
3. Subsill: Manufacturer's standard High-Performance (HP) subsill.

2.2 COMPONENTS

A. Extruded Aluminum: ASTM B221.

B. Sheet Aluminum: ASTM B209.

C. Sheet Steel: ASTM A653/A653M; galvanized to minimum G90.

D. Steel Sections: ASTM A36/A36M; shaped to suit mullion sections, galvanized.

E. Glass: Specified in Section 08 80 00.

F. Hardware: Refer to Section 08 71 00.

F. Perimeter Sealant: Specified in Section 07 90 00.

2.3 FABRICATION

A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.

B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.

C. Prepare components to receive anchor devices. Fabricate anchors.

D. Arrange fasteners and attachments to conceal from view.

E. Prepare components with internal reinforcement for door hardware.

F. Reinforce framing members for imposed loads.

2.4 SHOP FINISHING

A. Anodized Aluminum Surfaces: AAMA 611, Class I 0.7 mils clear coating.

B. Apply bituminous paint to concealed aluminum surfaces in contact with cementitious or dissimilar metals.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install wall system in accordance with AAMA MCWM-1 - Metal Curtain Wall, Window, Store Front and Entrance - Guide Specifications Manual.

B. Install sill flashings. Turn up ends and edges to form water tight dam.

C. Install and adjust door hardware.
   1. Door Opening Force: In accordance with the Americans With Disabilities Act (ADA), adjust all door hardware so that the maximum force required for pushing or pulling open a door shall be as follows:
      a. Exterior hinged doors: 8.5 lbf (SBS)
      b. Interior hinged doors: 5.0 lbf
   2. These forces do not apply to the force required to retract latch bolts or disengage other devices that may hold the door in a closed position.

D. Door Closers: If door is equipped with a closer, adjust the sweep period of the closer so that from an open position of 70 deg., the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the leading edge of the door.

3.2 PROTECTION AND CLEANING

A. Protection: After erection, adequately protect by covering all exposed parts of the work and the finish from damage by grinding and polishing machines and/or by plaster, lime, cement, acid or other harmful substances.

B. Cleaning: After completion of all other work in the vicinity of the aluminum doors, windows, and framing, remove all covering used to protect the work, and thoroughly clean the aluminum surfaces with soap and plain water or a petroleum product such as white gasoline, kerosene, or distillate. Do not use abrasive cleaning agents.

END OF SECTION

SECTION 08 71 00

DOOR HARDWARE

PART 1 GENERAL

1.01 SUMMARY

A. Section includes the supply and installation of the Finish Hardware.
   1. Include the termination of all Electrified Hardware.
   2. Include field verification of any existing doors, frames or hardware.

B. Related Sections
   1. Division 1
   2. Sealants – Division 7
   3. Openings – Division 8
   4. Finishes – Division 9
   5. Fire Alarm – Division 28
   6. Electrical – Division 26
   7. Security – Division 28

1.02 REFERENCES

A. Documents and Institutes that shall be used in estimating, detailing and installing the items specified.
   1. International Building Code – Current/Adopted Edition
   2. ICC/ANSI A117.1 – Accessible and Usable Building and Facilities -Current/Adopted Edition
   3. NFPA 70 – Current/Adopted Edition
   4. NFPA80 –Standards For Fire Doors and Fire Windows – Current/Adopted Edition
   5. NFPA101 – Life Safety Code – Current/Adopted Edition
   6. NFPA105 – Installation of Smoke-Control Door Assemblies – Current/Adopted Edition.
   7. ANSI - American National Standards Institute
   8. BHMA – Builders Hardware Manufacturers Association
   9. UL – Underwriters Laboratory
   10. DHI – Door and Hardware Institute
   11. Accessibility Standards – Current Adopted Edition
   12. Local Building Codes

1.03 SUBMITTALS

A. Comply with pertinent provisions of Division 01.

B. Finish Hardware Schedule to be in vertical format to include:
   1. Heading #/Hardware Set
   2. Door #, Location, Hand, Degree of Opening, Door Size and Type, Frame Size and Type, Fire Rating
   3. Quantity, type, style, function, product, product number, size, fasteners, finish and manufacturer of each hardware item.
   4. Location of hardware set cross-referenced to indications on Drawings both on floor plans and in door and frame schedule.

5. Keying schedule
6. Title Sheet, Index, Abbreviations, Manufacturers List, Template List and Templates.
7. Mounting locations for hardware.
8. Explanation of abbreviations, symbols, and codes contained in schedule.
9. Date of the Finish Hardware Specification and Drawing / Door Schedule used in completing the Finish Hardware Schedule.
10. In Name, Company and Date of Field Verification if required.
11. Door Index; include door number, heading number, and hardware group.
12. Name and phone number for local manufacturer's representative for each product.
13. Submit in conjunction with Door and Frame Submittal.
14. Operation Description of openings with electrified hardware.

C. Product Data: Provide product data in the form of a binder, manufacturer's technical product fact sheets for each item of hardware. Include whatever information may be necessary to show compliance with requirements, including instructions for installation and for maintenance of operating parts and finish.

D. Wiring Diagrams: Provide Riser/Elevation and Point to Point Wiring Diagrams for all openings with electrified hardware. Include all information that is necessary for coordination with other trades.

E. Samples: Provide samples as requested by Owner or Architect with Heading # and Door# marked on boxes. All samples will be returned to the contractor and used on doors for which they were marked.

F. Templates: Provide templates of finish hardware items to each fabricator of doors, frames and other work to be factory or shop prepared for the installation of hardware.

G. Keying Schedule: After meeting with the Owner, a keying schedule shall be submitted using keyset symbols referenced in DHI manual "Keying Systems and Nomenclature." The keying schedule shall be indexed by door number, keyset, hardware heading number, cross keying instructions and special key stamping instructions.

H. Operations and Maintenance Data: At the completion of the job, provide to the Owner one hard copies or one electronic copy of an Owner's operation and maintenance manual. The manual shall consist of a labeled hardcover three ring binder with the following technical information:
1. Title page containing: Project name, address and phone numbers. Supplier's name, address and phone numbers.
2. Table of Contents.
3. Copy of final (file and field use/as-installed) Finish Hardware Schedule.
4. Final Keying Schedule.
5. Maintenance instruction, adjustment, and preservation of finishes for each item of hardware.
6. Catalog pages for each items of hardware.
7. Installation Instructions for each item of hardware
8. Parts List for each item of hardware.
9. As installed point to point wiring diagrams for electrified hardware.
10. Warranties include Order #.

1.04 QUALITY ASSURANCES

A. Substitutions: Request for substitutions shall not be accepted within this project. Architect, Owner and Finish Hardware Consultant have selected one (1) specified and two (2) equals listed hereinafter in the Hardware Schedule. By this selection process they have established three (3) equal products for competitive pricing, while insuring no unnecessary delays by a substitution process. If any specified product is listed as a "No Substitution" product, this product will be supplied as specified, with no alteration or request of substitution. The reason for this is to comply with the uniformity established at this project. Parts and supplies are inventoried for these particular products for ease and standardization of replacement.

B. Supplier Qualifications: Supplier shall be recognized architectural finish hardware supplier, with warehousing facilities, who have been furnishing hardware in the project vicinity for a period of not less than 2 year and who is or employs a DHI Certified AHC, DHC, DHSC or person with a minimum of 10 years of experience as a hardware supplier. This person shall be available at reasonable times during the course of the work for consultation about products hardware requirements, to the Owner, Architect and General Contractor.

C. Installer Qualifications (Mechanical Hardware): All finish hardware shall be installed by the Finish Hardware Installer with a minimum of at least two (2) years documented experience. Installer shall attend a pre-installation meeting between the General Contractor, Finish Hardware Supplier/s, hardware manufacturer's representative for locks, closers and exit devices, and all door / frame suppliers. The Finish Hardware Installer shall be responsible for the proper installation and function of all doors and hardware.

D. Installer Qualifications (Electrified Hardware): All electrified finish hardware (power source, electrified locking or control device, switching device, through wire device and monitoring device) shall be installed by an Electronic Access Control Installer licensed by the Texas Department of Public Safety. The Electrified Finish Hardware Installer shall have a minimum of at least two (2) years of documented experience. Installer shall attend a pre-installation meeting between the General Contractor, Finish Hardware Supplier/s, Electrical Contractor, Fire Alarm Contractor, Security Contractor, hardware manufacturer's representative for electrified hardware, all door / frame suppliers. The Electrified Finish Hardware Installer shall be responsible for the proper installation, termination and function of all opening with electrified hardware. Installation shall include termination of all electrified products (including the required wire to the power supply and/or junction box).

1.05 DELIVERY, STORAGE AND HANDLING

A. Marking and packaging: Mark each item or package separately, with identification related to hardware set number, door number and keyset symbol.

B. Delivery:
   1. Deliver individually packaged and properly marked finish hardware at the proper time and location to avoid any delays in construction or installation.
   2. At time of delivery, inventory hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that count is correct.

C. Storage: Store hardware in enclosed, dry and locked area.

1.06 WARRANTY

A. All finish hardware products shall be covered by a 1 year factory warranty from the date of substantial completion of the project.

B. Supply warranty verification to the owner for all products that provide factory warranty. Warranty should include Factory Order # and date.

1.07 MAINTENANCE/EXTRA MATERIALS

A. Extra Materials:
   1. All extra screws, fasteners, and all special installation tools furnished with the hardware shall be turned over to the owner at the completion of the job.

PART 2 PRODUCTS

2.01 MATERIALS

A. Screws and Fasteners:
   1. Coordinate with door supplier and manufacturer to ensure proper blocking and reinforcement is provided to support wood or machine screws when mounting panic hardware and door closers. If proper blocking and reinforcement is not included provide through bolts sized to the thickness of the door. All fasteners should be the proper type and length for the product being supplied.
   2. All finish hardware shall be installed to manufacturer's recommendations, using screws, attachments and installation tools provided with the hardware. No other screws or attachments are acceptable.
   3. All other products to meet door and frame conditions.

B. Hinges:
   1. Template: Provide templated units only.
   2. Exterior: All exterior hinges shall be stainless steel base with stainless steel pin and stainless steel finish.
   3. Interior: All interior hinges steel based.
   4. Interior corrosive: All interior hinges at corrosive areas shall be stainless steel base with stainless still pin and stainless steel finish.
   5. All hinges on doors over 36" wide, with exit devices, or with push/pull shall be heavy weight.
   6. Electric Hinge: Provide minimum 8 wire.
   7. Provide non-removable pins for outswinging doors that are locked or are lockable.
   8. All hinges on doors with door closers shall be ball bearing.
   9. All hinges shall be full mortise.
   10. Size: Provide 4 ½ x 4 ½ hinges on doors up to 3'0" in width. Provide 5 x 4 ½ hinges over 3'0" to 4'0" in width. Reference manufacturers catalog for all other sizes.
   11. Number of Hinges: Provide number of hinges indicated but not less than 3 hinges for door leaf for doors 90" or less in height and one additional hinge for each 30" of additional height.
   12. Adjust hinge width as required for door, frame, trim and wall conditions to allow proper degree of opening.
   13. Provide hinges conforming to ANSI/BHMA A156.1.

14. Provide spring hinges where specified. Provide two spring hinges and one bearing hinge per door leaf for doors 90 inches (2286 mm) or less in height. Provide one additional bearing hinge for each 30 inches (762 mm) of additional door height.
15. Supply from the following list of manufacturers:

Ives	IVE
Hager	HAG
Bommer	BOM

C. Continuous Hinges:
1. Continuous hinges to be manufactured of 6063-T6 aluminum.
2. Continuous hinge shall be certified to ANSI 156.26, Grade 1
3. Continuous hinge should be tested an approved UL10C.
4. Electrified – Provide minimum 8 wire with removable panel.
5. Provide hinges 1 inch shorter in length than nominal height of door, unless otherwise noted.
6. Provide reinforcing for doors weighing over 450 pounds and up to 600 pounds.
7. Supply from the following list of manufacturers:

Ives	IVE
Select	SEL
Stanley	STA

D. Mortise Locks:
1. All locks on this project should be manufactured by the same manufacturer.
2. Mortise locksets shall meet ANSI/BHMA A156.13, Series 1000, Grade 1 Operational with all standard trims and conventional mortise cylinders.
3. All mortise locks shall be UL Listed for 3 hour fire door. Review lock for any height restriction.
4. Provide locks with a standard 2-3/4 inches (70 mm) backset with full 3/4 inch (19 mm) throw stainless steel mechanical anti-friction latchbolt. Provide deadbolt with full 1 inch (25 mm) throw, constructed of stainless steel.
5. Provide standard ASA strikes unless extended lip strike is necessary for frame/trim or 7/8” lip strike is necessary at pair with overlapping astragal.
6. Provide dust box.
7. Supply from the following list of manufacturers:

Schlage	SCH
Falcon	FAL
Corbin Russwin	C-R

E. Cylindrical Locks:
1. All locks on this project should be manufacturer by the same manufacturer.
2. All locks shall meet the new ANSI/BHMA A156.2, Series 4000, Grade 1.
3. All cylindrical locks shall be UL Listed for 3 hour fire door. Review lock for any height restriction.
4. Provide locks with standard 2-3/4 inches (70 mm) backset, unless noted otherwise, with a 1/2 inch (13 mm) latch throw. Provide proper latch throw for UL listing at pairs.
5. Provide standard ASA strikes unless extended lip strike is necessary for frame/trim or 7/8” lip strike is necessary at pair with overlapping astragal.
6. Provide dust box.
7. Lockset shall adjust to fit door thickness from 1 ¾” to 2 1/8”.
8. Supply from the following list of manufacturers:
9. Schlage SCH

Falcon FAL
Corbin Russwin C-R

F. Exit Devices:
1. All exit device types on this project should be manufactured by the same manufacturer.
2. Exit devices are to be architectural grade touch bar type. Touchpad to extend one half of door width.
3. Mechanism case to be smooth.
4. Exit devices shall meet ANSI A156.3, Grade 1.
5. All exit devices are UL listed Panic Exit or Fire Exit Hardware.
6. All lever trim to match lock trim in design and finish.
7. Dogging: Non-rated devices are to be provided with dogging. Less dogging where shown in Hardware Sets (some exterior, electrical rooms, electrified) Cylinder dogging as shown in hardware sets.
8. Exit devices are to be supplied and installed with thru-bolts for exterior, hollow metal doors, or as required for application.
9. Provide proper power supply for exit devices as required. Coordinate with Fire Alarm, Electrical and Security Contractor.
10. Push pads shall be metal, no plastic inserts allowed.
11. Exit devices shall have a flush end cap.
12. Exit devices shall be ordered with the correct strike for application.
13. Exit devices shall be order in the proper length to meet door width.
14. Exit devices shall have deadlatching.
15. Exit device shall be provided in width/height required based on door size.
16. Install exit devices with fasteners supplied by exit device manufacturer.
17. Mount mechanism case flush on face of doors, or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits as required.
18. Provide proper concealed vertical rods for wood or hollow metal doors as required.
19. Factory or field drill weep holes for exit devices used in full exterior applications, highly corrosive areas, and where noted in the hardware sets.
20. Supply from the following list of manufacturers:
Von Duprin VON As Specified

G. Flush Bolts:
1. Provide automatic, constant latching, and manual flush bolts with forged bronze or stainless steel face plates, extruded brass levers, and with wrought brass guides and strikes. Provide 12 inch (305 mm) steel or brass rods at doors up to 90 inches (2286 mm) in height. For doors over 90 inches (2286 mm) in height increase top rods by 6 inches (152 mm) for each additional 6 inches (152 mm) of door height. Provide dust-proof strikes at each bottom flush bolt.
2. Supply from the following list of manufacturers:
Ives IVE
Trimco TRI
Rockwood ROC

H. Pull Plates/Pulls/Push Plate:
1. Pull and Push Plates to meet ANSI 156.6 for .050” thickness.
2. Pull and Push Plate size to 4” x 16”.
3. Pull Plate to have 10” center and 1” round on pull plate with concealed fasteners.
4. Provide straight and offset pulls with fasteners as required

5. Provide concealed fasteners for all applications.
6. Prep plate for cylinder/lock as required.
7. Supply from the following list of manufacturers

Ives	IVE
Trimco	TRI
Rockwood	ROC

I. Door Closers:

1. All door closers on this project should be manufactured by the same manufacturer.
2. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. ISO 9000 certify closers. Stamp units with date of manufacture code.
3. Door closers shall be furnished with standard cover. Provide full cover as shown in hardware sets.
4. Size in accordance with the manufacturers recommendations for door size and condition.
5. Door closers shall be furnished with delayed action, hold-open as listed in the Hardware Sets.
6. Door closers shall be mounted out of the line of sight wherever possible (i.e., room side of corridor doors, etc.) with parallel arm mounting on out swinging doors.
7. All closer installation shall include thru bolts on exterior, hollow metal doors or where required for application.
8. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.
9. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
10. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
11. Supply from the following list of manufacturers

LCN	LCN
Falcon	FAL
Corbin Russwin	C-R

J. Door Protection Plates:

1. Protective plates shall meet ANSI A156.6 requirements for .050 thickness.
2. Protection plates should be fabricated from stainless steel.
3. Protection plate shall be height as shown in Hardware Sets. Width shall be 10” by 2” less than door width on single door or pair with a mullion and 1” less than door width on pair of doors without a mullion.
4. Beveled 4 edges.
5. Provide kickplate on all doors with closers, unless not required for aesthetic reasons.
6. Prep protective plates for hardware as required.
7. Supply from the following list of manufacturers:

Ives	IVE
Rockwood	ROC
Trimco	TRI

K. Door Stops and Holders:

1. Supply wall stops at all openings to protect doors or door hardware. Install so lock does not lock unintentionally. Install blocking in wall where wall stop will be mounted.

2. When wall conditions do not permit use of wall stop provide floor stops with risers as needed to adjust for floor conditions.
3. When wall conditions do not permit use of wall stop provide overhead stops. Jamb mount where required to not be visible from Corridor.
4. Exterior Ground Level Doors: Provide security floor stop.
5. Exterior Roof Doors: Provide heavy duty overhead stop.
6. Supply from the following list of manufacturers:

Glynn Johnson	GLY
Rockwood	ROC
Trimco	TRI

L. Silencers:
1. Provide silencers on all doors without seal. 3 for single doors and 2 for pairs.
2. Provide silencers as required for frame conditions. SR64 for hollow metal frames. SR65/SR66 for wood frames.
3. At wood frames, insure height of stop is compatible with silencer.
4. Supply from the following list of manufacturer's

Ives	IVE
Rockwood	ROC
Trimco	TRI

M. Thresholds/Weatherstripping:
1. Thresholds on doors in the accessible path shall conform to accessibility codes.
2. Threshold should be based on sill detail.
3. Smoke seal shall be teardrop design bulb seal.
4. Exterior seal/thresholds shall be silicone or brush as shown in hardware sets.
5. Drip strips shall protrude 2 ½" and be 4" wider than opening.
6. At S Label single doors provide seals on frame to comply with UL1784
7. At S Label pair of doors provide seals on frame and as meeting stile to comply with UL1784.
8. Automatic Door Bottom shall be mortised to comply with accessibility codes.
9. Supply from the following list of manufacturer's

Zero	ZER
National Guard	NGP
Pemko	PEM

2.03 KEYING

A. General: Finish Hardware Supplier shall meet in person with owner to finalize keying requirements prior to the locks and exit devices being ordered and match existing or start a new Master Key System for the project. During keying meeting all hardware functions should be reviewed with the owner to finalize lock and exit device functions. During keying meeting determine all expansion required.

B. Cylinders: Provide the correct and quantity of cylinders for all applications.

C. Keys: Provide nickel silver keys only. Furnish 2 change keys for each lock: 5 control keys: 5 master keys for each master system and 5 grandmaster keys for each grandmaster key system. Deliver all keys to Owners' Representative.

D. Cores and keys shall be provided with identification stamping.

E. Provide Bitting List to Owner.

2.04 KEY CONTROL

A. Key control shall be provided, by supplying a complete key storage and management system. Provide a complete key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers and standard metal cabinet. Size of system to be 150% of the number of locks required for the project.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine doors, frames and related items for conditions that would prevent the proper application of any finish hardware items. Do not proceed with installation until all defects are corrected.

B. Existing Door and Frame Compatibility: Field verify existing doors and frames receiving new hardware and existing conditions receiving new openings. Verify that new hardware is compatible with existing door and frame preparation and existing conditions.

C. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

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

3.02 INSTALLATION

A. Follow Door and Hardware Institute Publication:
Recommended Location for Architectural Hardware for Standard Steel Doors and Frames
Recommended Location for Builder's Hardware for Custom Steel Doors and Frames
Recommended Locations for Architectural Hardware for Wood Flush Door

B. Install each hardware item in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer.

C. Follow ANSI A117.1-1998 Accessible and Usable Building and Facilities and Texas Accessibility Standards.

D. Review mounting locations with Architect where required.

E. Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Closers should not be visible in corridors, lobbies and other public spaces where possible.

F. Locate power supplies in accessible location and indicate in as-builts where located.

G. Set threshold in full bed of sealant complying with requirements specified in Division 07.

H. Pre Installation meeting required with attendees to include Architect, General Contractor, Mechanical Hardware Installer, Electrified Hardware Installer, Finish Hardware Supplier and Manufacturer's Representative for Exit Device, Locks and Closers and Door/Frame Suppliers before installation begins.

3.03 FIELD QUALITY CONTROL

A. After installation has been completed, obtain the services of an Architectural Hardware Consultant to check for proper installation of finish hardware, according to the finish hardware schedule and keying schedule. In addition, check all hardware for adjustments and proper operation.

3.04 ADJUST AND CLEAN

A. Adjust, clean and inspect all hardware, to ensure proper operation and function of every opening. Replace items, which cannot be adjusted to operate freely and smoothly as intended for the application made.

3.05 PROTECTION

A. The General Contractor shall use all means at his disposal to protect all finish hardware items from abuse, corrosion and other damage until the owner accepts the project as complete.

3.06 TRAINING

A. After installation has been completed, provide training to the Owner on the operation of the Finish Hardware and programming of any electrified hardware.

3.07 HARDWARE SCHEDULE

A. These hardware set shown below are for use as a guideline. Provide hardware as required to meet the requirements of the openings, security, and code requirements.

PROVIDE 1-1/2" EXTENDED LIP STRIKES WHERE ALUMINUM SNAP ON TRIM IS USED.

HARDWARE GROUP NO. 000
FOR USE ON DOOR #(S):
13
PROVIDE EACH DOOR(S) WITH THE FOLLOWING:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR

ALL HARDWARE BY VAULT DOOR MANUFACTURER

HARDWARE GROUP NO. 103
FOR USE ON DOOR #(S):
3 5 6 7 8
PROVIDE EACH DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	ENTRANCE LOCK	ND53PD SPA	626	SCH
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE GROUP NO. 103S
FOR USE ON DOOR #(S):
4
PROVIDE EACH DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	ENTRANCE LOCK	ND53PD SPA	626	SCH
1	EA	OH STOP	450S X SIZE AS REQ	630	GLY
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE GROUP NO. 103W
FOR USE ON DOOR #(S):
24
PROVIDE EACH DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 5 X 4.5 NRP	652	IVE
1	EA	ENTRANCE LOCK	ND53PD SPA	626	SCH
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE GROUP NO. 201C
FOR USE ON DOOR #(S):
17
PROVIDE EACH DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	STOREROOM LOCK	ND80PD SPA	626	SCH
1	EA	SURFACE CLOSER	4050 SCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE GROUP NO. 203K
FOR USE ON DOOR #(S):
22
PROVIDE EACH DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	STOREROOM LOCK	ND80PD SPA	626	SCH
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE GROUP NO. 303S
FOR USE ON DOOR #(S):
16 18 20
PROVIDE EACH DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PRIVACY LOCK	ND40S SPA	626	SCH
1	EA	OH STOP	450S X SIZE AS REQ	630	GLY
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE GROUP NO. 401L
FOR USE ON DOOR #(S):
25
PROVIDE EACH DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	DBL CYL DEAD LOCK	L462P	626	SCH
1	EA	PASSAGE SET	ND10S SPA	626	SCH
1	EA	SURFACE CLOSER	4050 RA/PA MOUNT TO SUITE CONDITIONS	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	188S H & J	BK	ZER

HARDWARE GROUP NO. 501C
FOR USE ON DOOR #(S):
14
PROVIDE EACH DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	CLASSROOM LOCK	ND70PD SPA	626	SCH
1	EA	SURFACE CLOSER	4050 SCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE GROUP NO. 701
FOR USE ON DOOR #(S):
15
PROVIDE EACH DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	PANIC HARDWARE	99-L-17	626	VON
1	EA	CYLINDER	TYPE AS REQ	626	SCH
1	EA	SURFACE CLOSER	4050 RA/PA MOUNT TO SUITE CONDITIONS	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE GROUP NO. 701R
FOR USE ON DOOR #(S):
23
PROVIDE EACH DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	FIRE EXIT HARDWARE	99-L-F-17	626	VON
1	EA	CYLINDER	TYPE AS REQ	626	SCH
1	EA	SURFACE CLOSER	4050 RA/PA MOUNT TO SUITE CONDITIONS	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	188S H & J	BK	ZER

HARDWARE GROUP NO. 714A
FOR USE ON DOOR #(S):
21
PROVIDE EACH DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	112HD/224HD - TYPE AS REQ	628	IVE
1	EA	PANIC HARDWARE	3347A-EO	626	VON
1	EA	PANIC HARDWARE	3347A-NL-OP	626	VON
1	EA	CYLINDER	TYPE AS REQ	626	SCH
2	EA	90 DEG OFFSET PULL	8190HD 10" O	630	IVE
2	EA	SURFACE CLOSER	4050 TOP JAMB MOUNT	689	LCN
2	EA	FLOOR STOP	FS444	626	IVE
2	EA	ASTRAGAL	BY ALUM DOOR MANUFACTURER		
2	EA	BRUSH GASKETING	BY ALUM DOOR MANUFACTURER		
2	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	655A LENGTH AS REQ	A	ZER

HARDWARE GROUP NO. 801
FOR USE ON DOOR #(S):
19
PROVIDE EACH DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA	90 DEG OFFSET PULL	8190HD 10" O	630	IVE
1	EA	PUSH PLATE	8200 8" X 16"	630	IVE
1	EA	SURFACE CLOSER	4050H RA/PA MOUNT TO SUITE CONDITIONS	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE GROUP NO. A714A
FOR USE ON DOOR #(S):
1
PROVIDE EACH DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	112XY EPT	628	IVE
2	EA	POWER TRANSFER	EPT10	689	VON
1	EA	PANIC HARDWARE	3347A-EO	626	VON
1	EA	PANIC HARDWARE	3347A-NL-OP-388	626	VON
1	EA	CYLINDER	TYPE AS REQ	626	SCH
1	EA	RIM CYLINDER	20-057 ICX W/CONST. CORE	626	SCH
2	EA	90 DEG OFFSET PULL	8190EZHD-O 10"	630	IVE
1	EA	SURFACE CLOSER	4050 TOP JAMB MOUNT	689	LCN
1	EA	SURF. AUTO OPERATOR	9542 HL/D	ANCLR	LCN
1	EA	BRUSH GASKETING	BY ALUM DOOR MANUFACTURER		
2	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	655A	A	ZER
1	SET	MEETING STILE	BY DOOR MANUFACTURER		

SET PUSH "N" GO FEATURE TO ON. PUSHING OR PULLING DOOR OPEN 5 DEGREES CAUSES OPERATOR TO OPEN REMAINDER OF WAY AND HOLD OPEN TO THE AMOUNT OF HOLD OPEN DELAY SET. (1 TO 32 SECONDS). EXIT DEVICE TO BE DOGGED DOWN DURING BUSINESS HOURS. NO PUSH BUTTONS/ACTUATORS USED.

HARDWARE GROUP NO. A800A
FOR USE ON DOOR #(S):
2
PROVIDE EACH DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	112HD/224HD - TYPE AS REQ	628	IVE
2	SET	PUSH/PULL BAR	9190HD-33-10 NO	630	IVE
1	EA	SURFACE CLOSER	4050 TOP JAMB MOUNT	689	LCN
1	EA	SURF. AUTO OPERATOR	9542 HL/D	ANCLR	LCN
2	EA	FLOOR STOP	FS410	626	IVE

SET PUSH "N" GO FEATURE TO ON. PUSHING OR PULLING DOOR OPEN 5 DEGREES CAUSES OPERATOR TO OPEN REMAINDER OF WAY AND HOLD OPEN TO THE AMOUNT OF HOLD OPEN DELAY SET. (1 TO 32 SECONDS). NO PUSH BUTTONS/ACTUATORS USED.

HARDWARE GROUP NO. C205I
FOR USE ON DOOR #(S):
9
PROVIDE EACH DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	L9080P 17A	626	SCH
1	EA	ELECTRIC STRIKE	1006 (PROVIDED BY SECURITY CONTRACTOR)		HES
1	EA	SURFACE CLOSER	4050 RA/PA MOUNT TO SUITE CONDITIONS	689	LCN
1	EA	FLOOR STOP	FS410	626	IVE
1	EA	GASKETING	328 H&J	AA	ZER
1	EA	DOOR BOTTOM	365AA X END CAPS X LENGTH AS REQ	AA	ZER
1	EA	THRESHOLD	655A LENGTH AS REQ	A	ZER
1	EA	RAIN DRIP	141AA X LENGTH REQ	AA	ZER
1	EA	DOOR SCOPE	DS/2000	689	
1	EA	CREDENTIAL READER	BY SECURITY CONTRACTOR		
1	EA	POWER SUPPLY	BY SECURITY CONTRACTOR		

HARDWARE GROUP NO. C715A
FOR USE ON DOOR #(S):
27
PROVIDE EACH DOOR(S) WITH THE FOLLOWING:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	112HD/224HD EPT - TYPE AS REQ	628	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	ELEC PANIC HARDWARE	HD-RX-QEL-33A-NL-OP	626	VON
1	EA	CYLINDER	TYPE AS REQ	626	SCH
1	EA	90 DEG OFFSET PULL	8190HD 10" O	630	IVE
1	EA	SURFACE CLOSER	4050 TOP JAMB MOUNT	689	LCN
1	EA	FLOOR STOP	FS444	626	IVE
1	EA	ASTRAGAL	BY ALUM DOOR MANUFACTURER		
1	EA	BRUSH GASKETING	BY ALUM DOOR MANUFACTURER		
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	655A LENGTH AS REQ	A	ZER
1	EA	CREDENTIAL READER	BY SECURITY CONTRACTOR		
1	EA	POWER SUPPLY	PS902 900-2RS	LGR	SCE

INGRESS BY THE CARD READER.
EGRESS BY PANIC HARDWARE.

END OF SECTION

SECTION 08 80 00

GLAZING

1.1 SUMMARY

A. Section Includes:
1. Glass and glazing for metal frames, doors, and windows.
2. Glass and glazing materials and installation requirements are included in this section for other sections referencing this section.

1.2 PERFORMANCE REQUIREMENTS

A. Glass Thickness: Select minimum thickness in accordance with ASTM E1300 to resist specified design loads.

B. Structural Design: Design in accordance with applicable code for most critical combination of wind, snow, seismic, and dead loads.

C. Roof Loads: Design sloped glass to resist live and dead loads.

D. System Design: Design and size components to withstand dead loads and live loads caused by pressure and negative wind loads acting normal to plane of window.

1.3 SUBMITTALS

A. Shop Drawings: Required.

B. Product Data: Required. Submit solar heat gain coefficient, as well as thicknesses and tint for glass.

C. Samples: Required.

1.4 QUALITY ASSURANCE

A. Qualifications of Installers: Provide at least one person thoroughly trained and experienced in skills required, completely familiar with referenced standards and requirements of this work and to personally direct installation performed under this Section.

B. Applicable Standards For Glass and Glazing Work: Conform to the "Manual of Glazing" of the Flat Glass Marketing Association, requirements of Federal Specification DD-G-451c and Safety Standard 16 CFR 1201 of the U.S. Consumer Products Safety Commission.

1.5 WARRANTY

A. Furnish five year warranty for sealed glass units.

PART 2 PRODUCTS

2.1 GLASS MATERIALS

A. Annealed Glass: ASTM C1036, Type 1 transparent flat, Quality Q3, float glass.

B. Heat Strengthened Glass: ASTM C1048, Type 1 transparent flat, Quality Q3, uncoated.

C. Tempered Glass: ASTM C1048, Type 1 transparent flat, Quality Q3, uncoated.

D. Mirrors: Polished plate glass, No. 1 silvering quality with electrolytic copper backs; 1/4 inch thick.

E. Provide safety glazing as required by code. Provide heat strengthened glass where required by design pressures, anticipated thermal stress, or use in spandrel areas. Provide fully tempered glass only where safety glazing is mandatory or where pressures exceed capacity of heat strengthened glass.

2.2 FLOAT GLASS PRODUCTS

A. Clear Glass: Annealed, Heat strengthened, and Tempered float glass as specified; Class 1 clear.

B. Tinted Glass: Annealed, heat strengthened, and tempered float glass as specified; Class 2 tinted.
   1. Tint: Gray.

C. Minimum Thickness: 1/4 inch unless otherwise indicated.

2.3 FIRE RESISTIVE GLASS PRODUCTS

A. Fire Resistive Glass: Complying with ASTM E119, NFPA 80, and tested in accordance with NFPA 257.
   1. Product: Firelite manufactured by Nippon Electric Glass Co.
   2. Fire Rating: As shown on Drawings or otherwise required by code.
   3. Fire Rated Door Glazing: Tested in accordance with NFPA 252 with neutral pressure level at 40 inches maximum above sill at 5 minutes into test and complying with NFPA 80.

B. Minimum Thickness: 1/4 inch.

2.4 INSULATING GLASS PRODUCTS

A. Insulating Glass: ASTM E2190.
   1. Total Unit Thickness: 1 inch unless otherwise indicated.

B. Double Pane Insulating Glass:
   1. Product: Solarban 60 manufactured by Oldcastle.
   2. U-Factor Winter: 0.29 maximum.
   3. U-Factor Summer: 0.27 maximum.
   4. Solar Heat Gain Coefficient: 0.28 maximum.

2.5 GLAZING ACCESSORIES

A. Provide glazing accessories required to complete glazing work, that are compatible with various components of the glazing system(s), and subject to approval of Architect.

B. Glazing Sealants, Gaskets and Tapes: Materials compatible with adjacent materials including glass and glazing channels; type recommended by manufacturer to suit application.

C. Setting Blocks: Silicone blocks tested for compatibility with specified glazing sealants. Provide side blocks at both jambs, between midheight and top corner of glass, at four-side conventional dry glazed openings. Side blocks are not required where glass is continuously sealed with silicone sealant at two or more edges.

D. Compressible Filler Rod: Closed-cell or waterproof-jacketed foam of polyethylene, butyl rubber, neoprene, polyurethane or vinyl, tested for compatibility with specified glazing sealants, of 5 to 10 psi compression strength (25% deflection), recommended by sealant manufacturer for use in glazing channel to prevent sealant exudation from the channel.

E. Mirror Mastic: An adhesive setting compound, produced specifically for setting mirrors by spot application method (25% coverage) without support, to be used in 1/8" to 1/2" thickness.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify openings for glazing are correctly sized, within tolerance, and glazing channels or recesses are clean, free of obstructions, and ready to receive glazing.

3.2 PREPARATION

A. Seal porous glazing channels or recessed with substrate compatible primer or sealer.

B. Prime surfaces scheduled to receive sealant.

3.3 INSTALLATION

A. Perform installation in accordance with GANA Glazing Manual.
   1. Glazing Sealants: Comply with ASTM C1193.
   2. Fire Rated Openings: Comply with NFPA 80.

3.4 CLEANING

A. Remove glazing materials from finish surfaces.

B. Remove labels after Work is complete.

C. Clean glass, mirrors, and adjacent surfaces.

D. Clean glass on both sides after painting operations are complete and dry. Do not use acid solutions or caustic soaps to clean glass.

E. Do not use razor blades to clean glass. Any scratches on the glass caused by the cleaning process will be cause for the removal and replacement of the damaged glass at the Contractor's expense.

END OF SECTION

SECTION 09 21 16

GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Metal stud wall framing.
2. Gypsum board and joint treatment.
3. Cementitious backer board.
4. Acoustic insulation.
5. Textured finish.

1.2 SUBMITTALS

A. Product Data: Required.

B. Samples: Submit sample of wall texture for approval, before proceeding.

1.3 PROJECT CONDITIONS

A. In cold weather, heat building to provide uniform temperature of 50 to 70 and provide ventilation to eliminate excess moisture.

PART 2 PRODUCTS

2.1 GYPSUM BOARD ASSEMBLIES

A. Manufacturers:
1. BPB Americas Inc.
2. G-P Gypsum Corp.
3. National Gypsum Co.
4. United States Gypsum Co.
5. Substitutions: Permitted.

2.2 COMPONENTS

A. Framing Materials:
1. Furring, Framing, and Accessories: ASTM C645; GA-216 and GA-600; galvanized sheet steel, 20 gage thick unless noted otherwise.
2. Fasteners: ASTM C1002; Type S, GA-216.
3. Adhesive: ASTM C557, GA-216.

B. Gypsum Board Materials: ASTM C1396; Type X fire resistant where indicated on Drawings.
1. Standard Gypsum Board: 5/8 inch thick.
2. Moisture Resistant Gypsum Board: 5/8 inch thick.

C. Tile Backer Board:
1. Cementitious Backing Board: High density, glass fiber reinforced, ½ inch thick.

2.3 ACCESSORIES

A. Acoustic Insulation: ASTM C665; preformed glass fiber, unfaced.

B. Acoustic Sealant: Non-hardening, non-skinning.

C. Casing Bead: "Goldbond" No.500 galvanized steel by National Gypsum Co., or approved equal. Furnish and install metal reveal strips where shown and detailed.

D. Corner Beads: 0.014 inch thick, hot dip galvanized steel with 1" flanges with 1/16" radius nose with large openings in flange similar to 5/8" diameter holes 7/8" on center.

E. Control and Expansion Joints: "Sheetrock" zinc control joint No.093 by USG, or approved equal. Provide safing and/or acoustical insulation behind control joints as required for adjacent partition construction. Use fire rated control joints in partitions requiring a fire rating.

F. Joint Materials: ASTM C475; GA-216; reinforcing tape, joint compound, adhesive, and water.

G. Drywall Screws: Self-drilling type, 1" long for single layer application of gypsum board to metal studs and furring channels and of longer length for multiple layer installation.

PART 3 EXECUTION

3.1 GENERAL

A. Comply with specified requirements, manufacturer's instructions and recommendations, and referenced standards.

B. Deliver materials to job in original unopened containers or bundles and store protected from damage and exposure to the elements.

C. Cooperate with carpenters in placing of backing and blocking required for millwork, fixtures, fittings, and accessories.

D. Make cut-outs in panels for pipes, fixtures and small openings. Make holes and cut-outs by method that will not fracture wallboard core or tear covering. Cut holes with accuracy so plates, escutcheons and trim cover edges.

E. At any change in direction of gypsum board, provide sufficient auxiliary framing, blocking or nailers to allow secure attachment along every edge of every individual piece of gypsum board. Do not leave any loose edges.

3.2 INSTALLATION – FRAMING

A. Metal Studs:

1. Install studs in accordance with ASTM C754, GA-216 and GA-600.
2. Metal Stud Spacing: 16 inches o.c.
3. Partition Heights: Full height to structure above unless noted otherwise. Install additional bracing for partitions extending above ceiling.

B. Ceiling Framing Installation:
1. Install in accordance with GA-216 and GA-600.
2. Coordinate location of hangers with other work.
3. Install ceiling framing independent of walls, columns, and above ceiling work.
4. Reinforce openings in ceiling suspension system which interrupt main carrying channels or furring channels, with lateral channel bracing. Extend bracing minimum 24 inches past each end of openings.
5. Laterally brace entire suspension system.

3.3 INSTALLATION - GYPSUM BOARD

A. Install sound attenuation blankets where indicated, prior to gypsum board unless readily installed after board has been installed. Place acoustic insulation in partitions tight within spaces, around cut openings, behind and around electrical and mechanical items within or behind partitions, and tight to items passing through partitions. Install acoustic sealant within partitions.

B. Install gypsum board in accordance with GA-216 and GA-600.

C. Fasten gypsum board to furring or framing with screws. Staples may only be used when securing first layer of double layer applications.

D. Locate exposed end-butt joints as far from center of walls and ceilings as possible, and stagger not less than 1'-0" in alternate course of board.

E. Install ceiling boards in the direction and manner which will minimize the number of end-butt joints, and which will avoid end joints in the central area of each ceiling. Stagger end joints at least 1'-0".

F. Install wall/partition boards vertically to avoid end-butt joints wherever possible. Do not butt boards to concrete floor. Maintain a minimum 1/4" to a maximum 3/8" space between bottom of board and concrete.

G. Install exposed gypsum board with face side out. Do not install imperfect, damaged or damp boards. Butt boards together for a light contact at edges and ends with not more than 1/16 inch open space between boards. Do not force into place.

H. Locate either edge or end joints over supports, except in horizontal applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Position boards so that like edges abut, tapered edges against tapered edges and mill-cut or field-cut ends against mill-cut or field cut ends. Do not place tapered edges against cut edges or ends. Stagger vertical joints over different studs on opposite sides of partitions.

I. Attach gypsum board to framing and blocking as required for additional support at openings and cutouts. Space between recessed boxes and cut edges shall not exceed 1/8 inches.

J. Form control joints and expansion joints with space between edges of boards, prepared to receive trim accessories described below .

K. Space fasteners in gypsum boards in accordance with referenced standards and manufacturer's recommendations, except as otherwise indicated.

L. Seal cut edges, holes, and areas where wallboard covering is broken, with resistant sealer.

M. Ceilings:
1. Apply gypsum board prior to wall/partition board application to the greatest extent possible. For single-ply construction, use perpendicular application. For two-ply assembles use perpendicular application and apply face ply of gypsum board so that joints of face ply do not occur at joints of base ply with joints over framing members.
2. Where screws are used, they shall be spaced not more than 12 in. o.c. for ceilings where the framing members are 16 in. o.c.
3. Screws shall be spaced not more than 12 in. o.c. for ceilings where framing members are 24 in. o.c.
4. For applications on wood or other applications, refer to Gypsum Association GA-216 for fastener type and spacing.

N. Partitions:
1. Use maximum length sheets practical to minimize end joints.
2. When gypsum board is installed parallel to framing members, space fasteners 12 inches on center in field of the board, and 8 inches on center along edges.
3. When gypsum board is installed perpendicular to framing members, space fasteners 12 inches (304.8mm) on center in field and along edges.
4. Stagger screws on abutting edges or ends.
5. For single-ply construction, apply gypsum board with long dimension either parallel or perpendicular to framing members as required to minimize number of joints.

3.4 INSTALLATION - DRYWALL TRIM ACCESSORIES

A. General: Where feasible, use the same fasteners to anchor trim accessory flanges as required to fasten gypsum board to the supports. Otherwise, fasten flanges to comply with manufacturer's recommendations.

B. Install trim in strict accordance with manufacturers' recommendations. Install trim plumb, level, and true to line with firm attachment to supporting members.

C. Install metal corner beads at external corners of drywall work. Corner beads are to be completely bedded and taped.

D. Provide casing beads where edges of gypsum board meet dissimilar materials.

E. Install metal edge trim whenever edge of gypsum board would otherwise be exposed or semi-exposed, and except where plastic trim is indicated. Provide type with face flange to receive joint compound except where semi-finishing type is indicated. Install L-type trim where work is tightly abutted to other work, and install special kerf-type where other work is kerfed to receive long leg of L-type trim. Install U-type trim where edge is exposed, revealed, gasketed, or sealant-filled (including expansion joints).

F. Install metal control joints where indicated on drawings. If not indicated on drawings, install in accordance with the following:
   1. Interior Partitions: Maximum Single Dimension not to exceed 20 feet. Maximum Single Area not to exceed 400 sq. ft.
   2. Interior Ceiling With Perimeter Relief: Maximum Single Dimension not to exceed 40 feet. Maximum Single Area not to exceed 1,600 sq.ft. Install control joint at any change of direction of ceiling framing or support system.
   3. Interior Ceiling Without Perimeter Relief: Maximum Single Dimension not to exceed 20 feet. Maximum Single Area not to exceed 400 sq.ft. Install control joint at any change of direction of ceiling framing or support system.

3.5 JOINT TREATMENT AND FINISHING

A. General: Joint treatment for gypsum board surfaces is also described in Section 09 9000.

B. All joints in gypsum board construction are to be taped and floated. This includes work above ceilings, at concealed places and anywhere else joints in gypsum board construction occur.
   1. All screw and/or nail heads are to be floated smooth both above and below ceiling line.

C. Finish Levels:
   1. Level 1: At ceiling plenum areas and concealed areas.
   2. Level 2: At surfaces that are substrate for tile.
   3. Level 3: (Not Used).
   4. Level 4 (typical Finish): At surfaces receiving light finishes before painting.
   5. Level 5: At surfaces subject to severe lighting.

3.6 TOLERANCES

A. Tolerances: Maximum Variation from Flat Surface:1/8 inch in 10 feet in any direction.

3.7 CLEANING UP

A. Do not allow accumulation of scraps and debris arising from work of this Section. Maintain premises in neat and orderly condition at all times. Immediately remove spilled or splashed compound material and all trace of residue from adjoining surfaces.

END OF SECTION

SECTION 09 30 00

TILING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Porcelain tile for floor and wall.
2. Thin-set application methods.
3. Thresholds.
4. Accessories.

1.2 SUBMITTALS

A. Product Data: Required.

1.3 QUALITY ASSURANCE

A. Tile must be from the same die lot and caliber.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: Required.

1.5 EXTRA MATERIALS

A. Section 01 70 00 - Execution and Closeout Requirements: Spare parts and maintenance products.

B. Supply 6 sq ft of each size, color, and surface finish of each tile specified.

PART 2 PRODUCTS

2.1 TILE PRODUCTS

A. Porcelain Floor Tile:
1. Contact Rep: Gwyn Noland, gnoland@bpiteam.com
2. Manufacturer: Marazzi
3. Style: Silk
4. Size: 12 x 24
5. Colors:
a. Field: Sophisticated
b. Accent: Elegant

B. Porcelain Wall Tile:
1. Contact Rep: Linda Anderson, 501.812.5574
2. Style: Reflections
3. Style: Riverstone

C. Ledgestone behind Tellers:
   1. Contact Rep: Linda Anderson, 501.812.5574
   2. Style/Color: M-Stone Harappa Gold Ledger

2.2 ACCESSORIES

A. Mortar Materials: Latex-Portland Cement type: ANSI A118.4.

B. Grout Materials: ANSI A118.6; Latex-Portland cement type.

C. Crack Suppression Membrane: CrackBuster Pro, by Custom Building Products.

D. Cementitious Backer Board: As specified in Section 09 21 16.

E. Tile Floor Edging: Schluter Schiene.

F. Grout Sealer: Aqua Mix Sealer's Choice Gold, or approved equal.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install crack suppression membrane over entire Lobby/Teller floor area to receive tile.

B. Install tile, and grout in accordance with applicable requirements of ANSI A108.1 through A108.10, and TCA Handbook recommendations.

C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly.

D. Place edge strips at locations indicated.

E. Grout tile joints.

F. Apply grout sealer after fully cleaned.

G. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.

END OF SECTION

SECTION 09 51 13

ACOUSTICAL CEILINGS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Suspended metal grid ceiling system and perimeter trim.
2. Acoustic panels.
3. Linear metal ceiling.
4. Extruded aluminum trim for clouds.

1.2 PERFORMANCE REQUIREMENTS

A. Design and install suspended ceilings in accordance with requirements listed in the 2012 edition of the IBC and ASTM E580, for seismic category D.

B. Splice Connection Strength of Main Beams, Cross Tee Intersections and Splices: 180 pounds compression and tension.

C. Cross tees supporting light fixtures must have the same load-carrying capacity as the main beams, or be fitted with supplemental hangers.

D. Hanger wire attachment devices: Capable of supporting minimum 100 pounds.

1.3 SUBMITTALS

A. Product Data: Required.

B. Samples: Not required unless substitution.

1.4 QUALITY ASSURANCE

A. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40% during and after acoustic unit installation.

1.6 WARRANTY

A. Acoustical Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace acoustical panels that fail within the warranty period. Failures include, but are not limited to:
1. Acoustical Panels: Sagging and warping as a result of defects in materials or factory workmanship.

2. Grid System: Rusting and manufacturer's defects
3. Acoustical Panels with BioBlock Plus or designated as inherently resistive to the growth of micro-organisms installed with Armstrong suspension systems: Visible sag and will resist the growth of mold/mildew and gram positive and gram negative odor and stain causing bacteria.

B. Warranty Period Humiguard:
1. Acoustical panels: Ten (10) years from date of substantial completion.
2. Grid: Ten (10) years from date of substantial completion.
3. Acoustical panels and grid systems with HumiGuard Plus or HumiGuard Max performance supplied by one source manufacturer is thirty (30) years from date of substantial completion.

1.7 EXTRA MATERIALS

A. Section 01 70 00 - Execution and Closeout Requirements: Spare parts and maintenance products.

B. Furnish 50 sq ft of extra panels to Owner.

PART 2 PRODUCTS

2.1 COMPONENTS

A. Acoustic Panels: ASTM E1264.
1. Size: 24 x 24 inches.
2. Thickness: 5/8 inches.
3. Edge: Tegular.
4. Style: Armstrong Dune or Rockfon Artic.

B. Grid:
1. Non-fire Rated Grid: ASTM C635, intermediate heavy duty; exposed T, tegular configuration.
2. Grid Materials: Cold rolled steel with galvanized coating.
3. Exposed Grid Surface Width: 15/16 inch with reveal.
4. Grid Finish: White.
5. Support Channels and Hangers: Galvanized steel, minimum 12 gage.
6. Wall Moldings: Minimum 7/8”.
7. Provide seismic joint clip per ASTM A568 or BERC2 clip.

2.2 LINEAR METAL CEILING

A. Ceiling: Planar as manufactured by Rockfon, or approved equal.
1. Material: 0.025” aluminum.
2. Edge: Square, with fillers at exterior only.
3. Panel Width: 4"
4. Color: White.

B. Access Door Assembly Kit: Model 58.01.058 by Chicago Metallic, or approved equal.

2.4 EXTRUDED ALUMINUM TRIM

A. Trim: Axiom by Armstrong, or approved equal.

B. Components: Extruded aluminum trim of commercial quality hot dipped galvanized steel coating as per ASTM A653.

C. Finish: Exposed surfaces to be chemically cleansed, capping prefinished galvanized steel in baked polyester paint.

D. Provide all accessories such as hanging clips, T-Bar connectors and any other trim required for a complete installation in configuration as shown on Drawings.

PART 3 EXECUTION

3.1 INSTALLATION

A. Suspension System:
1. Install suspension system in accordance with ASTM C636 and ASTM E580, and special requirements for seismic category D.
2. Coordinate location of hangers with other work. Where components prevent regular spacing of hangers, reinforce system to span extra distance. Suspension wires to have maximum 4’ spacing.
3. Locate system on room axis according to reflected plan. Hang system independent of wall molding, ducts, pipes and conduit.
4. Install edge molding at intersection of ceiling and vertical surfaces, using longest practical lengths.
5. Attach suspension system to two adjacent walls. Provide ¾” clearance at opposite walls.
6. Tie ends of main beams and cross tees together to prevent spreading.
7. Provide positive bracing at changes in ceiling planes.
8. Support and brace cable trays and electrical conduits independently.
9. Provide perimeter support wires within 8”.

B. Acoustic Units:
1. Fit acoustic units in place.
2. Install hold-down clips to retain panels tight to grid system within 20 ft of exterior door and at restrooms.

C. Linear Metal Ceiling: Install in accordance with manufacturer’s instructions.

END OF SECTION

SECTION 09 65 00

RESILIENT FLOORING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Resilient plank flooring.
2. Resilient base.

1.2 SUBMITTALS

A. Product Data: Required.

B. Samples: Required.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: Required.

1.4 ATTIC STOCK

A. Provide one unopened carton of each flooring material for attic stock.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Maintain temperature in storage area between 55 degrees F and 90 degrees F.

B. Store materials for not less than 48 hours prior to installation in area of installation at temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

1.6 WARRANTY

A. Provide manufacturer’s 15 year commercial warranty for Luxury Vinyl Plank.

PART 2 PRODUCTS

2.1 LUXURY VINYL PLANK FLOORING

A. Manufacturer: J + J Industries
1. Style: Framework V5001
2. Color: 1012 Anchor
3. Size: 9” x 48”

2.2 RESILIENT BASE

A. Molded Rubber Base:

1. Manufacturer/Style: Johnsonite, Inflection.
2. Color: Grey Haze #24.
3. Size: 5-1/4”.

B. Rubber Cove Base:
1. Manufacturer: Johnsonite.
2. Color: Grey Haze #24
3. Size: 4”.

2.2 ACCESSORIES

A. Resilient Edge Strip: Johnsonite.
1. Porcelain Tile to LVP: CTA-XX-K
2. LVP to Concrete: RRS-XX-C

B. Adhesives, Primers, and Sub-Floor Fillers: Type recommended by manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify concrete floors are dry to maximum moisture content as recommended by manufacturer, and exhibit negative alkalinity, carbonization, and dusting.

3.2 PREPARATION

A. Clean substrate.

B. Fill minor low spots and other defects with sub-floor filler.

C. Apply primer as required to prevent "bleed-thru" or interference with adhesion by substances that cannot be removed.

D. Beginning of installation constitutes acceptance of subfloor.

3.3 INSTALLATION – PLANK FLOORING

A. Install luxury vinyl flooring in accordance with manufacturer’s instructions.

B. Install luxury vinyl planks staggered, as recommended by manufacturer.

C. Install edge strips where flooring terminates.

3.4 INSTALLATION - BASE

A. Fit joints tightly and make vertical.

B. Miter internal corners. At external corners, 'V' cut back of base strip to 2/3 of its thickness and fold. At exposed ends, use premolded units.

3.5 CLEANING

A. Remove excess adhesive from surfaces without damage.

B. Do not wash the floor for at least four to five days after installation.

END OF SECTION

SECTION 09 68 13

CARPET

PART 1 GENERAL

1.1 SUMMARY

A. Section includes carpet planks, with adhesive tab installation, and accessories.

1.2 REFERENCES

A. Carpet and Rug Institute:
   1. CRI 104 - Standard for Installation of Commercial Carpet.
   2. CRI Green Label Plus Testing Program.

B. Consumer Products Safety Commission:
   1. CPSC 16 CFR 1630 - Standard for the Surface Flammability of Carpets and Rugs.

C. National Fire Protection Association:
   1. NFPA 253 - Standard Method of Test for Critical Radiant Flux for Floor Covering Systems Using a Radiant Heat Energy Source.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures.

B. Shop Drawings: Indicate layout of joints, direction of carpet pile, and location of edge moldings.

1.4 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.

B. Operation and Maintenance Data: Submit maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.

1.5 QUALITY ASSURANCE

A. Surface Burning Characteristics:
   1. Floor Finishes: Comply with one of the following:
      a. Class I, minimum 0.45 watts/sq cm when tested in accordance with NFPA 253.
      b. CPSC 16 CFR 1630.

1.6 QUALIFICATIONS

A. Installer: Company specializing in performing work of this section with minimum 5 years documented experience.
   1. FCIB or IFCI certified carpet installers.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements.

B. Store materials in area of installation for 48 hours prior to installation.

1.8 WARRANTY

A. Furnish the following manufacturer warranties:
   1. Lifetime of Carpet. No More than 10% face yarn loss by weight in normal use.
   2. Static - Lifetime of Carpet.
   3. Edge Ravel - Lifetime of Carpet. Guaranteed no edge ravel in normal use (no seam sealers required)
   4. Delamination - Lifetime of Carpet. Guaranteed no delamination in normal use.
   5. Tuft Bind - Lifetime of Carpet. Guaranteed not to zipper, wet or dry.
   6. Stain Resistance - Lifetime stain warranty and a 10 year Lightfastness and Atmospheric Contaminant Warranty.

B. Submit installer's two year warranty to correct or replace all defects in workmanship.

1.9 EXTRA MATERIALS

A. Section 01 70 00 - Execution and Closeout Requirements: Spare parts and maintenance products.

B. Supply 5% of carpet tiles of each color and pattern selected.

PART 2 PRODUCTS

2.1 CARPET TILE

A. Manufacturer/Style/Colors: Mohawk, New Vintage Reawakened.
   1. Color: 849 Flawless
   2. Size: 12” x 36”.
   3. Installation: Brick ashlar with adhesive tabs.

2.2 ACCESSORIES

A. Sub-Floor Filler: Type recommended by flooring material manufacturer.

B. Moldings and Edge Strips: Refer to Section 09 65 00.

C. Contact Adhesive: Recommended by carpet manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify floor surfaces are smooth and flat within tolerances required by carpet manufacturer, and are ready to receive work. Beginning of work constitutes acceptance of conditions.

3.2 PREPARATION

A. Remove sub-floor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with sub-floor filler.

B. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.

C. Clean substrate.

3.3 INSTALLATION

A. Install carpet in accordance with manufacturer's instructions and CRI 104.

B. Do not mix carpet from different cartons unless from same dye lot.

C. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.

D. Install carpet tile in brick ashlar pattern, as shown on Drawings.

E. Locate change of color or pattern between rooms under door centerline.

F. Use manufacturer's adhesive tabs to secure planks to substrate.

G. Trim carpet neatly at walls and around interruptions.

H. Complete installation of edge strips, concealing exposed edges.

3.4 CLEANING

A. Section 01 70 00 - Execution and Closeout Requirements: Final cleaning.

B. Remove excess adhesive from floor, base, and wall surfaces without damage.

C. Clean and vacuum carpet surfaces.

END OF SECTION

SECTION 09 90 00

PAINTING AND COATING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Surface preparation.
2. Field application of paints, stains, varnishes, and other coatings.

1.2 SUBMITTALS

A. Product Data: Required.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: Required.

PART 2 PRODUCTS

2.1 PAINTS AND COATINGS

A. Manufacturers:
1. Benjamin Moore
2. Farrell Calhoun
3. PPG Industries Architectural Finishes
4. Sherwin Williams
5. Substitutions: Not Permitted.

2.2 COMPONENTS

A. Coatings: Ready mixed, except field catalyzed coatings. Provide premium quality products, not average.

B. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve finishes specified; commercial quality.

PART 3 EXECUTION

3.1 APPLICATION

A. Apply each coat to uniform appearance. Apply each coat of paint slightly darker than preceding coat.

B. Sand wood and metal surfaces lightly between coats.

C. Prime concealed surfaces of interior woodwork.

D. Finishing Mechanical and Electrical Equipment:

1. Paint shop primed equipment.
2. Paint interior surfaces of air ducts visible through grilles and louvers with one coat of flat black paint.
3. Color code equipment, piping, conduit, and exposed duct work.

3.2 SCHEDULE - EXTERIOR SURFACES

A. Pavement Markings:
1. Refer to Section 32 13 23.

B. Steel - Unprimed:
1. One coat of latex primer.
2. Two coats of latex enamel, semi-gloss.

C. Steel - Shop Primed:
1. Touch-up with zinc chromate primer.
2. Two coats of latex enamel, semi-gloss.

D. Steel - Galvanized:
1. One coat galvanize primer.
2. Two coats of latex enamel, semi-gloss.

3.4 SCHEDULE - INTERIOR SURFACES

A. Wood - Painted:
1. One coat of alkyd prime sealer.
2. Two coats of alkyd enamel, semi-gloss.

B. Wood - Transparent:
1. Filler coat (for open grained wood only).
2. Two coats of stain
3. One coat sealer.
4. Two coats of varnish, gloss.

C. Cabinet Interior:
1. Same as exterior of cabinet.

D. Steel - Unprimed:
1. One coat of latex primer.
2. Two coats of latex enamel, semi-gloss.

E. Steel - Primed:
1. Touch-up with latex primer.
2. Two coats of latex enamel, semi-gloss.

F. Steel - Galvanized:
1. One coat galvanize primer.
2. Two coats of latex enamel, semi-gloss.

G. Gypsum Board Walls:
1. One coat of latex primer sealer.
2. Two coats of latex acrylic enamel, satin.

H. Gypsum Board Ceilings:
   1. One coat of latex primer sealer.
   2. Two coats of latex acrylic enamel, eggshell.

3.5 SCHEDULE - COLORS

A. Restroom Walls: SW7074 Software

B. All Other Walls: SW7044 Amazing Gray

C. Accent Walls: SW7074 Software

END OF SECTION

SECTION 10 00 00

SPECIALTIES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Snow barricade system.
   2. Knox box.

1.2 SUBMITTALS

A. Product Data: Required.

PART 2 PRODUCTS

2.1 SNOW BARRICADE SYSTEM

A. Manufacturer:
   1. Sno Gem
   2. Substitutions: Permitted.

B. Snow Barricade System I-Clad System as manufactured by Sno-Gem or approved equal; 2” barricade with I-Beam-S. Finish to match roof panels.

2.2 KNOX BOX

A. Provide a knox box with tamper proof switch, dark bronze finish, recessed.

PART 3 EXECUTION

3.1 INSTALLATION – SNOW BARRICADE SYSTEM

A. Install piece of metal panel supplied by metal roofing supplier as shown on installation details.

B. Install snow barricade system on metal roofing in accordance with manufacturer’s instructions.

3.2 INSTALLATION – KNOX BOX

A. Install knox box recessed in the exterior wall, in location satisfactory to the Fire Marshall. Connect to building security system.

END OF SECTION

SECTION 10 14 00

SIGNAGE

PART 1 GENERAL

1.1 SUMMARY

A. Section includes:
   1. Interior restroom signs. Exterior signs are N.I.C.
   2. Vinyl letters/numbers.

B. Related Sections:
   1. Section 23 01 90 - Mechanical Identification

1.2 REFERENCES

A. Conform to the following:
   1. Department of Justice, Office of the Attorney General, "Americans with Disabilities Act", Public Law 101-336, (ADA).
   2. ANSI A117.1: Providing Accessibility and Useability for Physically Handicap People, 1986 edition.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures.

B. Shop Drawings: Indicate sign styles, lettering font, foreground and background colors, locations, overall dimensions of each sign.

C. Samples: Submit color chips (photos of colors are not acceptable) for selection by Architect.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.

B. Package signs, labeled in name groups.

C. Store adhesive attachment tape at ambient room temperatures.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.

B. Do not install signs when ambient temperature is lower than recommended by manufacturer.

C. Maintain this minimum temperature during and after installation of signs.

PART 2 PRODUCTS

2.1 INTERIOR SIGNS

A. Manufacturers:
1. ASI Sign Systems.
2. DFI
3. Archway Graphics
4. Mohawk
5. Substitutions: Section 01 60 00 - Product Requirements.

B. Signs: Clear Acrylic Face, in matte (non-glare) finish.
1. Backing Plate: Acrylic.
2. Sign Color: Color as selected.
3. Character Color: Contrasting color as selected.
4. Height: As required to fit on sign.
5. Edges: Radiused.
6. Character Font: Helvetica.
7. Provide braille to meet ADA.

C. Restroom Signs:
1. Description: HC symbol, message with Braille.
2. Approximate Size: 8" x 8"
3. Quantity: At each restroom and the Lactation Room.

2.2 VINYL LETTERS/ NUMBERS

A. Provide 6” high vinyl numbers with the address on the glass over entry doors, and at Community Room, as shown on Drawings.

2.3 ACCESSORIES

A. Tape Adhesive: Double sided tape, permanent adhesive.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install signs and letters after surfaces are finished, in locations as directed by Architect/Engineer.

B. Position restroom sign on strike side of door. Position sign 60 inches above the finished floor to the centerline of the sign.

C. Locate sign on wall surface, level.

END OF SECTION

SECTION 10 26 00

WALL PROTECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Corner guards.

1.2 SUBMITTALS

A. Product Data: Required.

B. Samples: Required.

PART 2 PRODUCTS

2.1 CORNER GUARDS

A. Manufacturers: Products listed are manufactured by C/S. Equal or superior products matching in color, will be considered for substitution.
   1. InPro Corporation.
   2. Koroseal Wall Protection Systems, Inc.
   3. Pawling Corp.
   4. Substitutions: Permitted.

2.2 COMPONENTS

A. Corner Guard Surface Mounted: High impact vinyl, with 1-1/2” wing.
   1. Color: CS 314 Ozark or approved equal.

B. Mounting Brackets and Attachment Hardware: Appropriate to component and substrate.

PART 3 EXECUTION

3.1 INSTALLATION

A. Position corner guard from top of base to ceiling.

END OF SECTION

SECTION 10 28 00

TOILET ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Toilet accessories.
2. Utility room accessories.

1.2 DESIGN REQUIREMENTS

A. Design grab bars and attachments to resist forces as required by applicable code.

1.3 SUBMITTALS

A. Product Data: Required.

PART 2 PRODUCTS

2.1 TOILET ACCESSORIES

A. Manufacturers:
1. A & J Washroom Accessories.
2. American Specialties, Inc.
3. Bobrick.
4. Bradley Corp.
5. Substitutions: Not Permitted.

2.2 COMPONENTS

A. Keys: Furnish 3 keys for each accessory to Owner; master key accessories.

B. Stainless Steel Sheet: ASTM A666, Type 304.

C. Stainless Steel Tubing: ASTM A269, stainless steel.

D. Mirror Glass: Float glass, with silvering, copper coating, and suitable protective organic coating.

E. Adhesive: As recommended by manufacturer.

2.3 TOILET ROOM ACCESSORIES

A. Refer to Schedule at end of this Section.

2.4 FACTORY FINISHING

A. Stainless Steel: No. 4 satin brushed.

B. Chrome/Nickel Plating: ASTM B456, satin finish.

C. Galvanizing: ASTM A123/A123M.

D. Shop Primed Ferrous Metals: Pretreat and clean, spray apply one coat primer and bake.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install plumb and level, securely and rigidly anchored to substrate.

B. Mounting Heights and Locations: As required by accessibility regulations and as follows:
1. Bottom of Mirrors: 40” to bottom of reflective surface.
2. Horizontal Grab Bars: Centerline 36" AFF.
3. Vertical Grab Bar: Bottom mounted at 40" AFF, centerline 40" from back wall.
4. Toilet Paper Dispenser: Centerline 24" AFF, 30" from back wall.
5. Paper Towel Dispenser: Bottom at 48" AFF max.

3.2 SCHEDULES

A. Grab Bars: 1-1/2" clearance, one 42" and one 36" horizontal, and one 18” vertical at each handicapped water closet.
1. ASI 3200 Series
2. Bobrick B-6206
3. Bradley 812 Series

B. Toilet Paper Dispensers: Double unit, one at each water closet.
1. ASI 7305-2
2. Bobrick B-686
3. Bradley 5324

C. Combination Paper Towel Dispenser/Waste Receptacles: Semi-recessed. One at each restroom and Lactation Room.
1. ASI 0467 (7 gallons): Mount bottom 40" AFF.
2. Bobrick B- 3942 (12 gallons): Mount 60 1/2" to top of unit.
3. Bradley 2252 (5.75gallons): Mount top 57 1/2" AFF

D. Soap Dispenser: Lavatory mounted, top fill, automatic, with 6" spout length; one at each lavatory.
1. Bobrick, B-824 or approved equal

E. Mirrors: Refer to Section 08 80 00.

F. Mop and Broom Holder: Provide one at each Janitor's Room.
1. ASI 1316
2. Bobrick B-239 x 34
3. Bradley 998

END OF SECTION

SECTION 10 35 00

FLAGPOLES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Vertical ground-set flagpoles.

1.2 SUBMITTALS

A. Shop Drawings: Indicate component locations, dimensions, and attachment and anchors.

B. Product Data: Provide data on materials and accessories.

PART 2 PRODUCTS

2.1 FLAGPOLE

A. Manufacturer: American Flagpole (1-800-368-7171), Model #94157, or approved equal.

B. Dimensions:
   1. Exposed Heights:
      a. U.S Flag: 25'-0" high
      b. Other Flags: 20'-0"

C. Features: Finial at top with internal halyard with winch and locking door; standard aluminum finish.

PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Verify that surfaces are ready to receive work as instructed by the manufacturer.

3.2 INSTALLATION

A. Install flagpoles in concrete settings, size and configuration as recommended by manufacturer.

END OF SECTION

SECTION 10 44 00

FIRE PROTECTION SPECIALTIES

PART 1 GENERAL

1.1 SUMMARY

A. Section includes fire extinguishers and fire extinguisher cabinets.

1.2 REFERENCES

A. National Fire Protection Association:
   1. NFPA 10 - Standard for Portable Fire Extinguishers.

B. Underwriters Laboratories Inc.:
   1. UL - Fire Protection Equipment Directory.

1.3 PERFORMANCE REQUIREMENTS

A. Conform to NFPA 10 code.

B. Provide extinguishers and cabinets classified and labeled by testing firm acceptable to authority having jurisdiction for purpose specified and indicated.

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures.

B. Shop Drawings: Indicate cabinet physical dimensions, rough-in measurements for recessed cabinets, and fire ratings where applicable.

C. Product Data: Submit extinguisher operational features, color and finish, anchorage details size.

1.5 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements.

B. Operation and Maintenance Data: Submit test, refill or recharge schedules and re-certification requirements.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.

B. Do not install extinguishers when ambient temperature is capable of freezing extinguisher ingredients.

PART 2 PRODUCTS

2.1 FIRE EXTINGUISHERS

A. Manufacturers:
   1. JL Industries.
   2. Larsen’s Manufacturing Co.
   3. Potter Roemer.
   4. Substitutions: Section 01 60 00 - Product Requirements.

B. Type: Cast steel tank, with pressure gage.
   1. Quantity: Two.

2.2 FIRE EXTINGUISHER CABINETS

A. Manufacturers:
   1. Larsen’s
   2. J. L. Industries
   3. Substitutions: Section 01 60 00 - Product Requirements .

B. Finish: Formed stainless steel.

C. Configuration: Semi-recessed type, sized to accommodate extinguisher.

D. Trim Type: Returned to wall surface, with 4-1/2 inch projection.

E. Door: Full glass.

F. Door Glazing: Glass, clear, 1/8 inch thick tempered.

G. Cabinet Mounting Hardware: Appropriate to cabinet.

H. Form cabinet enclosure with right angle inside corners and seams.

I. Weld, fill, and grind components smooth.

J. Quantity: Two.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify rough openings for cabinet are correctly sized and located.

3.2 INSTALLATION

A. Install cabinets plumb and level in wall openings, 48 inches from finished floor to top of extinguisher handle.

B. Install wall brackets, 48 inches from finished floor to top of extinguisher handle.

C. Secure rigidly in place.

D. Place extinguishers in cabinets.

END OF SECTION

SECTION 11 33 00

RETRACTABLE STAIRS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Manual disappearing stairways.

1.2 REFERENCES

A. ANSI A14.9: Safety Requirements for Ceiling Mounted Disappearing Climbing Systems.

1.3 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. 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 for Stairs:
1. Plan and section of stair installation.
2. Indicate rough opening dimensions for ceiling and/or roof openings.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store stairway until installation inside under cover in manufacturer's unopened packaging. If stored outside, under a tarp or suitable cover.

1.5 WARRANTY

A. Limited Warranty: One year against defective material and workmanship, covering parts only. Defective parts, as deemed by the manufacturer, will be replaced at no charge, freight excluded, upon inspection at manufacturer's plant.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Precision Ladders, LLC, P. O. Box 2279; Morristown, TN 37816-2279; Tel: 423-586-2265; Fax: 423-586-2091; www.PrecisionLadders.com

B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00.

2.2 MANUAL DISAPPEARING STAIRWAY

A. Manual Disappearing Stairway.
   1. Standard Model: Super Simplex Disappearing Stairway as manufactured by Precision Ladders LLC. Model 1000.

B. Performance Standard: Unit shall comply with ANSI A14.9, Commercial Type. Stairway capacity shall be rated at 500 lbs.

C. Accessories:
   1. Steel pole to aid opening and closing stairways.
   2. Stairs shall be equipped with a patented Precision Fold Assist to aid in folding and unfolding of sections.

D. Components:
   1. Ceiling Opening: 30” x 64” – verify.
   2. Stairway Stringer: 6005-T5 Extruded aluminum channel 5” x 1” x 1/8”; tri-fold design; steel blade type hinges; adjustable feet with plastic Mar-guard. Pitch shall be 63°.
   3. Stairway Tread: 6005-T5 extruded aluminum channel 5 3/16 inches by 1 1/4 inches by 1/8 inch. Depth is 5 3/16 inches. Deeply serrated top surface. Riser Height: 9-1/2 inches. Clear Tread Width for Standard Width: 18 inches.
   4. Railing: Aluminum bar handrail riveted to stringers, upper section only.
   5. Frame: 1/8” steel, 63° (with built-in steps) on the hinge end, 90° on the other end, custom depth to fill distance from ceiling to floor above. This custom frame will require a longer opening in the floor above than is required at the ceiling level.
   6. Door Panel: Constructed of 1/8 inch aluminum sheet attached to stairway frame with a steel piano hinge. Door overlaps bottom flange of frame. Eye bolt accommodates pole for opening and closing door.
   7. Hardware:
      a. Steel blade type hinge connecting stringer sections. Zinc plated and chromate sealed.
      b. Steel operating arms, both sides. Zinc coat with clear trivalent chromate.
      c. Double acting steel springs and cable, both sides.
      d. Rivets rated at 1100 lb (499 kg) shear strength each.
      e. Steel section alignment clips at stringer section joints.
      f. Molded rubber guards at corners of aluminum door panel.
   8. Finishes: Mill finish on aluminum stairway components. Prime coat on frame.

2.3 FABRICATION

A. Completely fabricate ladder ready for installation before shipment to the site.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until rough opening and structural support have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

C. Examine materials upon arrival at site. Notify the carrier and manufacturer of any damage.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

3.3 PROTECTION

A. Protect installed products until completion of project

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 12 20 00

WINDOW SHADES

PART 1 GENERAL

1.1 SUMMARY

A. Provide window shades and accessories as follows:
   1. Shade fabric: Fire resistant, openness factor as required by orientation and glazing; single sunscreen shadeband with specified weave.
   2. Operation / Manual: Offset side-mounted chain operator for manual operation as either single-band or multi-band shades.
   3. Mounting: Ceiling mounted to structure or brackets mounted to structure in gypsum wallboard coves; provide closure trim.
   4. Shade Orientation: Regular roll, shade cloth falls at window side of roller.
   5. Configuration: Single band per windows opening.
   6. Accessories without exposed fastening: Snap-on facia.

1.2 SUBMITTALS

A. Shop Drawings: Include typical elevation layout, shade fabrication, fasteners, installation methods and clearance for mounting condition.

B. Samples: Submit minimum 5” x 6” fabric samples in full color range for selection by Architect, and samples of exposed metal finishes.

1.3 QUALITY ASSURANCE

A. Provide shade system as a complete unit produced by one manufacturer, including hardware, accessory items, mounting brackets and fastening.

B. Provide products of acceptable manufacturers with satisfactory use in similar service for three years. Use experienced installers.

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver, handle and store materials in accordance with manufacturer’s instructions.

1.5 WARRANTY

A. Five year warranty on manually operated components, except bead chain which is a maintenance / service item.

B. Five year warranty on shade cloth with provision that it will not deteriorate, sag or warp and will remain fit for use for the full warranty period when used as an interior rollershade.

C. Provide five year warranty for hardware components to be free from defects in material and workmanship under the normal and proper use.

PART 2 PRODUCTS

2.1 MATERIALS

A. Manufacturer: Mechoshade, Draper, or Pfiefer.

B. Shade Cloth: Draper, Beige/Pearl Gray or approved equal.

C. Manual Shade System: Pre-engineered unit with one-piece molded sprockets and a linear disc brake opposed to a flat steel backing plate and concealed variable-adjustment mechanism. Shade mechanism shall be adjustable from 100% friction (static mode) with infinite positions to 15% friction (dynamic mode) with only pre-selected positions. The operator shall be a side-mounted gear and sprocket mechanism located within the drive-end bracket. The shade cloth shall be removable with a snap-on and snap-off mounting (Snap-Loc™) spline without having to remove the shade tube.

D. SnapLoc™ Fascia
   1. Extruded aluminum pocket with exposed tile support and pocket closure with baked-enamel finish.
   2. Accessibility by removing closure. No exposed screws or mounting means. Pocket shall be sized for single shadeband.

E. Location: Each exterior windows, excluding doors and transoms.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify mounting surface acceptability, installation conditions, and field measurements.

B. Take field measurements prior to the fabrication to ensure fit.

3.2 INSTALLATION

A. Install materials and systems in accordance with manufacturer's instructions and approved submittals.

B. Install level and plumb.

END OF SECTION

SECTION 12 48 13

ENTRANCE FLOOR MATS AND FRAMES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Carpet mat and frame set flush with porcelain tile.

1.2 SUBMITTALS

A. Shop Drawings: Required.

B. Product Data: Required.

C. Samples: Required.

PART 2 PRODUCTS

2.1 FLOOR MATS

A. Manufacturers: This specification is based on Pedimat, by Construction Specialties. Equal or superior products may be considered for substitution.

2.2 COMPONENTS

A. Frame: The actual frame is not recessed into the concrete. However, an aluminum angle frame is required for an installation flush with the adjacent porcelain tile.

B. Tread Inserts: Solution dyed, 100% nylon carpet; fibers fusion bonded to rigid two-ply backing.

C. Rails: Rigid vinyl/acrylic, with cushions

D. Hinge Rail connectors: Clear anodized aluminum.

E. Carpet: CS 9327 Dry Brown, or approved equal.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install mat frames to achieve flush plane with finished floor surface.

END OF SECTION

January 9, 2020

First Community Branch Bank
Brookland Arkansas

ROARK PERKINS PERRY YELVINGTON ARCHITECTS

MPE Consulting Engineers, Inc.
MPE #200-309

MECHANICAL SPECIFICATIONS
TABLE OF CONTENTS

SECTION 23 00 10

BASIC MECHANICAL REQUIREMENTS

PART 1 - GENERAL

1.01 REQUIREMENTS

A. The Conditions of the Contract, including the General Conditions and Supplementary Conditions, and Division One, apply to the work of this Division.

1.02 WORK INCLUDED

A. Provide all plant, labor, equipment, appliances, and material, in strict accordance with Project Manual and the applicable Drawings and subject to the terms and Conditions of the Contract. Include all parts and components necessary to the proper operation of the systems and equipment specified.

1.03 RELATED WORK

A. All Division One sections.

1.04 COORDINATION

A. Coordinate work with the Owner and all other contractors.

1.05 SUBMITTALS

A. Refer to Drawings.

1.06 CODES, ORDINANCES, INSPECTIONS, PERMITS AND FEES

A. Refer to the General Conditions of the Contract for construction.

B. Deliver to the Owner a copy of each certificate of approval from each inspection agency.

C. Should the Contractor perform any work that does not comply with the requirements of the applicable building codes, state laws, local ordinances, industry standards and utility company regulations, he shall bear all costs arising in correcting the deficiencies.

D. The Contractor shall obtain any and all required permits in connection with his work under the Contract and shall pay any and all fees in connection therewith. Contractor shall arrange with the Owner for the connections to all utilities and shall be responsible for all charges for same, including inspection fees if required.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Protect all materials and equipment from moisture and dust in a manner to prevent any damage. Do not store outside or expose to elements except with permission of the Owner.

1.08 GUARANTEE

A. The Contractor shall furnish a written certificate, guarantying all materials, equipment, and labor furnished by him to be free of all defects for a period of one year from and after

the date of final acceptance of the work by the Owner. The Contractor shall further guarantee that if any defects appear within the stipulated guaranty period, such work shall be replaced without charges.

1.09 DRAWINGS

A. The Drawings show the general arrangement of all piping, equipment, and components and shall be followed as closely as actual building construction and the work of other trades will permit.

B. The Contractor shall investigate the structural and finish conditions affecting the work and shall arrange his work accordingly, providing such fittings, valves and accessories as may be required to meet such conditions.

1.10 INSPECTION OF PREMISES

A. Before submitting his bid, the Contractor shall visit the site of the proposed job and satisfy himself as to the conditions under which he will work.

1.11 CODES AND STANDARDS

A. All materials and workmanship shall comply with all applicable codes, specifications, local ordinances, industry standards, and utility company regulations.

B. In case of differences between building codes, specifications, state laws, local ordinances, industry standards, and utility company regulations, and the Contract Documents, the most stringent shall govern. The Contractor shall promptly notify the Architect in writing of any such differences.

C. Non-Compliance: Should the Contractor perform any work that does not comply with the requirements of applicable building codes, state laws, local ordinances, industry standards, and utility company regulations, he shall bear all costs arising in correcting the deficiencies.

D. The following specifications and standards form a part of these specifications:

1. National Electrical Code;

2. National Fire Protection Association's Recommended Practices;

3. Local, City and State Codes and Ordinances;

4. Underwriters' Laboratories;

5. Occupational Health Safety Act.

6. Arkansas State Plumbing/Gas/Mechanical Codes;

7. American National Standards Association (ANSI);

8. American Society for Testing Materials;

9. Arkansas State Fire Prevention Code;

The latest specifications and standards available shall be used for the above.

PART 2 - PRODUCTS

2.01 MATERIAL AND EQUIPMENT

A. General: Refer to divisions one sections.

B. Each major component of equipment shall have a nameplate listing the manufacturer's name, address, catalog, and serial number. The nameplate shall be brass, aluminum, or other durable material attached to the equipment in a conspicuous location.

2.02 ROOF PENETRATIONS

A. Unless otherwise indicated, for riser or other roof penetrations complete as per roofing manufacturer's recommendations.

2.03 EQUIPMENT CONNECTIONS

A. Rough-in and make final connection to all equipment furnished under other Divisions of the specifications or by the Owner.

B. Provide unions or flanges at all connections to equipment to aid in equipment removal and maintenance.

2.04 ACCESS PANELS

A. Provide access panels as required to service valves in piping, controls, items in duct, etc.

B. Access doors shall be equal to the following MILCOR types:

1. Style A Door for Acoustical Tile

2. Style B Door for Acoustical Plaster

3. Style K Door for Plastered Surfaces

4. Style M Door for Masonry, Wallboard, etc.

5. Fire-rated Door where required.

C. Furnish size and type as required for proper service or as shown on Drawings for specific locations.

PART 3 - EXECUTION

3.01 CUTTING AND PATCHING

A. Provide all cutting and patching as required to perform the mechanical work.

B. Do not cut structural members except through explicit instructions of the Owner.

C. Accomplish patching work with workmen skilled in the trade required.

D. Perform all cutting and fitting in rough construction phases of the work.

3.02 INSTALLATION

A. Installation shall comply with the codes and the equipment manufacturers installation instructions.

B. The Contractor shall support plumb, rigid, and true to line all work and equipment furnished. The mechanical contractor shall study thoroughly all general, structural, electrical and mechanical drawings, shop drawings, and catalog data to determine how equipment, fixtures, piping, ductwork, etc., are to be supported, mounted, or suspended and shall provide extra steel bolts, inserts, pipe stands, brackets, and accessories for proper support whether or not shown on the Drawings.

3.03 EXCAVATION, TRENCHING, BACKFILLING, TUNNELING

A. Comply with the mechanical and plumbing codes.

B. Excavate banks of trenches nearly vertical or as shown on the Drawings.

C. Perform bracing and shoring as necessary to complete and protect excavation indicated on the Drawings as required for safety or to conform to governing laws.

D. Install sewer, gas, electrical, and water lines in separate trenches, except where otherwise noted on the Drawings.

F. Replace existing items removed or damaged in connection with work. Restore to original conditions, unless otherwise directed.

3.04 CLEAN UP

A. Do not allow waste material or rubbish to accumulate in or about the job site.

B. At completion of work, remove all rubbish, tools, scaffolding, and surplus materials from and about building, leaving work clean and ready for use.

C. Clean all equipment, piping, valves, fixtures, and fittings of grease, metal cuttings, insulation cement, dust, dirt, paper labels, etc.

D. Repair any discoloration or other damage to parts of building, its finish or furnishings due to failure to properly clean or keep clean, mechanical systems.

END OF SECTION

SECTION 23 00 60

PIPE AND PIPE FITTINGS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Pipe, fittings, and connections.

1.02 RELATED WORK

A. Section 23 00 10 - Basic Mechanical Requirements

B. Section 23 00 90 - Mechanical Supporting Systems

C. Section 23 01 20 - Valves

D. Section 23 03 50 - Natural Gas Piping System

E. Section 23 04 01 - Domestic Water System

F. Section 23 04 05 - Drainage, Sanitary Waste and Vent System

G. Section 23 07 11 – Condensate Drain Piping

1.03 QUALITY ASSURANCE

A. Welding Materials and Procedures: Conform to ASME Code and applicable state labor regulations.

B. Employ certified welders in accordance with ASME Section 9.

C. Replace pipe, fittings, or equipment broken or leaking during warranty period.

1.04 REFERENCES

A. ANSI/ASME B16.3 - Malleable-Iron Threaded Fittings.

B. ANSI/ASME B16.22 - Wrought Copper and Bronze Solder-Joint Pressure Fittings.

C. ANSI/ASTM - Pipe, Steel, Black, and Hot-Dipped Zinc-Coated, Welded and Seamless.

D. ANSI/A120 - Pipe, Steel, Black, and Hot-Dipped Zinc-Coated (galvanized), Welded and Seamless.

E. ANSI/ASTM A126 - Gray Iron Castings for Valves, Flanges, and Pipe Fittings.

F. ANSI/ASTM B43 - Seamless Red Brass Pipe, standard sizes.

G. ANSI/AWS D.1.1 - Structural Welding Code.

H. ASTM B88 - Seamless Copper Water Tube.

I. FS WW-P-521 - Pipe Fittings, Flange Fittings, and Flanges: Steel and Malleable Iron

(Threaded and Butt Welding) Class 150.

J. ANSI/AWWA-C151/A21.51 - Ductile Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds for Water of Other Liquids.

K. ANSI/ASTM A716 Standard Specification for Ductile Iron Culvert Pipe.

L. ANSI/ASTM A746 Standard Specification or Ductile Iron Gravity Sewer Pipe.

M. CISPI Standard 301 for hubless cast iron sanitary systems.

N. ASTM C564 Specification for compression-type Gasket Joints used in Case Iron Soil Pipe and Fittings with hubs and plain-end spigots.

O. ASTM A74, ANSI A112.5-1, Federal Specification WW-P-401 for SV cast iron soil pipe and fittings.

P. ASTM D1784, ASTM D2241, D3137, F477, AWWA C-900 and NSF-14-PVC Water Pressure Pipe.

Q. ASTM D2665 and D3371, NSF approved, PVC DWV fittings.

PART 2 - PRODUCTS

2.01 PIPE AND TUBE

A. Steel Pipe: ANSI/ASTM A53 or A120 Black, Schedule 40 weight.

B. Copper Water Tube: ASTM B88, type and temper as scheduled; seamless.

C. Cast Iron.

D. Ductile Iron.

E. PVC.

2.02 PIPE AND TUBE JOINTS AND FITTINGS

A. Steel Pipe Fittings: ANSI/ASME B16.3; ANSI/ASTM A126; FS WW-P-521, Class 150.

B. Copper and Brass Pipe Fittings: ANSI/ASME B16.22, pressure fittings, ANSI/AWWA C111, rubber gasket joints.

C. Cast Iron: ASTM C-564 for hub/spigot fittings. C.I.S.P.I. Standard 301 for hubless, clamp fittings.

D. Ductile Iron: ANSI/AWWA-C110/A21.10 and C111/A21.11 for push on fittings and mechanical joint fittings.

E. PVC: ASTM D2665 and D3311 solvent weld for DWV, ASTM D3139 for push on joints and ASTM F466 for gaskets on pressure pipe.

2.03 UNIONS AND COUPLINGS

A. Pipe Size 2" and Under: 150 psi malleable iron for threaded ferrous piping; bronze for

copper or brass pipe soldered joints.

B. Pipe Size Over 2": 150 psi forged steel slip-on flanges for ferrous piping; bronze flanges for copper or brass piping; synthetic rubber gaskets for gas service; preformed synthetic rubber elsewhere.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Route pipes parallel with, or perpendicular to, building lines. Wherever possible, group together for easier service and identification.

B. Lines requiring a definite grade for drainage shall have precedence in routing over all other lines.

C. Wherever possible, hold horizontal and vertical lines as close as possible to walls, ceilings, struts, and members so as to occupy minimum space consistent with the proper requirements for insulation, expansion, removal of pipe and access to valves.

D. Arrange for concealment of all piping in finished area of buildings unless otherwise noted.

E. Piping shall be placed without springing and/or forcing. Arrange all piping so as not to interfere with removal of other equipment or devices, nor to block access to doors, windows, manholes, or other access openings.

F. Install all piping so as to avoid liquid or air pockets throughout the work. Erect and pitch piping to ensure proper draining.

3.02 ASSEMBLY

A. Cut all pipes square and remove burr and cutting slag by reaming or other cleaning methods.

B. Use unions or flanges at all connections to all equipment to facilitate dismantling, and elsewhere as required, in the erection of pipe or installation of valves.

C. Make all joints and changes of direction with standard fittings. Bending of pipe will be permitted, providing a hydraulic bender is used. Use reducers at pipe size changes.

D. Install an insulating coupling between dissimilar metal fittings and/or pipe.

E. Use nipples or same material and composition as pipe on which they are installed. Use extra heavy type when unthreaded shoulder is less than 1-1/2". Do not use running thread nipples.

F. Make joints between steel or copper pipe and cast iron with calking ferrules.

G. Assemble galvanized steel pipe with galvanized screwed fittings.

H. Assemble black steel pipe with screwed or welded fittings. Use Weld-O-Lets or Thread-O-Let fittings where branch outlet is at least one pipe size smaller than the main.

I. Assemble copper pipe with wrought copper fittings. Above grade, use 95-5 solder. Below grade, make joints with "SIL-FOS". Do not install joints in below slab copper pipe.

3.03 SLEEVES AND PLATES

A. Use sleeves where piping passes through exterior walls, floors, or roofs; where required for sealing to meet any sanitation codes, ordinances or laws, and areas where water may accumulate.

B. Use Schedule 40 pipe sleeves in concrete or masonry construction and where collapse is possible. Use minimum 22-gage sheet metal for other sleeves.

C. Use sleeves accommodating insulated pipe of sufficient diameter to pass piping and full size of insulation.

D. In toilets, kitchen, equipment rooms and other areas where water may accumulate on the floor, extend sleeves 1/2" above the finished floor. Install other sleeves flush with finished floor.

E. After all piping has been inserted in sleeves, fill voids between pipe or insulation and sleeve with a suitable non-run, non-stain mastic.

F. Use spring clamp or set screw plates (escutcheons) where pipe is exposed in occupied rooms and where walls, floors or ceilings are finished. Use chrome-plated metal for exposed portion of plates.

G. In fire barrier penetrations fire stopping shall be applied. See Division 7.

3.04 THERMAL EXPANSION

A. Use swing joints, turns, expansion loops or long off-sets where necessary to allow for expansion and contraction.

3.05 OPEN ENDS

A. Cap open ends of pipe, including vents, drains, equipment connections, and fixture connections to keep building material from entering the pipe and traps during construction.

3.06 NOISE CONTROL

A. Install piping free of any objectionable noise.

B. Isolate piping from building where required to prevent transmission of noise.

3.07 CROSS CONNECTIONS

A. Do not make a cross-connection between potable water system and a polluted system.

3.08 TESTING

A. Test all piping systems provided under this contract and obtain approval of the Engineer before acceptance.

B. Test and inspect piping located underground before backfilling.

C. Furnish equipment and personnel required for these tests without additional cost. Use testing equipment as required for each particular test, with all equipment and gages

accurate and in good working order.

D. Remove equipment subject to damage at given test pressure before pressure is applied. Use proper plugs or caps.

E. Refer to specific piping system specification for test pressure, duration and medium.

F. Perform all testing in accordance with the local and state plumbing codes.

G. Do not pressure test existing piping unless otherwise indicated.

END OF SECTION

SECTION 23 00 90

MECHANICAL SUPPORTING SYSTEMS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Pipe hangers and supports.

B. Equipment foundation supports.

1.02 RELATED WORK

A. Section 23 00 10 - Basic Mechanical Requirements

B. Section 23 04 01 - Domestic Water System

C. Section 23 04 05 - Drainage, Sanitary Waste and Vent Systems

E. Section 23 06 04 – Exhaust Fans

F. Section 23 06 03 – Split Air conditioning and Heating Equipment

G. Section 23 04 50 – Plumbing Fixtures and Equipment

1.03 QUALITY ASSURANCE

A. Pipe Hangers and Supports: ASA Code for Pressure Piping, ANSI B31.1, and Manufacturer's Standardization Society Documents MSS-SP-58 AND MSS-SP-69.

B. Auxiliary Steel: Design in accordance with AISC Handbook.

1.04 SYSTEM DESCRIPTION

A. Provide adequate pipe, duct, stack and equipment foundation and suspension system in accordance with recognized engineering practices, using, where possible, standard commercial hangers and accessories.

B. Where thermal movement will occur, provide pipe hanger assembly capable of supporting the pipe hanger throughout the range of operating temperature. Perform weight balance calculations to determine the force at each hanger to prevent over stressing the pipe or connected equipment.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Empire Tool and Manufacturing Co., Manchester, Connecticut.

B. ITT Grinnell, Providence, Rhode Island.

C. Approved equal.

2.02 MATERIALS

A. Pipe Hangers and Supports:

1. Pipe 2" and larger shall be furnished with means of adjustment.

2. Uninsulated Steel Pipe:

a. 2" and Smaller: Grinnell Figures 97, 70, 138, or 260.

b. 2" and Larger: Grinnell Figures 104, 108 or 212.

c. Riser Clamp: Grinnell Figure 261.

3. Insulated Stationary Steel Pipe: Grinnell Figures 295 and 300.

4. Insulated Steel Pipe Subject To Longitudinal Movement: Grinnell Figures 171, 177, 181, 174, 175. Use Figure 178 spring cushion hanger where pipe subject to vertical movement. Furnish pipe covering protection saddle at each support point.

5. Uninsulated Copper Tubing 2" and Under: Copper finished, two hole tubing strap (Empire Figure 231 CT), copper finished wire tubing hook (Empire Figure 235 CT), or copper finished.

6. Insulated Copper Tubing 2" and Under: Empire Figure 11, Figure 110, Figure 310, or Figure 31, sized for O.D. of pipe insulation. Provide pipe covering protection shield (Empire Figure 167) at each hanger.

7. Refrigerant Lines: Grinnell Figure 260 clevis hanger. On insulated lines, provide Empire Figure 167 protection shield at each hanger.

8. Cast Iron Pipe: Grinnell Figure 590 clevis hanger. On insulated pipes, provide Empire Figure 167 protection shield at each hanger.

B. Brackets and Racks: For welded steel brackets, furnish Grinnell Figures 194, 195, and 199. Fabricate pipe racks and trapeze hangers from adequately sized Unistrut channel clamps and accessories.

C. Rods:

1. Hanger Rods: Grinnell Figures 140 and 146.

2. Eye Rods: Grinnell Figures 248 and 278WL.

D. Attachments:

1. Concrete Inserts: Empire Figure 81 or Figure 2500.

2. Beam Clamps: Grinnell Figures 218, 229, 131, 292, 228, 224 and 228; or Figure 87 "C" clamp with locknut and retaining strap.

3. Welded Beam Attachments: Grinnell Figures 66.

PART 3 - EXECUTION

3.01 GENERAL

A. All pipes, both horizontal and vertical, shall be adequately supported from the building structural members. Each hanger shall be properly sized to fit supported pipe.

B. Install hangers, inserts and supports as indicated, in accordance with manufacturer's written instructions and in compliance with recognized industry practices.

C. Coordinate installation of supporting devices with other work. Arrange for grouping of parallel runs of horizontal pipes to be supported together on trapeze type hangers where possible.

D. Where small pipes are supported under bar joists, hanger rods may be extended through the space between the bottom angles and secured with a washer and two nuts.

E. Where larger pipes are supported beneath bar joist, hanger rods shall be secured to angle irons of adequate size. Each angle iron shall span across two or more joists, as required, to distribute the weight effectively. Anchor these angle irons to the joist.

F. Where pipes are supported under exposed steel beams, approved type beam clamps shall be used.

G. Unless otherwise indicated perforated strap or wire will not be acceptable as hanger or fastening.

H. Do not support piping or equipment from ceilings or ceiling support systems.

3.02 ATTACHING TO STRUCTURE

A. Where equipment or piping is supported from building steel beam, use clamps or welded beam attachments. Do not drill holes in building steel for hanger support rods.

B. Anchor mechanical supports to wood structural beams and truss with lag screws, wood screws, nails or other appropriately sized fasteners complying with industry standard.

3.03 HANGER RODS AND SPACING

A. Where hanger rod sizes are catalog-listed for a specified hanger, this size shall govern. Where hanger rod sizes are not catalog listed, the load on the hanger shall be the determining factor and the maximum recommended hanger rod load as catalog listed shall govern.

B. Pipe hanger spacing shall not exceed that specified in the plumbing and mechanical codes.

3.04 AUXILIARY STEEL

A. Furnish all miscellaneous structural members necessary to hang or support pipe or mechanical equipment. Material members shall be consistent with that of the main structural system.

B. Furnish all auxiliary steel with one shop coat of primer paint.

C. Arrange for any adjustment necessary in main structural system for proper support of major equipment.

3.05 CONCRETE PADS

A. Where shown on the Drawings, provide concrete pads under all floor-mounted equipment and apparatus. Reinforce pads with 6 x 6 x W1.4 x W1.4 W.W.F.

B. Construct pads nominal 4" thick, unless indicated otherwise on Drawings.

C. Concrete to be 3000 psi.

3.06 CONCRETE INSERTS

A. Provide concrete inserts where mechanical equipment, pipes and pipe racks are supported from concrete. Install concrete inserts during placing of concrete at appropriate intervals and location.

B. Drilling and anchoring systems such as by Ramset may be used for support of miscellaneous pipe and duct work in existing concrete.

3.07 EXISTING MECHANICAL SUPPORTS

A. Reuse of existing concrete pads, pipe hangers, racks and auxiliary steel is allowed if in good condition and adequate for the new loading and size.

B. Examine and investigate the condition of existing mechanical supports. Recondition and reuse where feasible and practical.

END OF SECTION

SECTION 23 01 20

VALVES

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Providing valves, cocks, and safety relief valves.

1.02 RELATED WORK

A. Section 23 00 10 - Basic Mechanical Requirements

B. Section 23 00 60 - Pipe and Pipe Fittings

C. Section 23 04 01 - Domestic Water System

PART 2 - PRODUCTS

2.01 GENERAL

A. Manufacturer: *Nibco, Crane or Milwaukee*.

2.02 BALL VALVES (Gate valves not allowed)

A. *Nibco* T or S-580-70, 600 pound, WOG, 150 pound SWP. Stainless steel ball, teflon seats, 2-piece red bronze body, adjustable Teflon packing lever. Federal Specification WW-V-35.

2.03 GAS STOP COCKS

A. *Nibco* T-580-70 UL, or approved equal, 125 pound. WOG, bronze body, ball valve.

2.04 SAFETY RELIEF VALVES

A. Safety relief valves shall conform to ASME-UV code and be National Board tested and rated. Valves shall have bronze seating surfaces and guides and stainless stem. Valves shall have top guiding with self-aligning disc and open test lever construction.

2.05 SWING CHECK VALVES

A. For 1/4" to 2" Sizes: *Nibco* T or S-413, 125 pound. SWP, 200 pounds. WOG, bronze, teflon disc, for water or air. MSS-SP80.

B. For 2-1/2" and Larger Sizes: *Nibco* F-918, flanged, 125 SWP, 200 WOG, bolted bonnet. MSS-SP71.

2.06 INDOOR HOSE BIBB

A. *Prier* 138 standard bronze angle hose valve.

PART 3 - EXECUTION

3.01 ARRANGEMENT OR LOCATION

A. Locate valves in an accessible position or make accessible through access panel.

B. Where several valves are related as to function, group valves in a battery.

C. Do not install a valve with stem below horizontal position.

D. In copper pipe lines, install valves with threaded ends; use copper to MPT adapters.

3.02 VALVE BOXES

A. House all valves located below slabs or grade in cast iron boxes and covers. Use properly marked colors.

B. Furnish the Owner proper key or valve-operator extension.

3.03 SAFETY RELIEF VALVES

A. Equip all equipment and/or piping systems containing fluid and subject to heat input, or a fluid input of over 212 degrees F (or the atmospheric boiling temperature of any fluid other than water), with an ASME Code safety pressure relief valve.

END OF SECTION

SECTION 23 01 90

MECHANICAL IDENTIFICATION

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Provide identification of split air conditioning equipment.

1.02 RELATED WORK

A. Section 23 00 10 - Basic Mechanical Requirements

B. Section 23 06 03 – Split Air Conditioning and Heating Equipment

1.03 SUBMITTALS

A. Submit one (1) sample of nameplate for approval

PART 2 - PRODUCTS

2.01 MATERIALS

A. Nameplates:

1. Provide laminated plastic nameplates as manufactured by *SETON* or equal.

2. Nameplates to be white in color engraved with 1/4" (approximately) high upper case letters. Letters to be black in color.

PART 3 - EXECUTION

3.01 NAMEPLATES

A. Install nameplates on each enclosure related to the temperature control system. This includes enclosures for sensors, terminals, devices, control panel, time clock, etc.

B. Install nameplates on each piece of HVAC equipment including air handlers, furnaces and outdoor condensing units. Wording shall match the designation shown on the drawings unless otherwise directed.

C. Attach nameplates to enclosures by permanent method approved by the label nameplate manufacturer.

END OF SECTION

SECTION 23 02 50

MECHANICAL INSULATION SYSTEMS

PART 1 - GENERAL

1.01 WORK INCLUDES

A. Providing insulation systems for condensate drains, domestic water piping, refrigerant piping, HVAC ductwork/air devices and storm drainage piping.

1.02 RELATED WORK

A. Section 23 00 10 - Basic Mechanical Requirements

B. Section 23 04 01 - Domestic Water System

C. Section 23 04 05 - Drainage, Sanitary Waste and Vent Systems

D. Section 23 06 51 - Refrigerant Piping

E. Section 23 08 00 - Air Distribution

F. Section 23 07 11 – Condensate Drain Piping

1.03 JOB CONDITIONS

A. Deliver materials to job site in original non-broken factory packaging, labeled with manufacturer's density and thickness.

B. Perform work at ambient and equivalent temperatures as recommended by the adhesive manufacturer.

1.04 SUBMITTALS

A. Submit product data for the items listed below. Submittals shall consist of descriptive literature indicating performances, physical size features, options and other certified information indicating compliance with the specifications and drawings.

B. Submit manufacturer's installation instructions.

1.05 REFERENCES

A. ASTM E84, ASTM E96, ASTM B209.

B. State Energy Code.

C. State Mechanical Code.

1.06 CONTRACTOR QUALIFICATIONS

A. Only Contractors who specialize in mechanical insulation shall perform the work.

B. Qualified Contractors shall include those who have been in the business a minimum of

five years and have successfully completed projects of the size and complexity of the subject project.

C. Upon request, Contractors shall provide documentation of qualifications.

PART 2 - PRODUCTS

2.01 GENERAL

A. Fire Ratings:

1. All Insulation, Coverings, Lining, Adhesives, and Accessories: Non-combustible as per NFPA National Fire Code, Section 200.

2. Ratings determined by Underwriter's Laboratories, Incorporated, Method of Surface Burning Characteristics of Building Materials.

3. Ductwork in air distribution systems shall further conform to NFPA Standard 90A.

4. Flame Spread Rating: 25 or less, ASTM E84.

5. Smoke Developed: 50 or less, ASTM E84.

6. Furnish mastics, coatings, and adhesives certified by the manufacturer as being non-flammable as received and fire-resistive when dry.

B. Mildew Resistance: Furnish mildew-proof insulations, coverings, and coatings.

C. Vapor Transmission: 0.20 perm inches, ASTM E96.

2.02 REFRIGERANT LINES

A. Suction Lines: 3/4" Armstrong/Armaflex.

2.03 DUCTWORK - INTERNAL INSULATION

A. Internal rectangular duct insulation: Flexible, resilient duct liner manufactured from long glass fibers with black, fire-resistant coating on surface fibers, 1" thick, 1.5 pounds per cubic feet density, as manufactured by "Knauf".

2.04 DUCTWORK AND AIR DEVICES - EXTERNAL INSULATION

A. 2" thick, code compliant fiberglass blanket with Kraft-Foil-Scrim Vapor Barrier, Knauf Duct Wrap.

2.05 REFRIGERANT PIPING INSULATION - FLEXIBLE ELASTOMERIC CELLULAR

A. Material: Flexible expanded closed-cell structure with smooth skin on both sides.

1. Tubular Materials: ASTM C 534, Type I.

2. Sheet Materials: ASTM C 534, Type II.

B. Thermal Conductivity: 0.30 average maximum at 75 deg F.

C. Coating: Water based latex enamel coating recommended by insulation manufacturer.

D. 1/2" thick unless otherwise indicated.

2.06 FIBERGLASS PIPING INSULATION, ABOVE GROUND INTERIOR

A. Insulate above ground interior piping with Owens-Corning Fiberglass Corporations' heavy density sectional fiberglass pipe insulation, with a white fire retardant embossed vapor barrier laminate ASJ (all service jacket). Thickness of insulation shall be as follows:

1. Domestic Cold Water, Roof Drains, Storm Drain, overflow drain and Miscellaneous Drains:

a. All sizes: 1/2" thick.

2. Domestic Hot Water & Recirculating Hot Water:

a. 2-1/2" and larger: 1-1/2" thick.

b. 2" to 1-1/2": 1" thick.

c. 3/4" and smaller: 1/2" thick.

3. Pipe Runouts (12' in length or less), to individual coils, terminal units, etc., may be insulated with material 1/2" less thickness than that listed above. Note: Minimum insulation thickness; 1/2".

2.07 COVER AND ACCESSORIES

A. Aluminum Jacket:

1. ASTM B209.

2. Thickness: 0.016 inch, sheet material.

3. Finish: Smooth.

4. Joining: Longitudinal slip joints and 2 inch laps.

5. Fittings: 0.016 inch thick die shaped fitting covers with factory attached protective liner.

6. Metal Jacket Bands: 3/8 inch wide, 0.015 inch thick aluminum.

B. PVC Insulation Cover

1. Thickness: .020 inches.

2. Finish: Smooth.

3. Color: White.

4. Fittings: Pre-molded PVC.

5. Joints: Solvent weld.

C. Canvas Cover

1. Weight: 8-ounce.

2. Finish: Apply a smooth coat of Foster 82-42W lagging adhesive. Paint as specified under Division 9 section.

3. Color: White.

4. Fittings: Canvas

2.08 INSULATING CEMENTS

A. Mineral Fiber: ASTM C 195.

1. Thermal Conductivity: 1.0 average maximum at 500 deg F mean temperature.

2. Compressive Strength: 10 psi at 5 percent deformation.

B. Expanded or Exfoliated Vermiculite: ASTM C 196.

1. Thermal Conductivity: 1.10 average maximum at 500 deg F mean temperature.

2. Compressive Strength: 5 psi at 5 percent deformation.

C. Mineral Fiber, Hydraulic-Setting Insulating and Finishing Cement: ASTM C 449.

1. Thermal Conductivity: 1.2 average maximum at 400 deg F mean temperature.

2. Compressive Strength: 100 psi at 5 percent deformation.

2.09 ADHESIVES

A. Flexible Elastomeric Cellular Insulation Adhesive: Solvent-based, contact adhesive recommended by insulation manufacturer.

B. Lagging Adhesive: MIL-A-3316C, non-flammable adhesive in the following Classes and Grades:

1. Class 1, Grade A for bonding glass cloth and tape to unfaced glass fiber insulation, sealing edges of glass fiber insulation, and bonding lagging cloth to unfaced glass fiber insulation.

2. Class 2, Grade A for bonding glass fiber insulation for metal surfaces.

PART 3 - EXECUTION

3.01 GENERAL

A. Apply all insulation using experienced mechanics, regularly employed in the trade. Unless otherwise specified, apply insulation in accordance with the manufacturer's recommendations.

B. Install insulation through all structural members.

C. Test and clean systems before insulation is applied.

D. Insulate the backside of supply air devices unless factory insulated.

3.02 PIPING - INDOOR

A. Adhere jacket, horizontal jacket and end joint laps with white vapor adhesive (field and/or factory applied) and further secure with outward clinching type staples. On all cold insulation, coat the staples with white colored Foster 85-75 vapor barrier mastic to maintain the vapor seal. Insulate fittings with factory and/or field fabricated fittings with vapor barrier mastic and glass fabric reinforcement finished smooth and uniform. Adhere ends and butt joint strips over end joints with Foster 30-35 coating. Also, where factory adhesive system is used, apply a Foster 30-35 coating on all joints and seams.

B. Provide semi-circular protection saddles of #16 gage galvanized steel, twelve inches long for insulated piping where hanger occur. On pipe sizes two inches and over, provide twelve inches length of high density insulation at hangers. Secure saddles to insulation with tape or plastic ties.

C. Neatly point up all exposed ends of pipe insulation with appropriate insulating cement.

D. Insulate fittings (ells, tees), valves, strainers, and generally all piping components. Do not insulate interior pumps and expansion tanks.

E. Insulate bowl of roof drains and connected drain piping.

F. Insulate the body of above grade floor drains and adjacent horizontal runs of connected drain pipe where intended to be used for collection of condensate from air conditioning ,refrigeration equipment or other source of cold liquids.

3.03 DUCTWORK - GENERAL

A. Insulate supply, return and outside air ductwork.

B. Insulate the backside of supply air devices unless factory insulated.

C. Insulate exhaust ducts from grease hoods and dishwasher hoods.

3.04 DUCTWORK - INTERNAL INSULATED

A. Install duct liner by cutting side pieces of insulation to lap both top and bottom sections for maximum support.

B. Attach side pieces and bottom piece with adhesive. Provide 100% adhesive coverage.

C. After applying adhesive further secure insulation with Stic-Klip fasteners. Space one fastener per two square feet of insulation.

D. Batt edges of insulation with adhesive to insure a tight joint and provide a smooth surface. No "raw" edges of insulation are allowed.

3.05 DUCTWORK AND AIR DEVICES - EXTERNAL INSULATED

A. Butt tightly at joints. Overlap vapor barrier facing a minimum of two inches.

B. Remove insulation from overlaps.

C. Staple all vapor barrier seams six inches on center with outward clinching staples. Then seal with SMACNA Foil Vapor Barrier Tape or Vapor Barrier Mastic.

3.06 FLEXIBLE ELASTOMERIC CELLULAR PIPE INSULATION INSTALLATION

A. Slip insulation on the pipe before making connections wherever possible. Seal joints with adhesive. Where the slip-on technique is not possible, cut one side longitudinally and apply to the pipe. Seal seams and joints with adhesive.

B. Valves, Fittings, and Flanges: Cut insulation segments from pipe or sheet insulation. Bond to valve, fitting, and flange and seal joints with adhesive.

1. Miter cut materials to cover soldered elbows and tees.

2. Fabricate sleeve fitting covers from flexible elastomeric cellular insulation for screwed valves, fittings, and specialties. Miter cut materials. Overlap adjoining pipe insulation.

3. Coating shall be applied to exterior insulation. Apply 2 coats.

C. Apply 2 coats of coating on exterior portions of the insulation.

END OF SECTION

SECTION 23 04 01

DOMESTIC WATER SYSTEM

PART 1 - GENERAL

1.01 WORK INCLUDED

A. A system of domestic water pipe as shown on the Drawings including distribution and connection to fixtures and equipment.

1.02 RELATED WORK

A. Section 23 00 10 - Basic Mechanical Requirements

B. Section 23 00 60 - Pipe and Pipe Fittings

C. Section 23 00 90 - Mechanical Supporting System

D. Section 23 01 20 - Valves

E. Section 23 01 90 - Mechanical Identification

F. Section 23 02 50 - Mechanical Insulation Systems

G. Section 23 04 50 - Plumbing Fixtures and Equipment

1.03 SYSTEM DESCRIPTION

A. Provide domestic water system consisting of hot and cold water piping and required for each fixture or equipment item.

B. Provide domestic water piping system buried beyond the building, through meter and connection to city system.

1.04 QUALITY ASSURANCE

A. Install system in accordance with national and state codes regardless of possible conflicts in these Specifications or the Drawings.

PART 2 - PRODUCTS

2.01 PIPE

A. Above Ground: ASTM B88, Type L or type M copper, hard-drawn.

B. Buried Under Building: ASTM B88, Type K copper, soft-drawn without fittings.

C. Buried Beyond Building: ASTM B88, Type K copper, soft-drawn or hard drawn.

2.02 FITTINGS

A. Above Ground: Wrought copper assembled with lead free solder. Use ASTM B 32 95/5 TIN-ANTIMONY or code compliant mechanical joints and fittings

B. Buried Below Slab: Wrought copper assembled with lead free solder. Use AWS A 5.8, BCUP series brazing (silver solder).

2.03 SPECIALTIES

A. Impact Arrestor: SHOCK STOP by *Wade*.

PART 3 - EXECUTION

3.01 GENERAL

A. Install service valves in the hot and cold water at each fixture group, major equipment, and water heaters.

B. Install insulating connection or union between copper and iron pipe.

C. Conceal domestic water pipes in plumbing chases, in heated ceiling spaces or in partitions.

D. Disinfect potable water piping system in compliance with the code. Flush all piping and equipment. A negative bacteria test must result.

E. Install impact arrestor on hot and cold water lines, including one set (one for hot and one for cold) for each bathroom group, one set at each washing machine, one set at each kitchen sink and one at each ice machine.

F. Do not install pipe below grade or concrete slab unless indicated on the drawings. Do not install fittings below concrete slabs. Sleeve continuous, with code approved sleeve material.

G. Test water system in compliance with the code.

H. Provide drains at low points in the system.

3.02 FIXTURES AND EQUIPMENT BY OTHERS

A. Provide all accessories, trim, valves and miscellaneous piping as required to make connections to fixtures and equipment furnished by others.

3.03 SERVICE CONNECTION

A. Provide water service complete with water meter. Provide pressure reducing valve if water pressure exceeds 80 psi.

END OF SECTION

SECTION 23 04 05

DRAINAGE, SANITARY WASTE AND VENT SYSTEMS

PART 1 - GENERAL

1.01 RELATED WORK

A. Section 23 00 10 - Basic Mechanical Requirements

B. Section 23 00 60 - Pipe and Pipe Fittings

C. Section 23 00 90 - Mechanical Supporting Systems

D. Section 23 04 50 - Plumbing Fixtures and Equipment

E. Section 23 02 50 – Mechanical Insulation Systems

1.02 SYSTEM DESCRIPTION

A. Provide soil and waste system consisting of all sanitary waste and vent piping required for each fixture, drain, or equipment item.

B. Provide a storm drain piping system for roof drains.

C. Provide system in accordance with local and state codes regardless of possible conflicts in the Specifications or Drawings. Advise Architect of any changes required by codes that will change the design of the building.

PART 2 - PRODUCTS

2.01 SANITARY SEWER, WASTE AND VENT

A. Pipe Materials

1. Above Slab Pipe: No-hub service weight cast iron with approved gasket and clamp. Or code compliant solvent weld, schedule 40 PVC. Plastic pipe to be solid wall. Foam core type is not acceptable.

2. Below Slab Pipe: Cast iron, service weight, gasketed bell and spigot. System shall conform to the ASTM "Standard Specifications for Cast Iron Soil Pipe and Fittings". Or code compliant solvent weld, schedule 40 PVC. Plastic pipe to be solid wall. Foam core type is not acceptable.

3. Outside building (Beyond 5 feet): Cast iron, service weight, gasketed bell and spigot. System shall conform to the ASTM "Standard Specifications for Cast Iron Soil Pipe and Fittings".

4. Couplings to be flexible, chemical resistant rubber type by *Fernco*. Couplings to have two stainless steel clamping bands.

B. Copper and Brass at Fixture and Equipment Connections.

1. DWV copper with sweat or threaded fittings.

2. Exposed Fixture Branch Arms, Traps, Etc.: Chrome plate brass or copper.

2.02 STORM DRAINAGE

A. Pipe Materials

1. Above Slab Pipe: No-hub service weight cast iron with approved gasket and clamp. Or code compliant solvent weld, schedule 40 PVC. Plastic pipe to be solid wall. Foam core type is not acceptable.

2. Below Slab Pipe: Cast iron, service weight, gasketed bell and spigot, or code compliant solvent weld, schedule 40 PVC. Plastic pipe to be solid wall. Foam core type is not acceptable.

3. Outside building (Beyond 5 feet): Cast iron, service weight, gasketed bell and spigot. System shall conform to the ASTM "Standard Specifications for Cast Iron Soil Pipe and Fittings".

4. Couplings to be flexible, chemical resistant rubber type by *Fernco*. Couplings to have two stainless steel clamping bands.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Locate cleanouts as required by state and local codes and as shown on the Drawings. Bring cleanouts to an accessible location, flush with grade or floor, and terminate with cleanout as scheduled elsewhere.

B. Stop soil and waste system 5 feet outside of building line, unless otherwise shown.

3.02 TESTING

A. Test entire waste and vent system as per code.

3.03 CLEANING

A. Rod clean the entire system at the end of construction, but prior to the owner taking occupancy.

END OF SECTION

SECTION 23 04 50

PLUMBING FIXTURES AND EQUIPMENT

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Providing plumbing fixtures, equipment, and specialities.

B. Providing necessary support, trim, chairs, bolts, anchors, brackets, and accessories required.

1.02 RELATED WORK

A. Section 23 00 10 - Basic Mechanical Requirements.

B. Section 23 04 01 - Domestic Water System.

C. Section 23 04 05 - Drainage, Sanitary Waste & Vent Systems.

1.03 SUBMITTALS

A. Make submittals in accordance with Section 01300.

B. Submit product data on fixtures, equipment, and specialities.

PART 2 - PRODUCTS

2.01 PLUMBING FIXTURES AND EQUIPMENT

A. Furnish plumbing fixtures and equipment in accordance with the schedule at the end of this Section or on the drawings. Include all necessary chairs, bolts, anchors, and brackets.

B. Fixtures shall be non-absorbent throughout and free from waves, kiln marks, or discoloration.

C. All surfaces coming in contact with walls, floors or other flat surfaces shall be flat.

D. All enameled iron ware shall be acid-resistant.

2.02 FIXTURE TRIM

A. All exposed finished metal parts shall be chromium plated; except rough-bodied parts shall be nickel-plated.

B. All supplies shall be I.P.S. brass; except where otherwise specified.

C. All fixtures will be provided with supply stop or shut-off valve.

D. Traps for lavatories and sinks shall be chrome-plated cast brass P-traps with cleanouts.

E. Provide cast brass, chrome-plated, set screw type escutcheons on supply and waste piping at all floor and wall penetrations.

F. Chair carriers shall be approved models of Wade, or approved equal.

PART 3 - EXECUTION

3.01 FIXTURES INSTALLATION

A. Properly connect plumbing fixtures to waste, vent, and supplies in a rigid and substantial manner without damage to any adjoining work or finish.

B. Rigidly support wall hung fixtures with approved metal hangers, chairs, back up plate, threaded rod or other supports. Secure floor outlet fixtures to floor with approved floor flanges.

C. Provide connections of size listed on plumbing fixture schedule for connecting all new and relocated plumbing fixtures. Refer to drawings.

D. Provide above sizes for short branches only. Provide main lines of sizes shown on Drawings.

E. Protect all fixtures subject to damage prior to completion of building in an approved manner. Turn job over to Owner with all fixtures clean and free from damage.

F. Bed fixtures mounted on uneven surfaces in an approved manner.

3.02 FIXTURE AND EQUIPMENT SCHEDULE

A. Fixtures color is to be white unless otherwise indicated.

B. Approved manufacturers:
1. Lavatories and Water Closets: *American Standard, Kohler.*
2. Stainless steel sinks: *Just, Elkay.*
3. Faucets, shower/tub valves: *Delta, American Standard, Kohler, Symmons.*
4. Water coolers: *Oasis, Elkay, Acorn.*
5. Janitor and utility sinks: *Williams, Zurn, Fiat, American Standard, Kohler.*
6. Floor drains, roof drains, cleanouts, carriers: *Wade, Zurn, Froet, Mifab.*
7. Hose bibs and hydrants: *Woodford, Zurn.*
8. Flush Valves: *Sloan, Zurn.*
9. Water heaters – *AO Smith, Rheem, Bosch, Chronomite*

C. CLEAN OUTS

1. Clean Out Plug: Brass plug.

2. Floor Clean Out (FCO): *Wade* #6000 Cast Iron Floor Clean Out with appropriate outlet. Clean out to be two piece construction with double drainage flange, weep holes, reversible clamping collar, standard plastic plug round adjustable satin nickel bronze secured scoriated cover.

2. Wall Clean Out (WCO): *Wade* #8450-R cast iron body, standard plastic plug and round stainless steel access cover secured with machine screw.

3. Exterior Wall Clean Out (EWCO): *Wade* #8450-R cast iron body, standard plastic plug and 8480S square nickel bronze frame with secured smooth 18 gauge stainless steel access cover secured with machine screw.

4. Clean Out To Grade (COTG): *Wade* #6000 Cast Iron Floor Clean Out with appropriate outlet. Clean out to be two piece construction with double drainage flange, weep holes, reversible clamping collar, plastic plug round adjustable cast iron secured scoriated cover.

D. WATER CLOSETS

1. P-1 - Water Closet. Tank type, ADA – Elongated, 1.6 gpf. 16.5" rim height, tank type, vitreous china, free standing toilet, siphon action bowl, close couple tank, water surface seal, 2” ball pass trap. *American Standard* Champion #211.AA. Tank fittings to include backflow preventor, water control with volume regulator, fill valve, and trip lever. Locate trip lever on “open side” (right or left side) of ADA water closet tank as dictated by the floor plan. Provide appropriate solid plastic split front seat. *Bemis* #1955CT. Provide *McGuire* chrome plated angle supply, 3/8" x +/- 12", rigid riser, hand wheel, escutcheon.

E. LAVATORIES

1. P-2 - Undercounter ADA lavatory. White colored, vitreous china, *American Standard* #9482.000. Provide *Delta* #500-DST, single handle faucet, 5” long spout, 1.5 GPM. Provide *McGuire* integral grid offset strainer, *McGuire* handwheel water stops, *McGuire* 17 gauge trap. Provide *McGuire* insulation kit for trap, drain and supplies.

F. FLOOR DRAINS

1. P-6 – *Mifab* F-1000-C-STD floor drain. 2 or 3" size, as indicated on plans. Polished stainless steel, heavy duty, secured grated. Grate to be square. At tile floors, grate size to match tile size. Provide cast iron body, membrane clamp collar and seepage openings. Equip floor drain with code approved "trap guard" or "trap primer".

G. ELECTRIC WATER COOLERS

1. EWC-1 – ADA Electric Water Cooler. *Oasis* #PG8EBFSL, Bi-Level, barrier free, ¼ hp, 400 watts, 120 volt. Provide cane apron. Provide with hands free bottle filler. Provide *McGuire* hand wheel stop and #8872 trap. Provide appropriate floor mounted carrier by *Wade*.

H. HOSE BIBBS

1. P-8 - *Woodford* #B65 freeze proof hose bibb. ¾" size. Length to suit wall thickness. Provide with vacuum breaker and recessed box Chrome finish. Removable T-handle.

I. STAINLESS STEEL SINKS

1. P-3 – ADA, 18 Gauge, stainless steel double compartment, undermount sink. *Elkay* #ELUHAD321655 with back drains. 5.5 inch deep bowls. (2) Basket strainer/stops, *Delta* 400LF-HDF single handle faucet with 9" swing spout and chrome spray. 1.5 GPM aerator. *McGuire* stops with handwheel, (2) *McGuire* 17 gauge traps. Provide *McGuire* insulation kit for traps, drain and supplies.

J. GARBAGE DISPOSALS

1. P-4 - *In Sink Erator* Badger 5, ½ hp, 120 volt, thermally protected. Provide with grounded power cord.

K. SERVICE SINKS

1. P-5 - Mop service sink, *Florestone* #MSR-2424, 24 x 24 x 12 molded construction. Provide with hose section and wall bracket, sink faucet. *Delta* #28T9 faucet to have spout with bucket hook, ¾" hose thread end, vacuum breaker, adjustable top brace, chrome finish, integral stops.

L. ICEMAKER OUTLET BOXES

1. P-7 - *IPS* 9700 series icemaker wall outlet box. Provide with ¼ turn ball shut off valve and water hammer arrestor.

M. ROOF DRAINS & DOWNSPOUT NOZZLES

1. P-9 - *Wade* #3270 cast iron parapet drain with 90 degree side outlet, secured nickel bronze flashing clamp and secured grate. Size as indicated on the plan.

2. P-10 – *Wade* 3406-42-53. 12 inch diameter cast iron, dual outlet roof drain. Dura coated cast iron body with combination membrane flashing clamp/gravel guard & overflow standpipe and low profile cast iron dome. Provide under-deck clamp.

Size as indicated on the plan. This drain to be short in height, with 6” dimension from bottom of strainer to bottom pipe connections.

3. P-11 - *Zurn* #ZNAB-199 downspout nozzle, nickel bronze body, threaded inlet and decorative face of wall flange and outlet nozzle. Size as indicated on the plan.

N. ELECTRIC WATER HEATERS

1. EWH-A - Electric Water Heater. 10 gallon, 1.5 kw, 120 volt single phase, by *State* Model EJC-10 compact model. Provide with T&P relief valve. Provide *Watts* 2 gallon expansion tank.

END OF SECTION

SECTION 23 06 03

SPLIT AIR CONDITIONING AND HEATING EQUIPMENT

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Providing air cooled condensing units.

B. Provide fan coil units with D/X coil and electric resistance heater.

C. Provide outdoor heat pump units.

E. Provide duct free, mini-split fan coils.

1.02 RELATED WORK

A. Section 23 00 10 - Basic Mechanical Requirements

B. Section 23 00 90 - Mechanical Supporting Systems

C. Section 23 07 11 – Condensate Drain Piping

D. Section 23 02 50 - Mechanical Insulation Systems

E. Section 23 06 51 - Refrigerant Piping

F. Section 23 08 00 - Air Distribution

G. Section 23 09 00 – Electric Controls

H. Section 23 09 31 – Zone/Bypass Damper Control System

1.03 QUALITY CONTROL

1. Testing Requirements: The following factory tests are required for fans:

   a. Sound Power Level Ratings: Comply with AMCA Standard 301 "Method for Calculating Fan Sound Ratings From Laboratory Test Data." Test fans in accordance with AMCA Standard 300 "Test Code for Sound Rating." Fans shall be licensed to bear the AMCA Certified Sound Ratings Seal.

   b. Fan Performance Ratings: Establish flow rate, pressure, power, air density, speed of rotation, and efficiency by factory tests and ratings in accordance with AMCA Standard 210/ASHRAE Standard 51 - Laboratory Methods of Testing Fans for Rating.

1.04 SUBMITTALS

A. Provide product data for the items listed below. Include descriptive literature indicating performances, physical size, features, options, and other certified data indicating compliance with the specifications:

   1. Condensing units

2. Fan coils

3. Heat pumps

4. Mini-Split Systems.

PART 2 - PRODUCTS

2.01 Approved Manufacturers

A. Trane

B. Carrier

C. Ruud

D. Lennox

2.02 OUTDOOR AIR COOLED CONDENSING UNITS, 5 TON AND LESS

A. General:

1. Provide where indicated on plans, an air-cooled condensing unit. The unit shall contain sufficient refrigerant for complete system and be equipped with refrigerant line fittings which permit mechanical or sweat connection.

2. Brass service valves with fittings and gage ports shall be located on exterior of unit.

3. Refer to schedule on drawings for minimum performances.

4. The unit shall fit in the space indicated on the drawings with adequate clearance for service and airflow.

B. Compressor:

1. Compressor shall be of the hermetic scroll type with internal vibration isolation and be located in an isolated section of unit.

2. Compressor to have a 5 year warranty.

3. Compressor shall be equipped with a crankcase heater and have internal high pressure relief.

C. Condenser coil shall be constructed with aluminum fins mechanically bonded to seamless copper tubing. Condenser fan shall be propeller type, direct driven, and arranged for vertical air discharge. Fan motor shall be factory lubricated, totally enclosed, and inherently protected.

D. Controls shall be factory wired and placed in a location readily accessible. Compressor motor shall have both thermal and current sensitive overload devices.

E. Casing:

1. Casing shall make unit full weatherproof of outdoor installation. Casing shall be of galvanized steel, zinc phosphated and finished with baked enamel.

2. Openings shall be provided for power and refrigerant connections.

3. A panel shall be removable to provide access for servicing.

4. A guard shall be provided for the condenser coil.

F. Connections: Only one liquid line, one suction line, and one power supply connection shall be required for each unit.

G. Accessories:

1. Provide start capacitor and relay on single phase units.

2. Provide liquid line filter dryer.

3. Refer to drawings for additional accessories.

4. Provide indoor fan relay, and low voltage control transformer.

2.03 D/X FAN COILS UNITS, 2000 CFM & BELOW

A. General:

1. Provide direct-expansion fan coils equipped with electric heater in the location and manner shown on the plan. Unit shall operate properly in vertical upflow or horizontal position and is to be installed with ductwork.

2. Refer to Drawings for minimum performance.

3. The unit shall fit in the space indicated on the Drawings with adequate clearance for service, ductwork and pipe attachment, and coil removal.

B. Unit enclosure shall be insulated and constructed of cold-rolled steel, bonderized and finished with baked enamel. Large front service access panels shall provide easy access to all components. Units shall be equipped with permanent type filter that slides out for maintenance.

C. Fan shall be forward curved with double inlet, mounted on motor shaft, dynamically and statically balanced. The multi-speed, P.S.C., fan motor shall be factory lubricated, have internal overload protection, be resiliently mounted and shall not exceed 1/2 hp. Fan motor assembly shall be removable for service.

D. Cooling coil shall have a face velocity of 500 fpm or less and be constructed with aluminum plate fins mechanically bonded to copper tubing with all joints brazed. Coil shall have factory installed: refrigerated metering device; refrigerant line fittings which permit mechanical connections. Condensate pans shall be equipped with primary and auxiliary drain connections.

E. Electric Heater: As scheduled electric heaters shall be factory installed on the units. Heater models over 10 kW shall have heating elements sequenced on and off in 5 kW maximum increments and shall be wired for a minimum of 2-stage operation. All heaters shall be equipped with thermal overload device, current overload for heater above 10 kW and the required heating and cooling system controls. Low-voltage connections shall be

point-to-point on terminal board.

F. Controls: Provide cooling control kits containing 60-va control circuit (24-V) transformer, indoor fan relay, line voltage terminal block and low-voltage terminal strip.

2.04 OUTDOOR HEAT PUMP UNITS, 5 TONS & LESS

A. General:

1. Provide air-to-air electric heat pump (outdoor unit). The unit shall be designed and tested and contain a sufficient refrigerant charge for complete system. Brass service valves with refrigerant line fittings and service ports shall be located on exterior of unit.

2. Refer to schedule on Drawings for minimum performances.

3. The unit shall fit in the space indicated on the drawings. Provide adequate clearance for service and air flow.

B. Compressor:

1. Compressor shall be of the hermetic scroll type with internal vibration isolation. Compressor motor shall have both thermal and current-sensitive overload device, and start assist device.

2. Compressor shall be equipped with a crank-case heater and have internal high-pressure relief.

3. Compressor to have a 5 year warranty.

C. Coil:

1. Outdoor coil shall be constructed with aluminum fins mechanically bonded to copper seamless tubing. Coil shall be protected by a grille. Factory installed coil refrigerant metering device shall be mounted on unit liquid service valve. Metering device internal components shall be removable for cleaning or replacement.

2. Outdoor unit fan shall be propeller type, direct driven, and arranged for vertical air discharge. Fan motor shall be factory lubricated, inherently protected and resiliently mounted.

D. Controls:

1. Controls shall be factory wired and located in a readily accessible location. Controls and protective devices shall include a liquid line low-pressure switch, suction line accumulator and pressure relief device. An automatic defrost control shall be included to accomplish defrosting (only if coil saturated suction temperature indicates freezing temperatures) every 90 minutes.

2. Provide a transformer for 115 or 24 volt controls.

E. Casing:

1. Casing shall make unit full weatherproof for outdoor installation. Casing shall be

of galvanized steel, zinc phosphated and finished with baked enamel.

2. Openings shall be provided for power and refrigerant connections.

3. Panel shall be removable to provide access for servicing.

4. Provide with coil guard.

F. Connections:

1. Only one liquid line, one suction line, one power supply and one control wire connection shall be required for each unit.

G. Accessories:

1. Provide start capacitor and relay, indoor fan relay, and low voltage control transformer.

2. Provide liquid line filter dryer.

3. Refer to drawings for additional accessories.

2.05 MINI-SPLIT FAN COIL

A. Indoor, direct-expansion, exposed, wall or ceiling mounted fan coil. Unit shall be complete with cooling/heating (heat pump systems only) coil, fan, fan motor, piping connectors, electrical controls, microprocessor control system, and integral temperature sensing. Unit shall be furnished with integral wall/ceiling mounting bracket and mounting hardware.

B. Cabinet discharge and inlet grilles shall be attractively styled, high-impact polystyrene. Cabinet shall be fully insulated for improved thermal and acoustic performance.

C. Fan shall be tangential direct-drive blower type with air intake at the upper front face of the unit and discharge at the bottom front. Automatic, motor-driven vertical air sweep shall be provided standard.

D. Coil shall be copper tube with aluminum fins and galvanized steel tube sheets. Fins shall be bonded to the tubes by mechanical expansion. A drip pan under the coil shall have a drain connection for hose attachment to remove condensate. Condensate pan shall have internal trap and auxiliary drip pan under coil header.

E. Motors shall be open drip-proof, permanently lubricated ball bearing with inherent overload protection. Fan motors shall be 3-speed.

F. Controls shall consist of a solid-state electromechanical control system which shall control space temperature, determine optimum fan speed. The temperature control range shall be from 64°F to 84°F. The unit shall have the following functions as a minimum.

1. An automatic restart after power failure at the same operating conditions as at failure.

2. Programmable thermostat to provide cooling and heating set points and day/night setback modes.

3. Wired or wireless control to enter set points and operating conditions.

4. Filter status indication after 250 hours of indoor fan operation.

5. Automatic airsweep control to provide on or off activation of airsweep louvers.

6. Cooling mode to provide modulating fan speed based on difference between temperature set point and space temperature.

7. Fan only operation to provide room air circulation when no cooling is required.

8. A 50-ft indoor to outdoor control connection cable shall be provided with the fan coil unit.

9. Fan speed control shall be user-selectable: high, medium, low, or automatic operation during all operating modes.

10. A time delay shall prevent compressor restart in less than 2 or 4 minutes (adjustable)

G. Unit shall have filter track with factory-supplied cleanable filters.

H. Provide single point electrical connection. Power and control connections shall have terminal block connections.

I. Special Features (field Installed):

1. Internal Condensate Pump:
The condensate pump shall remove condensate from the drain pan when gravity drainage cannot be used. The lift capability of the condensate pump shall be 20 inches. Float control shall be in the condensate sump to shut unit down in case of pump malfunction.

2. Fresh Air Intake Kit:
Kit shall include filter and duct connections to provide for outdoor ventilation air.

3. Indoor Guard Kit:
Kit shall include a guard for the discharge grille to prevent objects from entering the air sweep mechanism.

4. Electronic Programmable Thermostat:
Thermostat shall be commercial grade and shall provide 7-day, 4-event scheduling. Integral sub-base shall be included. Thermostat shall also provide 3-speed fan switchover capability, air sweep auto changeover, and shall not require a battery to retain memory.

2.06 DRIVES

A. All equipment drives shall be direct drives unless scheduled otherwise.

2.07 GUARDS

A. Equip all exposed rotating machinery with guards.

2.08 VIBRATION PADS

A. Oil-resistant neoprene sheets, of manufacturer's standard hardness and cross-ribbed or waffled pattern as manufactured by the Amber/Booth Co.

PART 3 - EXECUTION

3.01 VIBRATION ISOLATION

A. Mount all equipment subject to vibration on vibration elimination neoprene pads or spring isolators. Comply with minimum static deflections recommended by ASHRAE, for selection and application of vibration isolation materials and units as indicated.

3.02 Make pipe connections to all equipment with unions or flanged connections to allow for removal or service.

3.03 Provide a condensate drain of insulated Type L copper with wrought copper fittings from each D/X coil and terminate as shown on the Drawings.

3.04 Install equipment according to code and the manufacturer’s published instructions. Arrange installation of units to provide access space around equipment for service and maintenance.

3.05 Duct installations and connections are specified in other Division 15 sections. Make final duct connections with flexible connections.

3.06 START UP

A. Do not operate systems until construction is complete.

B. Start up systems in accordance with manufacturer’s written instructions.

3.07 CLEANING

A. After construction is completed, clean unit interior and exterior surfaces including coil, fan and cabinets.

B. Retouch any marred or scratched surfaces.

C. Install new air filters.

END OF SECTION

SECTION 23 06 04

EXHAUST FANS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Exhaust fans.

1.02 RELATED WORK

A. Section 23 00 10 - Basic Mechanical Requirements

B. Section 23 09 00 - Electric Controls

C. Section 23 00 90 - Mechanical Supporting Systems

D. Section 23 08 00 - Air Distribution

1.03 QUALITY CONTROL

1. Testing Requirements: The following factory tests are required for fans:

a. Sound Power Level Ratings: Comply with AMCA Standard 301 "Method for Calculating Fan Sound Ratings From Laboratory Test Data." Test fans in accordance with AMCA Standard 300 "Test Code for Sound Rating." Fans shall be licensed to bear the AMCA Certified Sound Ratings Seal.

b. Fan Performance Ratings: Establish flow rate, pressure, power, air density, speed of rotation, and efficiency by factory tests and ratings in accordance with AMCA Standard 210/ASHRAE Standard 51 - Laboratory Methods of Testing Fans for Rating.

1.04 SUBMITTALS

A. Provide product data for the items listed below. Include descriptive literature indicating performances, physical size, features, options, and other certified data indicating compliance with the specifications.

1. Exhaust Fans.

PART 2 - PRODUCTS

2.01 APPROVED MANUFACTURERS

A. Loren Cook.

B. Greenheck.

C. Twin City Blower

D. Acme

2.02 CEILING EXHAUST FANS

A. Provide bathroom exhaust fans as indicated on the drawings:

1. Fans to be UL listed and certified by AMCA.

2. Minimum sizes and capacities: Refer to HVAC schedule on drawings.

3. Lubricated fan motor to be cushioned with vibration isolators.

4. Blower wheel to be balanced.

5. Housing to be of painted steel or silver anodized aluminum.

6. Provide decorative ceiling grille.

2.03 MOTORS

A. Motors required in connection with equipment shall be of sufficient size and speed for duty to be performed, not exceeding their full-rated load when drive equipment is operated at specified capacity under most severe conditions likely to be encountered.

B. Motors 3/4 HP and smaller shall have integral, internal thermal protection.

2.04 DRIVES

A. All equipment drives shall be direct drives unless scheduled otherwise.

2.05 GUARDS

A. Equip all exposed rotating machinery with guards.

PART 3 - EXECUTION

3.01 VIBRATION ISOLATION

A. Mount all equipment subject to vibration on vibration elimination neoprene pads or spring isolators. Comply with minimum static deflections recommended by ASHRAE, for selection and application of vibration isolation materials and units as indicated.

3.02 Secure roof-mounted fans to roof curbs with cadmium-plated hardware.

3.03 Arrange installation of units to provide access space around equipment for service and maintenance.

END OF SECTION

SECTION 23 06 51

REFRIGERANT PIPING

PART 1 - GENERAL

1.01 WORK INCLUDED

A. System consisting of a complete refrigerant piping system for each split D/X air conditioning system.

1.02 RELATED WORK

A. Section 23 00 10 -Basic Mechanical Requirements

B. Section 23 00 60 - Pipe and Pipe Fittings

C. Section 23 00 90 - Mechanical Supporting Systems

D. Section 23 02 50 - Mechanical Insulation Systems

E. Section 23 06 03 - Split Air Conditioning and Heating Equipment

PART 2 - PRODUCTS

2.01 MATERIALS

A. Freon piping, including liquid, suction, and hot gas lines:

1. 3/4" and Less: Soft temper, 50 feet refrigeration copper, dehydrated and capped.

2. Above 3/4": Hard temper, Type L or K, dehydrated and capped.

3. All copper to be CERRO copper of equal.

B. Joints: Wrought copper fittings and silfos. Silfos to be lead free with 12% to 15% silver content.

C. Freon Valves: Diaphragm packless bellows by Mueller, Brass, Kartest Manufacturing or equal.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install a liquid line filter dryer as per manufacturer's instructions. Size the filter-dryer as per manufacturer's recommendations.

B. Size and install liquid and suction refrigerant lines as per equipment manufacturer's recommendations.

3.02 EVACUATION AND CHARGING

A. Evacuate non-precharged refrigerant systems only.

B. Use a two stage rotary vane gas ballast vacuum pump and an electronic (thermocouple) vacuum gauge.

C. The pipe size between the piping system and the pump shall be 1/2" minimum.

D. Before charging with freon the following evacuation procedure shall be accomplished:

1. 30 minutes or more at 1500 microns vacuum.

2. Fill to zero gauge pressure with dry nitrogen for 10 minutes.

3. 15 minutes or more at 1500 microns vacuum.

4. Fill to zero gauge pressure with dry nitrogen.

5. 30 minutes or more at 1500 microns vacuum.

E. After completion of the above evacuation procedure, and testing, charge the system with refrigerant as per manufacturer's recommendations.

3.03 TESTING

A. Test during progress of work or at completion to ensure tight system. Use Nitrogen for testing. Soap test refrigerant system at 245 psi. Allow system to stand for 24 hours under pressure and if no change is pressure, system may be considered tight.

END OF SECTION

SECTION 23 07 11

CONDENSATE DRAIN PIPING

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Condensate Drain Piping

1.02 RELATED WORK

A. Section 23 00 10 - Mechanical General Provisions

B. Section 23 00 60 - Pipe and Pipe Fittings

C. Section 23 00 90 - Mechanical Supporting Systems

D. Section 23 06 03 – Split Air Conditioning and Heating Equipment

E. Section 23 02 50 – Mechanical Insulation Systems

PART 2 - PRODUCTS

2.01 CONDENSATE MISCELLANEOUS DRAIN AND VENT PIPING

A. Type M or L hard drawn copper with wrought sweat fittings. Insulate copper pipes routed indoors. Outdoor pipe is to be left un-insulated.

B. At interior locations, as an alternate to insulated copper drain pipe, un-insulated schedule 40 PVC with solvent weld fittings may be used.

2.02 FLANGES, UNIONS, AND COUPLINGS

A. Pipe Size 2 Inches and Under: 150 psig galvanized malleable iron unions for threaded ferrous piping; bronze unions for copper pipe, soldered joints.

B. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

PART 3 - EXECUTION

3.01 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and dirt on inside and outside before assembly.

C. Prepare piping connections to equipment with flanges or unions.

3.02 INSTALLATION

A. Route piping in orderly manner, plumb and parallel to building structure, and maintain gradient.

B. Install piping to conserve building space and not interfere with use of space, other work, or equipment.

C. Provide clearance for installation of insulation and access to valves and fittings.

D. Unless otherwise indicated, do not insulate condensate drains routed exposed outdoors.

E. Provide access where cleanouts are not exposed or accessible.

F. Slope condensate piping at 1/4” per foot in direction of flow. Use eccentric reducers to maintain bottom of pipe level.

3.03 APPLICATION

A. Install unions downstream of valves and at equipment or apparatus connections. Install dielectric unions where joining dissimilar materials.

B. Install brass male adapters each side of valves in copper piped system. Sweat solder adapters to pipe.

3.04 PIPE CLEANING

A. Provide the necessary chemicals to safely remove oil and grease resulting from manufacturing process and assembly of piping. Such chemicals shall clean the metal surfaces but not be corrosive to pipes and other materials in the system.

3.05 PIPE TESTING

A. The piping system shall be tested for leaks and all leaks repaired.

B. Do not pressure test the existing piping. Test new piping only.

C. Test pipe before filling to 50 psig air for a period of two hours. Prove tight by maintaining pressure without air.

D. Test pipe in sections as required for convenience. Disconnect mechanical equipment and cap pipes during testing.

3.06 PIPE ACCESSORIES

A. Install piping accessories as per manufacturer's instructions.

END OF SECTION

SECTION 23 08 00

AIR DISTRIBUTION

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Supply, return, outside and exhaust air ductwork.

B. Ductwork accessories.

1.02 RELATED WORK

A. Section 23 00 10 - Basic Mechanical Requirements

B. Section 23 00 90 - Mechanical Supporting Systems

C. Section 23 02 50 - Mechanical Insulation Systems

1.03 REFERENCES

A. SMACNA Low Velocity Duct Construction Standards; latest edition.

B. ASHRAE Fundamentals Journal; latest edition.

C. Underwriter's Laboratory, Incorporated.

1.04 SUBMITTALS

A. Provide product data for the items listed below. Include descriptive literature indicating performances, physical size, features, options, and other certified data indicating compliance with the specifications:

1. Grilles, diffusers, registers;

2. Ductwork accessories.

3. Louvers, roof hoods.

PART 2 - PRODUCTS

2.01 LOW PRESSURE DUCTWORK

A. Construct low pressure ductwork to withstand 2" positive and 2" negative static pressures.

B. Fabricate ductwork of galvanized steel sheets unless otherwise noted on plans or specified. Galvanized steel shall be of lock forming quality (LFQ) and shall have a galvanized coating of 1-1/2 ounces total for both sides of one square feet of a sheet.

C. Round ductwork shall be galvanized sheet metal.

D. All duct joints shall be sealed air tight (SMACNA Class B) under operating pressures.

Seal metal duct before application of duct insulation.

E. Minimum duct sheet metal gauges shall be:

0" thru 30"	- 24 gauge
31" thru 54"	- 22 gauge
55" thru 84"	- 20 gauge
85" thru 120"	- 18 gauge

F. Seal low pressure ductwork with one of the following *Hardcast* products or approved equal. Sealant shall be suitable for *SMACNA* pressure classes 2” W.G. through 6” W.G. Sealant shall be suitable for *SMACNA* A, B, and C seal classes.

1. Iron Grip 601 indoor/outdoor heavy brush on sealant.

2. Foil Grip 1402 indoor/outdoor rolled sealant.

2.02 DUCTWORK ACCESSORIES

A. Turning Vanes: Barber-Coleman "Airturn".

B. Round Tap: ACME or equal. Provide with bell mouth transition. Do not provide air scoop. Damper to have 2" spacer at operator to compensate for thickness of insulation.

C. Operator handle to be locking quadrant type.

D. Extractors: Metalaire Model 101-1, 1" on center blades, aluminum, with accessible push-pull adjusting arm.

E. Opposed Blade Induct Manual Damper: Ruskin CD-50 opposed blade type with locking quadrant operator outside of duct. Damper to have 2" spacer at operator to compensate for thickness of insulation.

F. Flexible Connector: Duro-Dyne Junior reinforced neoprene fabric, UL listed.

G. Access Doors:

1. Ruskin Model ADC2 removable door type.

2. Door to be unhinged, with frame, interior and exterior panel, 1" insulation, cam latches.

3. Frame to have foam gasket seal.

4. Door and frame to be 24 gage galvanized steel.

PART 3 - EXECUTION

3.01 INSTALLATION - GENERAL

A. Adhere to Drawings as closely as possible. Where required to meet structural or other interferences, vary run and shape of ducts and made offsets during progress of work. Establish duct routes and take field measurements before ductwork is fabricated.

B. Install ductwork free of any objectionable self-generating noise or rattles.

C. Construct and install all dampers so that there shall be no vibration to air flow over damper.

D. Construct T's, bends, and elbows with radius of 1-1/2 times width of duct on center line. Where not possible provide turning vanes.

E. Increase duct sizes gradually, not exceeding 30 degrees divergence and 45 degrees convergence.

F. All metal longitudinal seams shall be Pittsburgh Lock or other SMACNA listed seams.

G. Connect diffusers or troffer boots to low pressure ducts with 5 feet (1.5 m) maximum length of flexible duct. Hold in place with strap or clamp.

H. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.

I. Provide fire dampers at penetrations of fire rated walls. Install with required perimeter mounting angles, sleeves, breakaway duct connections, corrosion resistant springs, bearings, bushings and hinges.

J. Provide flexible connections immediately adjacent to equipment in ducts associated with fans and motorized equipment.

K. Provide balancing dampers on duct take-off to diffusers, and grilles and registers, regardless of whether dampers are specified as part of the diffuser, or grille and register assembly.

3.02 ACCESS DOORS

A. Install access doors in ductwork where provided to service concealed equipment.

B. Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, and elsewhere as indicated. Provide minimum 8 x 8 inch size for hand access, 24 x 24 inch size where feasible.

3.03 CENTERING OF AIR DEVICES

A. Install grilles, registers and outlets centered and/or spaced equally along walls, floors, or ceilings. Coordinate with Architectural Drawings.

3.04 AIRTIGHTNESS

A. Install the ductwork system airtight and lightproof.

B. Connect round duct with sheet metal screws. Seal all joints.

C. Clean all dirt, oil, and moisture before applying duct sealant.

D. Duct tape, caulk or glazing compounds are not acceptable.

3.05 DUCT SUPPORT

A. Rigidly support ductwork by metal straps from structural members of the building. Do not use furring members, plastered partitions, or other finished materials for support.

B. Support as per SMACNA guidelines for ductwork low pressure standard.

END OF SECTION

SECTION 23 09 00

ELECTRIC CONTROLS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Providing a complete system of electric heating and electric cooling controls for split electric heat pump systems and packaged rooftop units.

B. Providing a complete system of exhaust fan controls.

C. Providing training and instruction to Owner.

1.02 RELATED WORK

A. Section 23 06 03 - Split Air Conditioning and Heating Equipment.

B. Section 23 06 04 – Exhaust Fans.

C. Section 23 09 31 – Zone Bypass Damper Control System

D. See Electrical.

1.03 QUALITY ASSURANCE

A. The control system shall be installed, checked out, calibrated and training performed by a HVAC controls company, specializing in HVAC controls design, installation, service and maintenance.

1.04 SUBMITTALS

A. Furnish control wiring diagrams, sequences of operation and submittal data on control devices.

PART 2 - PRODUCTS

2.01 APPROVED MANUFACTURERS & HVAC CONTROLS CONTRACTORS

A. Northwest Controls, Commercial Air of Little Rock, Powers of Arkansas, Trane Controls, or approved equal.

2.02 EQUIPMENT - GENERAL

A. Voltage: Provide low voltage control components and system unless otherwise indicated.

B. 115 V Wire: 12 gauge.

C. 24 V Wire: 18 gauge or 16 gauge.

D. Conduit: EMT.

2.03 WALL MOUNTED THERMOSTATS: Refer to drawings.

2.04 THERMOSTAT ENCLOSURES

A. When requested by Architect or owner, provide a factory finished enamel painted steel, key lock, tamper-proof enclosure for each wall thermostat.

2.05 CONTROL SEQUENCES

A. Manufacturers standard unless otherwise indicated on the drawings.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Thermostats shall be located where shown on Drawings unless otherwise instructed by the Owner. Locate thermostat 48" above floor or as otherwise indicated.

B. At completion of installation, regulate and adjust all thermostats and equipment specified in this Section.

C. Provide the owner two sets of thermostat enclosure keys.

3.02 CONTROL WIRING

A. Route all line voltage control wire in conduit.

B. Low Voltage (48 volt or less) control wiring.

1. Route in conduit in exposed installations such as mechanical/electrical rooms and other unfinished installations.

2. Route in conduit in walls, partitions, above plaster and gypboard ceilings and other inaccessible areas.

3. Route in conduit where routed outdoors or other areas subject to damage.

4. Route in conduit in ceiling spaces used as supply or return air plenums.

5. Conduit is optional in above lay-in ceiling installations unless space is used as a supply or return air plenum.

C. Refer to electrical specification for wiring requirements.

D. Conduit and conductors by mechanical.

3.03 TRAINING

A. Provide heating and cooling system training presentation for the Building Owner or someone designated by the Building Owner.

B. Provide the Owner two sets of bound control system description wiring schematics.

END OF SECTION

SECTION 23 09 31

ZONE/BYPASS DAMPER CONTROL SYSTEM

PART 1 GENERAL

1.01 WORK INCLUDED

A. Provide zone/bypass control systems for hvac systems as indicated on the drawings.

1.02 RELATED SECTIONS

A. Section 23 06 03 – Split Air Conditioning and Heating Equipment

B. Section 23 09 00 – Electric Controls

C. All Electrical sections.

1.03 SYSTEM DESCRIPTION

A. The changeover/bypass VAV system shall provide temperature control of multiple comfort zones through the use of a constant volume single-zone HVAC unit. Variable air volume control shall be provided for each zone to maintain zone temperature within the heating/cooling setpoints. The system shall monitor the temperature and setpoints of the zones and automatically change the heat/cool mode of the HVAC unit to satisfy zone requirements. The system shall maintain proper airflow through the duct system and HVAC unit by bypassing air from the supply to the return duct as necessary to maintain the required static pressure needed in the system.

B. The changeover/bypass VAV system shall have all ancillary devices, sensors and operating parameters viewable and editable from a central system panel or from an intelligent thermostat.

1.04 SUBMITTAL

A. Submit shop drawings and product data sheets indicating configuration, general assembly, and materials used in fabrication.

B. Submit manufacturer's installation instructions.

1.05 OPERATION AND MAINTENANCE

A. Include manufacturer's descriptive literature, operating instructions, and maintenance data.

1.06 QUALITY ASSURANCE

A. Manufacturer; Company specializing in manufacturing products of the type specified in this section with minimum 5 years documented experience.

B. The control system shall be installed, checked out, calibrated and owner training performed by a HVAC controls company, specializing in HVAC controls design, installation, service and maintenance.

1.07 SYSTEM RESPONSIBILITY AND SEAMLESS COMMUNICATION

A. The entire changeover/bypass system, including dampers, shall be furnished by a single manufacturer who shall be responsible for the entire system.

1.08 WARRANTY

A. Provide one year manufacturer's parts warranty from the notification of substantial project completion.

PART 2 PRODUCTS

2.01 Acceptable Manufacturers: The control sequence and function shall be equal to the Comfort Zone system by *Carrier.*

2.02 Zone Damper and Bypass Control System

A. Zoning system to provide control of up to eight areas of a building being served by one constant volume air handler.

B. System to include, as a minimum, equipment controller, user interface, duct leaving air temperature sensor, outdoor temperature sensor, room thermostats, zone dampers and bypass damper.

C. The room zone thermostats shall have a digital display and shall allow the room occupant to adjust the temperature setpoint.

D. Galvanized steel zone and bypass dampers shall be motorized and shall modulate. Automatic alignment, position indicator, spring loaded disengagement button, recessed electrical connections, permanently lubricated bushings.

E. Components mounted in finished areas shall have painted steel or plastic enclosure.

F. System shall be 24 AC. Provide appropriated low voltage transformer.

G. Environmental Range: 32 to 104 degrees F.

H. Multi-stage heat and cool and dual fuel capable.

I. Seven programming days, 4-wake, day, evening and Sleep, Auto or manual changeover, Programmable fan, Humidity control, Smart recovery, Filter reminder, Copy functions, Permanent memory, Humidity and Temperature display, Temperature sensor offsets. Two hour override.

J. Provide a surge protection device at the system power connection.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

3.02 CONTROL WIRING

A. Route all line voltage control wire in conduit.

B. Low Voltage (48 volt or less) control wiring.

1. Route in metallic conduit in exposed installations such as mechanical/electrical rooms and other unfinished installations.

2. Route in conduit in walls, partitions, above plaster and gypboard ceilings and other inaccessible areas.

3. Route in conduit where routed outdoors or other areas subject to damage.

4. Route in conduit in ceiling spaces used as supply or return air plenums.

5. Conduit is optional in above lay-in ceiling installations unless space is used as a supply or return air plenum. Plenum rated low voltage cable may be used above accessible lay in ceilings.

3.03 DEVICE LOCATIONS

A. Check and verify locations of thermostats, humidity sensors, panels, control sensors, relays and contactors with Plans and Architect before installation.

3.04 SERVICE AND GUARANTEE

A. After completion of installation, controls contractor shall adjust and program the equipment provided under this contract. They shall be placed in complete operating condition subject to the approval of the Architect. System shall be free from defects in workmanship and material under normal use and service.

3.05 TRAINING and CLOSE-OUT DOCUMENTS

A. Contractor shall provide operation and maintenance manuals complete with wiring diagrams to the owner and instruct the operators in the functions available for the facilities operation. Contractor shall allow for up to (2) hours of instruction on site in two, one hour sessions to be scheduled during the first year of operation.

END OF SECTION

SECTION 23 09 90

SYSTEM TESTING AND BALANCING

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Air systems and water systems

1.02 RELATED WORK

A. Section 23 00 10 - Basic Mechanical Requirements

B. Section 23 08 00 - Air Distribution

1.03 QUALITY ASSURANCE

A. Tester's Qualifications: NEBB or AABC Certified or Registered Professional Engineer.

B. Codes and Standards: NEBB Compliance.

C. Execution of system testing and balancing work shall be closely monitored by an individual holding a current NEBB or AABC certificate.

1.04 SUBMITTALS

A. Submit certified test reports:

1. Air flow test and balance report to be provided and signed by individual conducting that test.

2. System operating test to be provided and signed by the installing contractor.

B. Include identification and types of instruments used, and their most recent calibration date with submission of final test report.

C. Report format: Provide in soft cover, letter size, 3-ring binder, with index page and tabs, and cover identification. Include reduced scale drawings with air outlets and equipment identified to correspond with data sheets, and indicating thermostat locations.

D. Report Forms: AABC National Standards for Total System Balance forms, forms prepared following ASHRAE 111 or NEBB forms.

PART 2 - PRODUCTS

2.01 APPROVED TEST AND BALANCE CONTRACTORS.

1. *Airetech* of Little Rock Arkansas.
2. *Pro Building Solutions,* Little Rock Arkansas
3. *Wade Company*, Little Rock Arkansas
4. *Powers of Arkansas*, Little Rock, Arkansas
5. Approved equal

PART 3 - EXECUTION

3.01 GENERAL

A. Before commencing work, verify that systems are complete and operable.

B. Report any defects, deficiencies, or abnormal conditions in mechanical systems which prevent system balance.

C. Beginning of work means acceptance of existing conditions.

D. Recorded data shall represent actually measured or observed condition.

E. Permanently mark settings of valves, dampers, and other adjustment devices. Set and lock memory stops.

F. Patch holes in insulation and housing that have been cut or drilled for test purposes, in manner recommended by original installer.

G. Retest, adjust, and balance systems subsequent to significant system modifications, and resubmit test results.

H. Prepare report of test results, including instrumentation calibration reports, in format recommended by applicable standards.

3.02 CERTIFICATION OF REQUIREMENT

A. No person shall adjust or work on the environmental control system without possessing an NEBB of AABC certificate.

B. All environmental systems test and balance work completed by technicians (without certificates) shall be supervised by a certified technician on a one to one ratio. The certified technician shall be present at the job-site at all times that systems test and balance work I being accomplished.

C. Environmental testing and balancing technicians shall be required to present the license or certificate to an appropriate inspector or general contractor upon request.

3.03 TEST OBJECTIVE

A. Test, adjust, and balance environmental systems and components, as indicated, in accordance with procedures outlined in applicable standards as described:

1. Air measurements and balancing for airhandlers, fan coils, air devices, air terminal boxes to obtain design flow.
2. Water side pressure drops across cooling coils, heating coils, heat exchangers will be adjusted to obtain the manufacturer’s certified pressure drop for design flow.

3.04 TOLERANCES

A. Air Handling Systems: Adjust airflow to within plus or minus 5 percent of design.

B. Air Outlets and Inlets: Adjust to within plus or minus 10 percent of design.

3.05 PROCEDURE

A. Adjust air handling and distribution systems to provide required or design supply, return, outside air and exhaust air quantities and water flow quantities.

B. Measure air quantities at air inlets and outlets.

C. Use volume control devices to regulate air quantities only to extent that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers.

D. Vary total system air quantities by adjustment of fan speeds. Provide fan drive changes as required. Vary branch air quantities by damper regulation.

E. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Allow for 50 percent loading of filters.

F. Adjust automatic outside air, return air, and exhaust air dampers for design conditions.

G. Measure temperature conditions across outside air, return air, and exhaust air dampers to check leakage.

H. Where modulating dampers are provided, take measurements and balance at extreme conditions.

I. Measure and adjust water flows through heat exchanges and coils.

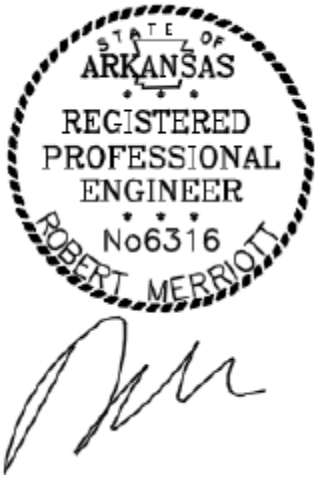
END OF SECTION

The following Electrical Specifications have been prepared by

Lucas Merriott and Associates

for

First Community Bank-Brookland



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SECTION 26 00 00

BASIC ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Basic electrical requirements specifically applicable to Divisions 26, 27, 28 sections in addition to applicable Division 01 sections of the Specifications. The Engineer (or Architect) shall herein be the A/E.

1.2 COORDINATION

A. The electrical work shall be installed in cooperation with other trades installing inter-related work. Coordinate all conduit runs to miss mechanical ducts as shown on mechanical sheets and at building.

B. Anchor bolts, sleeves, inserts, and supports shall be installed by this subcontractor.

C. Contact Engineer three days prior to pouring of slabs to verify floor outlet locations. Obtain dimensioned drawings from the Architect for floor outlet positioning.

1.3 SUBMITTALS

A. Deviation from the Drawings and Specifications shall be called to the attention of the Architect in writing at the time of submission of the Shop Drawings. The Engineer's checking of any drawing shall not release the subcontractor from responsibility for such deviations.

B. The Contractor shall furnish complete sets of certified Shop Drawings. Provide submittals for Lighting, Switchgear, electronic systems, wiring devices and other items as noted in other sections of the specification.

C. Where equipment requiring different arrangement of connections from those shown is approved, it shall be the responsibility of the subcontractor to install the equipment to operate properly and in harmony with the intent of the Contract Documents, and to make all changes in the work required by the different arrangement of connections and pay all charges resulting from changes.

D. Submittals shall include physical dimensions of electrical equipment.

1.4 CODES, ORDINANCES, INSPECTIONS AND PERMITS

A. Obtain and pay for required fees, permits, and inspections for electrical work.

B. Perform Work in accordance with N.E.C., N.F.P.A., U.L.,local codes and N.E.C.A.(latest version).

1.5 DELIVERY, STORAGE AND HANDLING

A. Place stored materials on clean, hard surfaces above ground and keep covered at all times to ensure protection from paint, plaster, dust, water and other construction debris or operations.

B. Keep conduit ends plugged or capped, and all covers closed on boxes, panels, switches, fixtures, etc., until installation of each item.

C. Stored materials and equipment shall be located to facilitate prompt inspection.

1.6 ACCURACY OF DATA

A. The data given herein and on the Drawings are as exact as could be secured, but their absolute accuracy is not guaranteed. Exact locations, distances, levels, etc., will be governed by the building, and the Contractor shall use the data contained herein with this understanding.

B. The Contractor shall verify all measurements at the building and shall be responsible for the correctness of same. No extra compensation will be allowed because of differences between work on the Drawings and measurements of the building.

1.7 INTENT OF DRAWINGS AND SPECIFICATIONS

A. The intent of the Electrical Drawings and Specifications is that the subcontractor shall furnish all labor and materials, equipment and transportation necessary for the proper execution of the work. This subcontractor shall thoroughly examine the Drawings and Specifications relating to other trades in order to include all necessary work in his bid. No additional payments shall be considered for failure to properly interpret the responsibilities to other trades. The subcontractor shall do all the work shown on the Drawings and described in the Specifications and all incidental work necessary to complete the Project in a substantial and acceptable manner, and to fully complete the work ready for use, occupancy, and operation by the Owner. The A\E reserves the right to make any reasonable changes up to six feet (6') in the locations indicated without additional cost to Owner.

1.8 OPERATING AND MAINTENANCE MANUALS

A. Deliver to the A\E for the Owner's use, two complete operating and maintenance manuals covering all equipment and systems installed by this Division.

B. Include approved equipment and material submittals, parts lists, wiring diagrams, and operating instructions for all operating equipment.

C. Bind brochures in hard back three ring binder and tab indexed. Label front cover and back spine indicating project name. Include page showing data and local responsible vendors with addresses and telephone numbers and furnishing parts and information on equipment.

1.9 OBSERVATION OF WORK

A. The A/E will make final onsite review of the Work of this division, prepare punch list, and visit the job site to check the punch list.

B. If additional trips are required to the job because the Contractor did not perform the work as shown and called for on the punch list, then the Contractor shall reimburse the A\E for charges at the rate of $175.00 per hour plus 55 cents per mile for travel expenses.

C. The Contractor shall allow the Engineer access to all parts of the Work and shall furnish assistance and information as required by the Engineer.

1.10 PROJECT RECORD DRAWINGS

A. The Contractor shall provide as-built drawings. Record all deviations from plans, actual locations of underground utilities etc.

1.11 INSPECTION OF SITES

A. Inspect the site and become thoroughly familiar with conditions to be met and the work to be accomplished. At existing building sites verify prior to bid all conditions shown affecting work.

1.12 SAFETY AND WORK METHODS

A. Refer to General Conditions.

B. The Electrical Subcontractor is completely responsible for how all of his work is performed; safety, in, on, or about the job site; methods of performance;

and timeliness in such performance. In the event he is unsatisfied with the performance of other trades, he shall set forth such complaints in writing for the Owner's review. In no event shall this subcontractor expect to be specifically directed in the protection of personnel or material by the Owner, Architect, or Engineer.

1.13 NOISE AND VIBRATION CONTROL

A. Isolate noise generating equipment and all equipment mounted to building including A/C units, ballast, etc., with flexible conduit to prevent transmission of noise through conduit system.

1.14 PAINTING

A. Repair finish surfaces damaged by Work of this section.

B. Paint equipment and material furnished and installed under this section that has only a prime coat of paint. Use color and brand of paint selected by Architect.

C. All “exposed to view” conduit, boxes, panels, etc. to be primed and painted with color selected by Architect. Verify prior to painting.

1.15 TEMPORARY CONSTRUCTION POWER

A. This Contractor shall furnish and install temporary construction power wiring as required. Temporary electrical service shall be obtained in the name of the General Contractor, and it will be the General Contractor's responsibility to pay all power company charges. The temporary service shall be obtained from the local utility company. Provide temporary lighting as required for adequate illumination for construction and safety purpose.

1.16 LICENSING REQUIREMENT

A. No person shall perform electrical work on the contract without possessing an Arkansas State Master or Journeyman License from the Arkansas State Electrical Examiners Board. All electrical work and apprentice electricians shall be supervised as required by State law.

B. All electricians shall have a copy of their license with them and shall be required to show it to an appropriate inspector upon request.

PART 2 - PRODUCTS

2.1 MATERIAL AND EQUIPMENT

A. In order to establish standards of quality, the Engineer has referred to certain products by name and catalog number. This procedure is not to construed as eliminating from competition other products of equivalent or better design. Where multiple manufacturing sources are shown on the Drawings or herein specified, the subcontractor shall limit his bid to one of those manufacturers.

B. Electrical fixtures, appliances, hardware, switch gear, panel boards, boxes and other items related in any manner to electrical work shall be considered; however, it will be at the discretion of the Architect and the electrical engineer to evaluate “equal” as a substitution to that as specified. It will be the responsibility of the bidder for the substituted item’s approval. Should item be deemed “not equal” by the Architect and electrical engineer, then the bidder must supply the item as specified without additional cost to the Owner or any design team member.

C. The subcontractor shall abide by the Engineer's judgment when proposed substitute materials or items of equipment are judged to be unacceptable and shall furnish the specified material or item of equipment in such case. All proposals for substitution shall be submitted in writing by the General Contractor and not by the Electrical Subcontractor or material suppliers. The Engineer will approve or disapprove proposed substitutions in writing. If any request for a substitution is rejected, the Contractor shall automatically furnish material specified. All materials shall be new and shall bear the manufacturer's name and the Underwriters Laboratory label. Materials of the same general type shall be the same throughout the job to provide uniform appearance, operation, and maintenance.

D. Delivery and Storage: Equipment and materials shall be delivered to the site and stored in original containers. All items subject to moisture damage (such as coils of dry transformers) shall be stored in dry, heated space. At the completion of the work, fixtures, equipment, and materials shall be cleaned and polished thoroughly and turned over to the Owner in a condition satis-factory to the Architect. Damage or defects developing before acceptance of the work shall be made good at no expense to the Owner.

2.2 LABELING

A. Each major component of equipment shall have a nameplate listing the manufacturer's name, address, catalog and serial number. The nameplate shall be brass, aluminum or other durable material attached to the equipment in a conspicuous location. Nonferrous identifying tags or pressure-sensitive labels shall be provided for all cables, feeders, and power circuits in vaults, pull boxes, manholes and switchboard rooms at cable termination and in other locations.

B. Tags or labels shall be stamped or printed to correspond with markings on the as-built drawings so that feeder or cable may be readily identified. Electrical equipment, safety switches, time clock, starters, panels and transformers shall have black and white laminated bakelite nameplates securely fastened to device with screws and be exposed. Edge of plates shall be beveled. Letters shall be white with black field. Letters shall be 3/8-inch upper case. Nameplate shall state its purpose and the voltage of the equipment. 120 or 240 volt equipment shall have black; 480 volts red.

C. Provide “Flash Protection” label as per NEC.

2.3 FLASHING

A. For roof penetrations, furnish penetration as approved by roofing company.

2.4 ACCESS PANELS

A. Furnish access panels as required to service electrical devices.

B. Furnish size and type as required for proper service or as shown on Drawings for specific locations.

2.5 WIRING NOT IN RACEWAY

A. Where the Drawings or Specifications allow communication system wiring to be run without raceways, the Contractor shall supply plenum-rated wire where wiring penetrates air plenums, whether indicated or not.

2.6 ARRESTORS

A. Where a data, telephone, fire alarm, intercom or similar cable is specified for the project; provide arrestors at all cable entrances as per code.

PART 3 - EXECUTION

3.1 CUTTING AND PATCHING

A. Provide cutting and patching required to perform the electrical work. Do not cut structural members except through explicit instructions of the Architect/Engineer. Accomplish patching with workmen skilled in the trade required. Perform cutting and fitting in rough construction phases of the work.

B. Seal penetrations with fire-rated sealant equal to or greater than the fire rating of the wall.

3.2 ACCESSIBILITY

A. Install in an accessible location, all junction boxes, starters, relays, light fixtures, and other items that may require servicing or repairing.

3.3 CLEARANCES

A. Maintain clearances in front of electrical equipment as required by code. Report discrepancies to A/E PRIOR TO ROUGH-IN.

B. Submit ½" = 1'-0" scale plan showing layout of electrical equipment.

3.4 EXCAVATING, TRENCHING, AND BACKFILLING

A. Excavate and trench as required to install portion of the electrical systems required to be located below grade. Arrange cutting of streets and walks with governing authorities and patch cuts to conform to their requirements.

B. Protect roots of trees designated to remain. Perform trenching within the branch spread by hand. When trench is opened, install the utility immediately, prune injured roots cleanly, and backfill as soon as possible.

C. Keep trenches free from water while construction therein is in progress. Conduct discharge from dewatering to drains or natural drainage channels.

D. Backfill trenches only after required electrical system tests have been completed. Backfill and tamp in 6-inch layers with materials free of large stones or clods of earth to cover of 12 inches. Backfill the remainder of trenches in 12-inch layers. Do not use blasted rock, broken concrete or large boulders for backfill. Backfill entire depth of trenches to be covered with roads, walks, or concrete slabs in 6 inch layers, compacting each layer to 95 percent of maximum dry density at or near optimum moisture content as determined by Standard Proctor procedures, ASTM D698.

E. Ensure that buried lines have a minimum of 30-inch cover. Install marking tape above all feeder conduits ,telephone and data lines. Do not install utility

lines beyond 2 feet from the building until rough grading is completed. Allow for finished grading operations to ensure adequate final cover over lines.

3.5 WIRING

A. Electrical wiring for mechanical equipment or equipment furnished by others is separated into two main wiring divisions: (1) Power wiring by Electrical Contractor and (2) Control wiring by Mechanical Contractor.

B. Power wiring shall be the energy source and shall include installation of circuit protective devices, controller, conduit, wiring, and safety disconnects from power supply, and terminating at the motor or appropriate terminals on equipment. Install starters as required.

C. Control wiring shall comprise conduit and wiring not included in power wiring or noted above. This wiring shall include low voltage automatic temperature control wiring, safety and interlocking wiring, push button starting, pilot light, and signal wiring, etc., that is not included as part of safety equipment.

D. The Electrical Contractor shall install all wiring and equipment specifically shown on the Electrical Drawings.

E. All telephone, data and similar wiring shall be permanently marked. In addition a wiring schedule shall be placed on the as-builts.

3.6 CONNECTION OF EQUIPMENT NOT SPECIFIED IN THIS DIVISION

A. Provide necessary materials and make connections to equipment requiring electrical power.

B. Rough-in for connection of this equipment according to shop drawings furnished with the equipment or by actual measurements taken from equipment on site. Provide junction boxes, disconnect switches, etc., required to properly connect each piece of equipment unless specifically stated otherwise.

3.7 UTILITIES LOCATIONS, METERS, AND CONNECTIONS

A. Arrange with proper authorities and utility companies for service connections, verifying locations and arrangements. Pay all costs of service as shown and provide all required conduits,meter bases wiring for indicated service. Contact the serving utility prior to bid and include all cost of utility services in bid.

B. When connections to existing lines, rerouting of utility lines, modifications to services, etc., would interrupt service or interfere with normal use of the buildings, arrange work such that outages are minimized and schedule outages to occur at times satisfactory to the Owner.

C. Before ordering equipment and proceeding with Work, verify with the utility company existing or available voltages shown on Drawings. If voltage differs from that noted on the Drawings and in the Specifications; notify the Engineer immediately.

D. Transformers: Locate utility transformer pads so as to provide code (and Utility) required clearances from building. Verify prior to bid.

3.8 APPEARANCE OF WORK

A. Arrange and install exposed portions on Work specified under this division such as devices, fixtures, panels, and safety switches to fit in and harmonize with Work specified in other divisions.

B. Run conduits concealed in chases, attics or cable trenches unless indicated otherwise. Run conduit exposed to view in mechanical rooms and electrical equipment rooms.

C. Run conduit parallel or perpendicular to building lines.

3.9 TESTS

A. Test panel feeders, motor circuits, and conductors larger than #6 with a 600 volt Megger to prove insulation resistances.

B. Test grounding electrode system to verify compliance with N.E.C. requirements.

C. Demonstrate in the presence of the Engineer testing of the emergency power system, the interface between the fire alarm and sprinkler system, the interface between the fire alarm and HVAC control systems and the interface between the fire alarm and elevator controls if such systems are on the project.

3.10 GUARANTY PERIOD

A. Electrical Contractor shall warrant equipment furnished and work performed for a period of one year from date of written acceptance of work. This

guarantee shall cover patching, refinishing, etc., required to restore faulty condition at no additional expense to Owner.

3.11 CLEANING

A. At completion of work, clean and polish fixtures, equipment, and materials.

3.12 CONFLICT

A. If there is a conflict between Drawings and Specifications, provisions of the most stringent shall control. Drawings and Specifications are complementary; work required by one, but not required by the other, shall be performed as though required by both.

3.13 MOTOR CONNECTIONS

A. Wherever equipment requiring electrical connection is specified, power wiring shall be furnished and installed under applicable sections of Electrical Division of Specifications. Starting switches, protective devices, and other means for operation and control of equipment shall be furnished under applicable equipment sections but shall be installed under applicable electrical section, unless specifically noted otherwise on Drawings. Additional disconnects required by National Electrical Code shall be furnished, installed, and connected by Electrical Contractor. Motor terminals or equipment connections shall terminate in a junction box or disconnect adjacent to equipment. See Mechanical Plan for exact location of motors.

B. Install conduit and boxes for thermostats. Obtain count and location from mechanical Drawings. Extend conduit from thermostat box to equipment. If thermostat conduits are shown to be included under the mechanical section then that section shall take precedence.

END OF SECTION

PRE-FINAL PROJECT OBSERVATION
CHECK LIST

Complete this form and forward to the Engineer's office three business days prior to the requested Final Project Observation date.

Forward this form to: Lucas, Merriott & Associates
2225 West Seventh Street
Little Rock, Arkansas 72201
Phone: 501.374.3522
FAX: 501.375.7505

	ITEM	YES	NO
1.	Polarity of all receptacles shall be tested. GFI receptacles shall be tested. *		
2.	Test all emergency lighting by turning circuit breakers off.		
3.	Provide typed panel directories.		
4.	Obtain certification letter from Fire Alarm Vendor indicating the system has been tested and is fully operational.		
5.	Clean fixture lenses and reflectors.		
6.	Provide Owner with spare lamps, parts, keys, etc. as specified for this project.		
7.	All junction boxes shall have covers and shall be labeled with the circuit number(s).		
8.	Clean all switchgear and provide designation label.		
9.	Remove paint from all devices and device plates.		
10.	Replace all burned out lamps.		
11.	Megger test reports (attach with this form)		
12.	Ground and bonding connections to cold water pipe, building steel, ground rods, etc.		

*test with ECOS #1019 or similar tester

All of the items must be met prior to the Final Project Observation.

Requested Final Project Observation date: _____

Signature of Electrical Contractor: _____

SECTION 26 05 19

WIRE AND CABLE

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Building wire and cable.

PART 2 - PRODUCTS

2.1 BUILDING WIRE

A. Feeders and branch circuits larger than 10 AWG: stranded conductor, 600 volt insulation, THW or THHN/THWN. Conduit sizes are based on THWN. Wiring shall have UL listing and markings on insulation. Use THHN where fluorescent fixture channel is used as wireway. Wire sizes shown are based upon copper conductors unless noted as “AL”.

B. Stabiloy may be used for feeders and services that exceed 800 amps. Adjust wire size to match copper rating. Aluminum is not permitted except as noted here or specifically on the plans.

C. Feeders and branch circuits 10 AWG and smaller: Solid conductor, 600 volt insulation THHN/THWN.

D. Armored cable is not permitted.

2.2 COMMUNICATION SYSTEM WIRING

A. Wiring type and size for communication (nurse call, intercom, bell systems) and fire alarm systems shall be as recommended by equipment manufacturer. In no case shall any circuit carrying a load have less more than 3% voltage drop. Contractor shall check Drawings and provide plenum-rated wiring where wiring penetrates air plenums and is allowed by the Drawings or Specifications to not be run in raceway.

PART 3 - EXECUTION

3.1 GENERAL WIRING METHODS

A. Use no wire smaller than 12 AWG for power and lighting circuits, no smaller than 14 AWG for control wiring other than that listed above. Use

10 AWG conductor for 20 ampere, 120 volt branch circuit home runs longer than 75 feet and for 20 ampere, 277 volt branch circuit home runs longer than 200 feet. For longer runs consult Engineer for required sizes.

B. **EACH CIRCUIT SHALL HAVE A SEPARATE NEUTRAL (NO SHARING).**

C. For parallel feeders; place an equal number of conductors for each phase of a circuit in same raceway or cable and make conductor lengths the same.

3.2 WIRING INSTALLATION IN RACEWAYS

A. Pull all conductors into a raceway at the same time. Use UL listed wire pulling lubricant for pulling 4 AWG and larger wires. Completely and thoroughly swab raceway system before installing conductors.

B. Install wire in raceway after interior of building has been physically protected from the weather and all mechanical work likely to injure conductors has been completed.

3.3 COLOR CODING

A. Color code wiring as per code.

3.4 CIRCUITING

A. **Circuit as shown on Drawings.** Failure to properly circuit according to Drawings shall result in rewiring as directed at no increase in Contract Sum. Contact Engineer for resolutions of circuiting conflicts. If duplicate circuit numbers are found on the plans contact the Engineer prior to rough in. Allow for spare room in all conduits by not filling to more than 60% of that allowed by NEC.

END OF SECTION

SECTION 26 05 26

SECONDARY GROUNDING

PART 1 - GENERAL

1.1 SYSTEM DESCRIPTION

A. Ground the electrical service system neutral at service entrance equipment to metallic water service where applicable and to supplementary grounding electrodes.

B. Ground each separately-derived system neutral to nearest effectively grounded metallic water pipe where applicable or nearest effectively grounded building structural steel member.

C. Bond together system neutrals, service equipment enclosures, exposed non-current carrying metal parts of electrical equipment, metal raceway systems, grounding conductor in raceways and cables, receptacle ground connectors, and piping systems.

D. Do not connect neutral and ground anywhere except at service entrance.

E. Do not use conduit as the sole grounding method.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Ground Rods: Copper-encased steel, 3/4-inch diameter, minimum length 10 feet.

B. Furnish BURNDY bar connectors or CADWELD connectors.

C. Provide a concrete encased grounding electrode for the main grounding electrode. See plans.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Provide a separate, insulated equipment grounding conductor in feeder and branch circuits. Terminate each end on a grounding lug, bus, or bushing.

B. Connect grounding electrode conductors to metal 1-inch water pipe using a suitable ground clamp. Make connections to flanged piping at street side of flange. Provide bonding jumper around water meter.

C. Supplementary Grounding Electrode: Use driven ground rod on exterior of building. Connect grounding system to nearest structural steel member.

D. Provide a #6 AWG minimum copper conductor for communications service grounding conductor. Leave 10 feet slack conductor at telephone terminal board. Provide grounding as directed in Telecommunications section if included.

E. Isolated Grounding Systems: Use insulated equipment grounding conductor and connect only at panel ground bus. Use isolated ground receptacles.

3.2 FIELD QUALITY CONTROL

A. Leave grounding points exposed for inspection – Provide box with cover for inspection port.

END OF SECTION

SECTION 26 05 33a

CONDUIT

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Raceways

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND FITTINGS

A. Allied, Triangle or approved equal.

B. Quick connect type rigid steel couplings not permitted.

2.2 FLEXIBLE METAL CONDUIT AND FITTINGS

A. Conduit: FS WW-C-566; steel or aluminum.

B. Fittings and Conduit Bodies: Use clamp or compression type ANSI/NEMA FB 1. Screw in type not allowed.

2.3 LIQUIDTIGHT FLEXIBLE CONDUIT AND FITTINGS

A. Conduit: Flexible metal conduit with PVC jacket.

B. Fittings and Conduit Bodies: Use compression type connectors; screw in type not allowed. ANSI/NEMA FB 1.

2.4 PLASTIC CONDUIT AND FITTINGS

A. Conduit: Carlon or equal.

2.5 ARMORED CABLE – Not permitted

PART 3 - EXECUTION

3.1 CONDUIT SIZING, ARRANGEMENT, AND SUPPORT

A. Size conduit for conductor type installed, minimum size 3/4-inch. Conduit sizes shown on Drawings are based on THWN. Provide spare capacity in all branch circuits by not filling to more than 60% of the NEC allowed conduit fill.

B. Arrange conduit supports to prevent distortion of alignment by wire pulling operations. Fasten conduit using galvanized straps, lay-in adjustable hangers, clevis hangers, or bolted split stamped galvanized hangers. Arrange conduit to maintain headroom and present a neat appearance.

C. Group conduit in parallel runs where practical.

D. Do not fasten conduit with wire or perforated pipe straps or piggy back type clamps. Remove all wire used for temporary conduit support during construction before conductors are pulled.

E. Conduit and conduit bodies including, FS & FD or larger cast or sheet metal boxes, are not permitted to be supported by either a ceiling grid wire and/or the ceiling grid itself, via any conduit or conduit body clips which may include but would not be limited to: t-bar and/or ceiling wire conduit clips.

3.2 CONDUIT INSTALLATION

A. Cut conduit square using saw; de-burr cut ends and bring conduit to the shoulder of fittings and couplings and fasten securely.

B. Use conduit hubs or sealing locknuts for fastening conduit to cast boxes, and for fastening conduit to sheet metal boxes in damp or wet locations.

C. Use hydraulic one-shot conduit bender or factory elbows for bends in conduit larger than 2-inch size.

D. Avoid moisture traps where possible; where unavoidable, provide junction box with drain fitting at conduit low point.

E. Use suitable conduit caps to protect installed conduit against entrance of dirt and moisture.

F. Provide pull strings in all empty conduits.

G. Install expansion joints where conduit crosses building expansion joints and every 75 feet.

H. Where conduit penetrates fire-rated walls and floors, provide fire-stop fittings with UL listed fire rating equal to wall or floor rating.

I. Install four spare 3/4-inch conduits from each flush mounted power panel to an accessible point above ceiling and cap off.

J. Use long radius elbows on telephone conduit over 1-inch size.

3.3 CONDUIT INSTALLATION SCHEDULE

A. Galvanized rigid steel: Minimum 3/4-inch size may be used in all areas.

B. Electrical Metallic Tubing: Minimum 3/4-inch size may be used in indoor dry locations where it is:

1. Not subject to damage, not in contact with earth, not in concrete slabs on grade and in compliance with other qualifications in this section.

C. Schedule 40 PVC may be run for underground branch circuits and feeders.

D. Flexible steel conduit: 1/2-inch minimum; use for final connection to recessed fluorescent light fixtures and mechanical equipment; length not to exceed four feet. Support independently of the box.

E. Liquid-tight flexible steel conduit:

1. Use for outdoor final connections to mechanical equipment, length not to exceed four feet.

END OF SECTION

SECTION 26 05 33b

BOXES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Pull, junction, and outlet boxes.

PART 2 - PRODUCTS

2.1 OUTLET BOXES

A. Sheet Metal Outlet Boxes: ANSI/NEMA OS 1; galvanized steel, with 1/2-inch male fixture studs where required. Use 4x4 deep type box with single gang mud ring for telephone and data outlets.

B. Cast Boxes: Cast feralloy, deep type, gasketed cover, threaded hubs.

2.2 FLOOR BOXES AND WALL BOXES

A. On grade floor boxes shall be Wiremold Evolution Series EFB45S-OG multiservice box unless noted otherwise. Provide a complete assembly matching box to floor type and trip to floor covering type. Include all internal components for wiring to be installed. Unless noted otherwise include ports for data, HDMI, duplex receptacle and telephone.

B. For bid purposes include Wiremold: EFSB4 for wall mounted TV’s and for connections to Lecturn. Include cover in bid price unless noted otherwise. Each box shall have a duplex receptacle, data port, HDMI and coax. Where used as a lecturn box extend a 2” conduit to above ceiling for low voltage cables. FOR WALL MOUNTED DISPLAY BOXES VERIFY OWNER DESIRED BOX PRIOR TO ORDERING.

C. For boxes on floors above ground level where the slab does not permit the box noted above use the Wiremold Evolution Series Poke through multi service box. Unless stated otherwise bid the 6” as a minimum but insure it is large enough for all requirements indicated on the plans.

D. Obtain exact mounting location for these boxes from Architect.

2.3 PULL AND JUNCTION BOXES

A. Sheet Metal Boxes: ANSI/NEMA OS 1; galvanized steel.

B. Cast Metal Boxes for Outdoor and Wet Locations Installations: NEMA 250; Type 4 and Type 6, flat-flanged, surface-mounted junction box, UL listed as raintight. Galvanized cast iron box and cover with ground flange, neoprene gasket, and stainless steel cover screws.

C. Cast Metal Boxes for Underground Installations: NEMA 250; Type r, outside flanged, recessed cover box for flush mounting, UL listed as raintight. Galvanized cast iron box and plain cover with neoprene gasket and stainless steel cover screws.

PART 3 - EXECUTION

3.1 COORDINATION OF BOX LOCATIONS

A. Provide electrical boxes as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections, and code compliance. Electrical box locations shown on Drawings are approximate unless dimensioned.

B. Mount switches and pull stations 48 in (center of box) above finish floor and receptacles 16 inches (center of box) above finish floor. Mount clock outlets 12 inches below ceiling. Strobes 80” AFF.

C. Refer to architectural plans prior to rough in. Coordinate the architectural plans with that shown on the electrical plans. If there are discrepancies, obtain correct rough in locations prior to work. Verify with the architect the exact locations of all wall mounted devices. If this is not done the contractor shall move them as directed by the architect for no additional cost. In general light switches shall always be located near the door strike side jam unless there are sidelight. Where there are sidelights – confirm the location.

3.2 OUTLET BOX INSTALLATION

A. Do not install boxes back-to-back in walls. Provide minimum 6 inch separation, except provide minimum 24-inch separation in acoustic and fire rated walls. Separate phone/data and power by 12 inches.

B. Provide knockout closures for unused openings.

C. Support boxes independently of conduit except for cast boxes that is connected to two rigid metal conduits, both supported within 12 inches of box.

D. Use multiple-gang boxes where more than one device are mounted together; do not use sectional boxes. Provide barriers to separate wiring of different voltage systems.

E. Install outlets mounted above counters, benches, and backsplashes according to millwork plans.

F. Position lighting outlets as per reflected ceiling plans.

G. In inaccessible ceiling areas, position outlets and junction boxes within 6 inches of recessed luminaire, to be accessible through luminaire ceiling opening. NO boxes shall be installed in inaccessible areas.

H. Secure boxes to interior wall and partition studs with 8-32 bolts or weld. Use stamped steel stud bridges for flush outlets in hollow stud wall, and adjustable steel channel fasteners for flush ceiling outlet boxes.

I. Align wall-mounted outlet boxes for switches, thermostats, and similar devices. Set switch boxes within 6 inches of door jamb where applicable.

J. Provide cast outlet boxes in exterior locations exposed to the weather and wet locations.

3.3 FLOOR BOX INSTALLATION

A. Set boxes level and flush with finish flooring material. Install floor boxes as directed by Arch. **Obtain exact dimensions from Architect prior to rough in.**

END OF SECTION

SECTION 26 05 48

SEISMIC PROTECTION

PART 1 - GENERAL

1.1 GENERAL

A. The requirements for seismic protection measures to be applied to electrical equipment and systems specified herein are in addition to any other items called for in other sections of these specifications. Electrical equipment shall include the following items to the extent required on plans or in other sections of these specifications:

1. Light fixtures

1.2 CONDUIT NOT REQUIRING SPECIAL SEISMIC RESTRAINTS

A. Seismic restraints may be omitted from the following installations:

B. All electrical conduit less than 2 1/2" inside diameter

C. All conduit suspended by individual hangers 12" or less in length from the top of pipe to the bottom of the support for the hanger.

1.3 SHOP DRAWINGS

A. Shop drawings along with catalog cuts, template, and erection and installation details, as appropriate, for the items listed below shall be submitted. Submittals shall be complete in detail; shall indicate thickness, type, grade, class of metal, and dimensions; and shall show construction details, reinforcement, anchorage, and installation with relation to the building construction.

PART 2 - PRODUCTS

2.1 BOLTS AND NUTS

A. Squarehead bolts and heavy hexagon nuts: ANSI B1 8.2.1 and B1 8.2.2, and ASTM A307 or A576.

B. Bolts, underground: ASTM A325

2.2 SWAY BRACE

A. Materials used for member listed in Table I of this specification shall be structural steel conforming with ASTM A36.

PART 3 - EXECUTION

3.1 SWAY BRACE

A. Sway brace shall be installed on conduit not otherwise rigidly anchored to preclude damage during seismic activity. Bracing shall conform to approved arrangements. Provisions of this paragraph apply to all conduit within a 5'-0" line around outside of building unless buried in the ground. Hanger rods shall be increased in cross sectional area proportionate to the increased weight per linear foot of pipe and contents supported at each trapeze hanger. No trapeze-type hanger shall be secured with less than two 1/2" bolts.

B. TRANSVERSE SWAY BRACING: Transverse sway bracing shall be provided at intervals NOT TO EXCEED 30'-0".

C. LONGITUDINAL SWAY BRACING: Longitudinal sway bracing shall be provided at 40'-0" intervals.

D. VERTICAL RUNS: Vertical runs of conduit shall be braced at not more that 10'-0" vertical intervals.

E. ANCHOR RODS, ANGLES, AND BARS: Anchor rods, angles, and bars shall be bolted to either conduit clamps at one end and cast-in-place concrete or masonry insert or clip angles bolted to the steel structure on the other end. Rods shall be solid metal or pipe as specified hereinafter. Anchor rods, angles, and bars shall not exceed lengths given in Table I.

F. BOLTS: Bolts used for attachment of anchors to pipe and structure shall be not less that 1/2" diameter.

TABLE I
MAXIMUM LENGTH FOR BRACING MEMBERS

TYPE	SIZE	MAXIMUM LENGTH*	ALLOWABLE LOADS* (Kips)
ANGLES	1-1/2” x 1-1/2” x 1/4”	4’-10”	5.7
	2” x 2” x 1/4”	6’-6”	7.8
	2-1/2” x 1-1/2” x 1/4”	8’-0”	9.8

	3” x 2-1/2” x 1/4”	8’-10”	10.8
	3” x 3” x 1/4”	9’-10”	11.9
RODS	3-4”	3’-1”	3.7
	7-8”	3’-8”	5.0
FLAT BARS	1-1/2” x 1/4”	1’-2”	3.1
	2” x 1/4”	1’-2”	4.1
	2” x 3/8”	1’-9”	6.2
PIPES (40S)	1”	7’-0”	4.1
	1-1/4”	9’-0”	5.5
	1-1/2”	10’-4”	6.6
	2”	13’-1”	8.9

* Based on the slenderness of 1/r = 200 and ASTM A36 steel.

3.2 SPREADERS

A. Spreaders shall be provided between racked or adjacent conduit runs to prevent contact during seismic activity whenever surfaces are less than 4" apart or four times the maximum displacement due to seismic force. Spreaders to be applied at same interval as sway braces.

3.3 ANCHOR BOLTS

A. All floor or pad mounted equipment will have a minimum of four anchor bolts securely fastened through base. Two nuts shall be provided on each bolt. Anchor bolts shall have an embedded straight length equal to at least 10 times the nominal diameter of the bolt and shall conform to the following Tables of sizes for various equipment weights, in accordance with ASTM A325 and A576.

MAXIMUM EQUIPMENT WEIGHT (POUNDS)	MINIMUM BOLT SIZES* (INCHES)
500	3/8
1.000	1/2
5.000	5/8
10,000	3/4
20,000	7/8
30,000	1
50,000	1-1/4
100,000	1-1/2

* Based on four bolts per item, use equivalent total cross sectional areas when more than four bolts per item are provided. Anchor bolts that exceed normal depth of equipment foundation piers or pads shall either extend into concrete floor or the foundation shall be increased in depth to accommodate bolt lengths.

B. When height-to-width ratio of the equipment exceeds 8.9, overturning must be investigated.

3.4 EQUIPMENT SWAY BRACING

A. Equipment sway bracing shall be provided for all items supported from overhead floor or roof structures. Braces shall consist of angles, rods, bars, or pipes run at a 45° angles.

3.5 LIGHTING FIXTURES IN BUILDING

A. In addition to the requirements of the preceding paragraphs, lighting fixtures and supports will conform to the following:

3.6 MATERIALS AND CONSTRUCTION

A. Fixture supports shall be malleable iron.

B. Loop and hook or swivel hanger assemblies for pendant fixtures shall be fitted with a restraining device to hold the stem in the support position during earthquake motions. Pendant supported fluorescent fixtures shall also be provided with a flexible hanger device at the attachment to the fixture channel to preclude breaking of the support. The motion of swivels or hinged joints shall not cause sharp bends in conductors or damage to insulation.

C. Recessed fluorescent individual or continuous row fixtures shall be supported by a seismic resistant suspended ceiling support system and shall be bolted thereto at each corner of the fixture; or shall be provided with fixture support wires attached to the building structural members using 2 wires for individual fixtures and 1 wire per unit of continuous row fixtures.

D. A supporting assembly that is intended to be mounted on an outlet box shall be designed to accommodate mounting features on 4" boxes, 3" plaster rings, and fixture studs.

E. Surface mounted fluorescent individual or continuous row fixtures shall be attached to a seismic resistant ceiling support system. Fixture support devices for attaching to suspended ceilings shall be a locking-type scissor clamp or full loop band that will securely attach to the ceiling support. Fixtures attached to underside of a structural slab shall be properly anchored to the slab at each corner or the fixture.

F. Each wall mounted emergency light unit shall be secured in a manner to hold the unit in place during a seismic disturbance.

G. TESTS: In lieu of the requirements for equipment supports, lighting fixtures and the complete fixture supporting assembly may be tested as specified hereinafter. Such tests shall be conducted by an approved and independent testing laboratory, and the results of such tests shall specifically state whether or not the lighting fixture supports satisfy the requirements given herein.

1. TEST EQUIPMENT: To simulate earthquake motion, fixtures and supports shall be attached to a carriage suspended on rollers from an overhead track. A gear motor and crank assembly shall be used to provide oscillatory motion of approximately 1 cycle per second. The exact number of cycles per second and the actual dimension of the crank apparatus shall be adjusted to produce a minimum carriage acceleration of 0.28 g. The actual fixture mounting surface shall be on the underside of the carriage and shall provide capacity for orienting the fixture in a horizontal plane in various positions ranging from parallel to perpendicular to the line of traverse.

2. TEST REQUIREMENTS: All tests shall be conducted with the maximum fixture weight so as to produce the most severe loading conditions. Fixtures having stems shall be tested with the actual stem lengths to be used. Tests shall be of 1 minute duration with the mounting surface in the line of traverse, at 45° to the line of traverse, and at 90° to the line of traverse. A total of 2 fixtures shall be tested in each of the above positions. After each of the 6 tests, the complete stem assemblies from fixtures having stem assemblies shall be subjected to a tensile strength test. The sample shall withstand, without failure, a force of not less than 4 times the weight it is intended to support.

3. ACCEPTANCE: No component of a fixture nor its supports shall be accepted individually. For acceptance, the fixture and its supports shall exhibit no undue damage, and no component of the fixture shall fail or fall from the fixture during testing.

3.7 RECESSED LIGHTING FIXTURES

A. Recessed lighting fixtures not over 56 pounds in, weight and suspended and pendant hung fixtures not over 70 pounds in weight may be supported and attached directly to the ceiling system runners by a positive attachment such as screws or bolts.

END OF SECTION

SECTION 26 24 00

PANELBOARDS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Panelboards and switchboards.

1.2 SPARE PARTS

A. Keys: Furnish two for each panel to Owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Square 'D', Siemens, Eaton/Cutler Hammer. Use bolted circuit breakers .

2.2 SWITCHBOARDS

A. Multiple sections shall be bussed together.

2.3 MAIN AND DISTRIBUTION PANELBOARDS

NOTE: ALL MAIN PANELS AND SERVICE DISCONNECTS SHALL HAVE TVSS

A. Enclosure: NEMA 1 indoors; NEMA 3R outdoors. Provide doors with cylinder locks on all panels.

B. Panel short circuit rating (unless shown otherwise on Drawings):

1. 208/240 volts: for 100 amp through 300 amp, 22,000 RMS; for 301 amp through 800 amp, 42,000 RMS.

2. 277/480 volts: For 100 amp through 300 amp, 14,000 RMS; for 301 amp through 800 amp, 25,000 RMS.

C. Molded Case Circuit Breakers: NEMA AB 1; provide circuit breakers with integral thermal and instantaneous magnetic trip in each pole. Provide circuit breakers UL listed as Type HACR for air conditioning equipment branch circuits and HID/SWD for all breakers used to switch lighting circuits. Verify breakers for A/C equipment prior to rough-in. Provide G.F.I. type circuit breakers for all heating cable and immersion heaters.

D. All main disconnect devices located inside shall have shunt trip operators.

E. All flush mounted panelboards shall fit in 6" nominal stud wall.

F. Where buildings are sprinklered furnish shunt trip breakers for elevator drives and control power (connected via the fire alarm to shut off power prior to sprinkler activation. Provide one auxilliary contact to shut off car emergency battery power as well. Coordinate with the fire alarm vendor and elevator supplier.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install panelboards plumb and flush with wall finishes in conformance with NEMA PB 1.1 unless noted as surface-mounted. Provide filler plates for unused spaces in panelboards.

B. Provide typed circuit directory under plastic for each branch circuit panelboard. The circuit directory shall indicate the load served. Circuits feeding lighting and receptacles shall be labled as per which room is served (use owner's room naming system).

C. Stub four empty 3/4-inch conduits to accessible location above ceiling out of each recessed panelboard.

END OF SECTION

SECTION 26 27 26

WIRING DEVICES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Wall switches, receptacles and plates.

1.2 SUBMITTALS

A. Submit product data showing configurations, finishes, dimensions, and manufacturer's instructions. **Note if contractor does not request color selection from Architect he shall change all devices and plates as directed by Architect.**

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Hubbell, Leviton unless shown otherwise.

2.2 WALL SWITCHES

A. Wall switches shall be commercial grade.

B. Wall Switches for Lighting Circuits and Motor Loads Under 1/2 HP: NEMA WD 1; AC general use snap switch with toggle handle, rated 20 amperes and 120-277 volts AC-**Color as selected by Architect.**

C. Pilot Light Type: (light on with load on) used to indicate a load is on (e.g. remote exhaust fan).

D. Lighted Toggle Type: (light on with load off) used to locate switch where it may be difficult to find in the dark.

E. Manufacturer Catalog Numbers as listed in table below:

2.3 RECEPTACLES

A. Receptacles shall be specification grade heavy duty unless otherwise shown on the drawings.

B. Convenience and Straight-blade Receptacles: NEMA WD 1 - 20 Amp: 5-20R, one piece ground strap construction - **Color as selected by Architect.**

C. GFI Receptacles: 20 Amp duplex convenience receptacle with integral ground fault current interrupter. Slaving of GFI's not permitted unless shown otherwise. Provide GFI protection for all receptacles in kitchens. In addition provide GFI receptacles at all locations within 6' of a water outlet.

D. Tamper Resistant. Install commercial grade tamper resistant devices as defined and as required by code.

2.4 WALL DIMMERS

A. Wall Dimmers: Dimmers shall be compatible with the LED (or other) fixtures specified. **Color as selected by Architect. Note; all devices on a project shall be from one vendor if possible so that color etc matches.**

2.5 WALL PLATES

A. Cover plates – **302 Stainless Steel shall be standard**. If desired by Architect (confirm prior to submittals) a nylon plate can be used. Color as selected by Architect. Submit stainless plates unless directed otherwise in writing by the architect. If plastic plates are substituted without specific change proposal request the contactor shall replace with stainless steel.

B. Weatherproof Cover Plate: Thomas & Betts, "In use" Red-Dot "Code Keeper". Complete unit shall be made of die cast copper-free* aluminum alloy including flip cover. Plastic units are not acceptable. (*less than .004 copper content). Flip lid types are permitted only where allowed by code.

C. Furnish blank plates for openings without a device.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Install receptacle behind E.W.C. so cord will not show. Provide GFI protection for all water cooler outlets. This can be a GFI breaker or slaved and properly labeled from a bathroom GFI receptacle.

END OF SECTION

SECTION 26 28 00

DISCONNECT SWITCHES

PART 1 - GENERAL

PART 2 - PRODUCTS

2.1 MANUFACTURERS - DISCONNECT SWITCHES

A. Square D, Eaton, Siemens

2.2 DISCONNECT SWITCHES

A. Fusible Switch Assemblies: NEMA KS 1; Heavy duty, quick-make, quick-break, load interrupter enclosed knife switch with externally operable handle. Handle lockable in OFF position. Fuse Clips: FS W-F-870, designed to accommodate Class R fuses with solid neutral. General duty may be used for A/C disconnects under 100 amps.

B. Nonfusible Switch Assemblies: NEMA KS1; Type HD; FS W-S-865; quick-make, quick-break, load interrupter enclosed knife switch with externally operable handle. Handle lockable in OFF position. General duty may be used for disconnects under 100 amps.

C. Enclosures:
   1. NEMA 1: Indoors.
   2. NEMA 3R: Outdoors.
   3. As indicated on Drawings.

2.3 MANUFACTURERS - FUSES

A. Bussman: Fusetrons for motors, Low Peak or Hi-Cap elsewhere and at service.

2.4 FUSES

A. Fuses 600 Amperes and Less: ANSI/UL 198E, Class Low Peak. as indicated on Drawings; dual element, current limiting, time delay, 200 or 600 volt as required.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install disconnect switches where indicated on Drawings and as required by code. Install a disconnecting means within sight of all motors (whether shown or not).

B. Install heavy duty switches for service entrances and 100 amps and above.

C. If switches are mounted on equipment, provide 12 inches of flexible conduit next to switch between switch and panel.

END OF SECTION

SECTION 26 50 00

LIGHTING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Luminaires and accessories.

1.2 SUBMITTALS

A. Submit product data.

1.3 QUALITY ASSURANCE

A. Furnish interior ceiling fixtures compatible with ceiling system. Coordinate with ceiling system installer. Verify prior to ordering.

PART 2 - PRODUCTS

2.1 MANUFACTURERS - LUMINAIRES AND ACCESSORIES

A. See Fixture Schedule on Drawings.

B. All request for substitutions shall be accompanied by factory certified computer printouts of performance of substituted fixture showing foot candles on Floor Plan.

C. All LED color temperatures shall be the same for all fixtures on the project. Verify color prior to bidding if it affects pricing. Verify prior to ordering.

2.2 LIGHTING POLES

A. Provide fuses in pole at hand hole for each ballast.
B. All poles shall have full base cover and galvanized anchor bolts.
C. All poles shall be 7 gage. Minimum rating shall be for 80 MPH winds.

2.3 OCCUPANCY SENSORS

A. Ceiling mounted occupancy sensors shall be Leviton or approved equal. Do not use ultrasonic sensors where interference with interactive boards is

anticipated. The vendor shall submit a factory approved layout for review during the submittal stage and shall guarantee the layout for proper function. Provide power packs and auxiliary relay contacts as required for switching arrangement shown. Adjust each sensor as recommended.

B. Wall mounted occupancy sensors shall be Leviton series or approved equal. Adjust each sensor as recommended.

C. Locate sensors so that there is full room coverage. Provide additional sensors if required for irregular rooms or where pendant mounted fixtures obstruct the sensor.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Connection to light fixtures shall be from j-box directly to fixture (fixture to fixture wiring not permitted except where fixtures are run in continuous runs such as lighting coves).

B. Support surface-mounted luminaires directly from building structure. Support lay in fixtures according to Code.

C. Layout work to ensure that ceiling outlets are located symmetrically in area.

D. Luminaire Pole Bases: Size and constructed as indicated on Drawings. Provide galvanized anchor bolts and project anchor bolts 3 inches minimum above base. Install poles on bases plumb; lock into place as directed by manufacturer. Grout around pole base. In traffic areas base shall extend 30 inches above pavement.

E. Each pole shall be furnished with pole base cover whether indicated on the fixture schedule or not.

3.2 ADJUSTING AND CLEANING

A. Align luminaires and clean lenses and diffusers at completion of Work. Clean paint splatters, dirt, and debris from installed luminaires.

B. Touch up luminaire and pole finish at completion of work.

END OF SECTION

SECTION 26 30 00

TELECOMMUNICATION RACEWAY SYSTEM

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Provide a complete raceway system for telecommunications. Cabling etc not in this contract. Refer to plans for additional information.

PART 2 – PRODUCTS

2.1 BOXES AND CONDUITS

A. Unless noted otherwise on the drawings, telecommunication outlet boxes shall be 4” square by 2-1/8” deep with single gang plaster ring. Extend 1” conduit from telecommunications outlet box to above accessible ceiling area. Conduit ends shall be outfitted with a plastic bushing prior to the installation of cables.

B. In facilities where more than one telephone closet is required provide raceways between rooms. Provide either a cable tray system or a minimum of two 4” conduits.

C. Include in the bid provision for the boxes and conduits required for card access to the room. Verify prior to work.

D. Conduits entering the phone room from above the rack shall penetrate a minimum of 2” into the closet. If from floor extend to 4” AFF.

E. Provide blank filler module for any unused openings.

F. Provide a minimum of two 4” conduits from the service point on the site to the data closet. If not shown on the plans assume the furthest point on the site for bid purposes then verify with the service company. Use long sweep bends. Include pull boxes or manholes to keep the maximum number of 90 degree bends to two. Terminate these conduits in a pull box on the site. Include pull strings and cap the conduits on both ends to be water proof.

2.2 PLYWOOD BACKBOARDS

A. Each Telecommunications Room shall have ¾" AC grade plywood floor to ceiling on all walls (finished side out). Paint plywood with white fire resistant paint.

2.3 GROUNDING

A. Each telecommunication rack shall be grounded via a #4 insulated conductor to grounding plate.

2.4 POWER REQUIREMENTS

A. Include a minimum of two 20A/120 circuits and two quad receptacles just to feed the data rack. Locate as directed by owners vendor. Include service outlets on all walls fed by an additional dedicated circuit.

2.5 Smoke detection

A. Provide smoke detection in the data room and other rooms as shown on the plans.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Installation of all equipment shall comply with EIA/TIA 568 and the latest addition of the NEC.

END OF SECTION

SECTION 28 31 00

FIRE ALARM SYSTEM

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. At the time of bid, all exceptions taken to these Specifications, all variances from these Specifications and all substitutions of operating capabilities or equipment called for in these Specifications shall be listed in writing and forwarded to the consulting engineer. Any such exceptions, variances, or substitutions which were not listed at the time of bid and are identified in the submittal shall be grounds for immediate disapproval without comment.

B. Installation company shall be licensed by the State of Arkansas in accordance with ACA 17-33-101 et.seq., and shall have been in business minimum 5 years installing fire alarm systems. In addition the equipment and materials shall be provided by a franchised distributor. Technicians must be factory trained. Submit copy of training certificate with submittals.

1.2 SYSTEM DESCRIPTION

A. Provide complete fire alarm system of the general alarm horn/strobe type. The system shall include but not be limited to the following:

1. Addressable analog intelligent fire alarm control panel.
2. Annunciator panel. Locate as directed by Fire Department.
3. Manual fire alarm stations.
4. Smoke detectors.
5. Alarm horns and flasher horns.
6. Visual alarm lights - ADA rated (visual devices to have mutli-candela settings within a single unit as manufactured by Wheelock or approved equal).
7. Central station alarm and trouble connection. Provide cellular dialer and internet communication.
8. Standby battery backup.

1.3 APPLICABLE CODES AND STANDARDS

A. All equipment shall be U.L. and FM listed for its intended use.

B. IBC Section 907 Fire Alarm and Detection Systems and NFPA.

C. All raceways and wiring shall be installed in compliance with NFPA Standard 70 (National Electrical Code - Article 760).

D. The system equipment and its installation shall comply with all other local codes and authorities having jurisdiction.

1.4 SUBMITTALS

A. Provide list of all types of equipment and components provided.

B. Provide description of operation of the system, similar to that provided in Part 2 of this section, to include any and all exceptions, variances, or substitutions listed at the time of bid.

1.5 WARRANTY

A. The equipment manufacturer shall guarantee the system equipment to the Owner for a period of one year from the date of final acceptance of the system.

B. The Contractor shall guarantee all wiring and raceways to be free from inherent mechanical or electrical defects for one year from the date of final acceptance of the system.

1.6 ACCESS CONTROL SYSTEMS.

A. Where there is any sort of door access system this contractor shall provide a relay and connection to directly interupt power to the locks (as per NFPA). Provide wiring to the access control system.

PART 2 - PRODUCTS

2.1 EQUIPMENT

A. As shown on Drawings (all systems shall have spare capacity in the control panel).

B. All lines exiting the building shall have surge suppression.

C. **All cable shall be plenum rated where ceilings are used for plenums.**

2.2 ACCEPTABLE VENDORS

A. The acceptable vendors are:
   1. AlarmTec Systems
   2. Advanced Cabling Systems

B. Other vendors may submit for approval 10 days prior to bid. Provide a minimum of eight references and information to verify the other requirements of this specification. If accepted the Engineer will put the newly accepted vendor in an addendum approving them for this project. **Vendors not listed here or in an addendum are not permitted.**

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install entire system in accordance with approved manufacturer's wiring diagrams. Furnish all conduit, wiring, outlet boxes, junction boxes, cabinets, and similar devices necessary for the complete installation. All wiring shall be of the type and size recommended by the manufacturer and shall be approved by the local fire department. Install wiring in dedicated conduit throughout.

B. Install outside horns flush and weatherproof.

C. Install pull stations at each exterior door and exits from floors and no further than 200' apart.

D. Install horn with strobe in each corridor, stairwell and as shown on Drawings and install strobes in public toilets. Strobe location shall comply with ADA.

E. Install smoke detector at FAP whether indicated on the plans or not.

F. Refer to mechanical drawings and provide duct mounted smoke detectors at all smoke dampers and the appropriate controls.

3.2 TESTS

A. Each individual system operation, on an address by address and circuit by circuit basis, shall be tested for its complete operation. Procedure for testing the entire fire alarm system shall be set forth with the consent of the code enforcement official, the Engineer, and the manufacturer.

3.3 DOCUMENTATION AND TRAINING

A. The Contractor shall compile and provide to the Owner four complete manuals on the finished system. Each manual shall include operating and maintenance instructions, catalog cuts of all equipment and components, all as-built wiring diagrams (both floor plan and riser types) and a manufacturer's spare parts list.

B. In addition to the above manuals, the Contractor shall provide the service of a trained manufacturer's employee for not less than a four hour session, during normal business hours, to instruct the Owner's designated personnel on the operation and maintenance of the entire system.

END OF SECTION

A NEW BRANCH BANKING CENTER FOR
FIRST COMMUNITY BANK
BROOKLAND, AR

Civil Specifications

January 9, 2020

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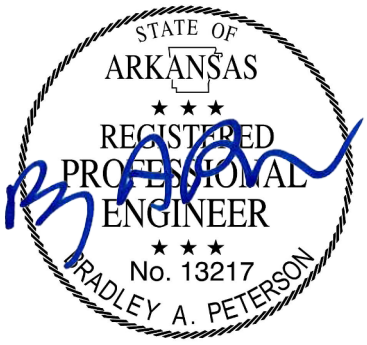
The Civil Engineer of Record for
A NEW BRANCH BANKING CENTER FOR
FIRST COMMUNITY BANK
In Brookland, AR is:



Date 1/9/20

Crafton, Tull & Associates, Inc. Project #19806900

SECTION 31 00 00

SITE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes

B. Section Includes
1. Demolition of structures, paving, and utilities.
2. Filling voids created as a result of removals or demolition.

C. Related Sections
1. Section 311000 - Site Clearing
2. Section 312000 - Earthwork

1.2 REGULATORY REQUIREMENTS

A. Conform to applicable State and local codes for demolition of structures, safety of adjacent structures, dust control, and runoff control.

B. Obtain required permits and licenses from appropriate authorities. Pay associated fees including disposal charges.

C. Notify affected utility companies before starting work and comply with their requirements.

D. Do not close or obstruct public or private roadways, sidewalks, or fire hydrants without appropriate permits or written authorization.

E. Conform to applicable regulatory procedures when hazardous or contaminated materials are discovered.

F. Test soils around buried tanks for contamination.

1.3 SUBMITTALS

A. Project Record Documents: Accurately record actual locations of capped utilities and subsurface obstructions that will remain after demolition. Submit record as part of closeout submittals.

1.4 PROJECT CONDITIONS

A. Structures to be demolished will be discontinued in use and vacated prior to start of work.

B. Owner assumes no responsibility for condition of structures to be demolished.

C. Conditions existing at time of inspection for bidding purposes will be maintained by Owner as reasonably practical. Variations within structures may occur by Owner's removal and salvage operations prior to start of demolition work.

D. Unless otherwise indicated in Contract Documents or specified by the Owner, items of salvageable value to Contractor shall be removed from site and structures. Storage or sale of removed items on site will not be permitted without consent of the Owner and shall not interfere with other work specified.

E. Explosives shall not be brought to site or used without written consent of authorities having jurisdiction. Such written consent will not relieve Contractor of total responsibility for injury to persons or for damage to property due to blasting operations. Performance of required blasting shall comply with governing regulations.

PART 2 - PRODUCTS

2.1 FILL MATERIALS

A. Fill material shall be aggregate fill materials as specified in Section 312000.

PART 3 - EXECUTION

3.1 PREPARATION

A. Provide, erect, and maintain erosion control devices, temporary barriers, and security devices at locations indicated on Construction Drawings.

B. Protect existing landscaping materials, appurtenances, and structures, which are not to be demolished. Repair damage to existing items to remain caused by demolition operations.

C. Prevent movement or settlement of adjacent structures. Provide bracing and shoring as necessary.

D. Mark location of utilities. Protect and maintain in safe and operable condition utilities that are to remain. Prevent interruption of existing utility service to occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities as acceptable to governing authorities and Owner.

E. Notify adjacent property owners of work that may affect their property, potential noise, utility outages, or other disruptions. Obtain written permission from adjacent property owners when demolition equipme

3.2 GENERAL DEMOLITION REQUIREMENTS

A. Conduct demolition to minimize interference with adjacent structures or pavements to remain.

B. Cease operations immediately if adjacent structures appear to be in danger. Notify authority having jurisdiction. Do not resume operations until directed by authority.

C. Conduct operations with minimum of interference to public or private access. Maintain ingress and egress at all times.

D. Sprinkle work with water to minimize dust. Provide hoses and water connections for this purpose.

E. Comply with governing regulations pertaining to environmental protection.

F. Clean adjacent structures and improvements of dust, dirt, and debris caused by demolition operations. Return adjacent areas to condition existing prior to start of work.

3.3 DEMOLITION

A. Demolish site improvements designated to be removed as shown on the drawings. Site improvements shall include but not be limited to structures, retaining walls, foundations, pavements, curbs and gutters, drainage structures, utilities, signage or landscaping.

B. Disconnect and cap or remove utilities to be abandoned as shown on the drawings.

C. Fill or remove underground tanks, piping, and appurtenances as shown.

D. Demolish buildings completely and remove from site using methods as required to complete work within limitations of governing regulations. Small structures may be removed intact when acceptable to Owner and authorities having jurisdiction.

E. Locate demolition equipment and remove materials to prevent excessive loading to supporting walls, floors, or framing.

F. Demolish concrete and masonry in small sections. Break up concrete slabs-on-grade that are 2-feet or more below proposed subgrade to permit moisture drainage. Remove slabs-on-grade and below grade construction within 2-feet of proposed subgrade.

3.4 FILLING BASEMENTS AND VOIDS

A. Completely fill below grade areas and voids resulting from demolition or removal of structures, underground fuel storage tanks, wells, cisterns, etc., using aggregate fill materials consisting of stone, gravel, or sand free from debris, trash, frozen materials, roots, and other organic matter.

B. Areas to be filled shall be free of standing water, frost, frozen or unsuitable material, trash, and debris prior to fill placement.

C. Place fill materials in accordance with Section 02300 unless subsequent excavation for new work is required.

D. Grade surface to match adjacent grades and to provide flow of surface drainage after fill placement and compaction.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove from site debris, rubbish, and other materials resulting from demolition operations. Leave areas of work in clean condition.

B. No burning of any material, debris, or trash on-site or off-site will be allowed except when allowed by appropriate governing authority and Owner. If allowed as stated above, burning shall be performed in manner prescribed by governing authority. Attend burning materials until fires have burned out and have been completely extinguished.

C. Transport materials removed from demolished structures with appropriate vehicles and dispose off-site to areas that are approved for disposal by governing authorities and appropriate property owners.

END OF SECTION

SECTION 31 10 00

SITE CLEARING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes
   1. Cleaning site of debris, grass, trees, and other plant life in preparation for site or building earthwork.
   2. Protection of existing structures, trees, or vegetation indicated on the Construction Drawings to remain.

B. Related Sections
   1. Section 310000 - Site Demolition
   2. Section 312000 - Earthwork

1.2 ENVIRONMENTAL REQUIREMENTS

A. Construct temporary erosion control systems as shown on Construction Drawings or as directed by the "Storm Water Pollution Prevention Plan" (SWPPP) to protect adjacent properties and water resources from erosion and sedimentation.

B. In event that sitework on this project will disturb 1 or more acres; Contractor shall not begin construction without "National Pollution Discharge Elimination System" (NPDES) permit governing discharge of storm water from site for entire construction period. NPDES permit requires SWPPP to be in place during construction.

C. Contractor shall conduct storm water management practices in accordance with NPDES permit and shall enforce action taken or imposed by Federal or State agencies, including cost of fines, construction delays, and remedial actions resulting from Contractor's failure to comply with provisions of NPDES permit.

1.3 PROJECT CONDITIONS

A. Conditions existing at time of inspection for bidding purposes will be maintained by Owner as reasonably practical.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.1 PREPARATION

A. Identify existing plant life that is to remain and verify clearing limits are clearly tagged, identified, and marked in such manner as to ensure their protection throughout construction operations.

3.2 PROTECTION

A. Locate, identify, and protect existing utilities that are to remain.

B. Protect trees, plant growth, and features designated to remain as part of final landscaping.

C. Conduct operations with minimum interference to public or private accesses and facilities. Maintain ingress and egress at all times and clean or sweep roadways daily as required by SWPPP or governing authority. Dust control shall be provided with sprinkling systems or equipment provided by Contractor.

D. Protect benchmarks, property corners, and other survey monuments from damage or displacement. If marker needs to be removed it shall be referenced by a licensed land surveyor and replaced, as necessary, in kind.

E. Provide traffic control as required, in accordance with the US Department of Transportation's "Manual on Uniform Traffic Control Devices" and applicable state highway department requirements.

3.3 EQUIPMENT

A. Material shall be transported to and from the project site using well-maintained and operating vehicles. Transporting vehicles operating on site shall stay on designated haul roads and shall not endanger improvements by rutting, overloading, or pumping.

3.4 CLEARING

A. Clear areas required for access to site and execution of work.

B. Unless otherwise indicated on Construction Drawings, remove trees, shrubs, grass, other vegetation, improvements, or obstructions interfering with installation of new construction. Removal includes digging out stumps and roots. Depressions caused by clearing and grubbing operations shall be filled to subgrade elevation to avoid ponding of water. Satisfactory fill material shall be placed in accordance with Section 312000.

C. Remove grass, trees, plant life, stumps, and other construction debris from site to dump site that is suitable for handling such material according to state laws and regulations.

D. Cut heavy growths of grass from areas before stripping and topsoil removal and remove cuttings with remainder of cleared vegetative material.

END OF SECTION

SECTION 31 20 00

EARTHWORK

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Excavation, filling, and backfilling for structures and pavement.
   2. Trenching and backfilling for utilities.
   3. Dewatering.
   4. Boring under crossings.

B. Related Sections
   1. Section 312800 - Erosion Control and Sedimentation

C. Order of Precedence: Geotechnical Engineering Report specifies requirements for earthwork preparation and placement of fill. The foundation design and site grading recommendations shall take precedence over the provisions of this section whenever duplication or conflict occurs.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM)
   5. ASTM D 422 - Standard Test Method For Particle Size Analysis of Soil
   6. ASTM D 698 - Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN.m/m^3))
   7. ASTM D 1557 - Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2,700 Kn.m/m^3))
   8. ASTM D 2922 - Density of Soil and Soil-Aggregate In Place by Nuclear Methods (Shallow Depth)
   9. ASTM D 4318 - Liquid Limit, Plastic Limit, and Plasticity Index of Soils

B. American Association of State Highway and Transportation Officials (AASHTO)
   1. AASHTO T 88 - Particle Size Analysis of Soils

C. State Department of Transportation (DOT):
   1. Standard Specifications for Construction and Materials

D. National Fire Protection Association (NFPA)
   1.NFPA 70 - National Electrical Code

E. American Water Works Association (AWWA)
   1. AWWA C200 - Standard For Steel Water Pipe - 6 In. (150 Mm) And Larger
   2. AWWA C206 - Field Welding Of Steel Water Pipe

1.3 QUALITY ASSURANCE

A. An independent testing laboratory, selected and paid for by the Contractor, will be retained to perform construction testing on site.

1. The independent testing laboratory shall prepare test reports that indicate test location, elevation data, and test results. Owner, Civil Engineering Consultant, and Owner shall be provided with copies of reports within 96 hours of time that test was performed. In event that test performed fails to meet Specifications,the independent testing laboratory shall notify Owner and Contractor immediately.
2. Costs related to retesting due to failures shall be paid for by the Contractor at no additional expense to Owner. Contractor shall provide free access to site for testing activities.
3. Quality assurance testing will be conducted in accordance with Paragraph "Field Testing" in Part 3 hereinafter.

1.4 DEFINITIONS

A. Satisfactory Soils: ASTM D 2487 soil classification groups GW, GP, GM, SW, SP, and SM, or a combination of these group symbols; free of rock or gravel larger than allowed for fill or backfill material as specified hereinafter or as shown on the drawings. Satisfactory soil shall contain no debris, waste, frozen materials, vegetation, and other deleterious matter.

B. Unsatisfactory Materials: Materials which do not comply with the requirements for satisfactory materials are unsatisfactory including materials classified in ASTM D 2487 soil classification groups GC, SC, ML, MH, CL, CH, OL, OH, and PT, or a combination of these group symbols.

1. Unsatisfactory materials also include man-made fills; trash; refuse; backfills from previous construction; and material classified as satisfactory which contains root and other organic matter or frozen material. The Contracting Officer shall be notified of any contaminated materials.
2. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

1.5 SUBMITTALS

A. Submit 30-pound sample of each type of off-site fill material that is to be used at the site in airtight containers to the independent testing laboratory or submit gradation and certification of aggregate material that is to be used at the site to the independent testing laboratory for review.

B. Submit certification that all material obtained from off-site sources complies with specification requirements.

C. Submit name of each material supplier and specific type and source of each material. Change in source throughout project requires approval of Owner.

D. If fabrics or geogrids are to be used, design shall be submitted for approval to Owner.

E. Submit Dewatering Plans upon request by Owner.

F. Shop drawings or details pertaining to excavating and filling are not required unless otherwise shown on the Drawings or if contrary procedures to Construction Documents are proposed.

G. Shop drawings or details pertaining to site utilities are not required unless required by regulatory authorities or unless uses of materials, methods, equipment, or procedures that are contrary to The Drawings or Specifications are proposed. Do not perform work until Owner has accepted required shop drawings.

H. Contact utility companies and determine if additional easements will be required to complete project. Provide written confirmation of the status of all easements to Owner at time of Preconstruction Conference or no later than 90 days prior to project possession date.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Fill and Backfill. Satisfactory soil materials excavated from the site.

B. Imported Fill Material: Satisfactory borrow material provided from offsite borrow areas when sufficient satisfactory soil materials are not available from required excavations.

C. Trench Backfill: ASTM D 2321 unless otherwise specified or shown on the drawings.

D. Building Subbase Material: Subbase for building and appurtenances slabs on ground is specified in Section 03300 or 03312 as applicable.

E. Bedding: Aggregate Type as indicated on the plans or naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.

F. Drainage Fill: Washed, narrowly graded mixture of crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.

G. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch sieve and 0 to 5 percent passing a No. 4 sieve.

H. Topsoil: Topsoil shall consist of stripping material excavated from the site. Topsoil shall consist of organic surficial soil found in depth of not more than 12-inches. Topsoil shall be as further defined in Section 329300 – Planting.

I. Filter and drainage fabrics: As specified in Section 312800.

J. Steel Casing Pipe: Comply with AWWA C200 minimum grade B, size, and wall thickness as indicated on The Drawings.

K. Trench Utility Locator Tape: Heavy duty 6" wide underground warning tape. Tape shall be made from polyethylene material, 3.5 mils thick, with a minimum tensile strength of 1,750 psi. Place the tape at one-half the minimum depth of cover for the utility line or a maximum of 3 feet, which ever is the less, but never above the top of subgrade. Color of tape shall be determined by as follows:

3. Natural Gas or Propane - Yellow
4. Electric - Red
5. Telephone – Orange
6. Water – Blue
7. Sanitary Sewer – Green

2.3 EQUIPMENT

A. Transport off-site materials to project using well-maintained and operating vehicles. Once on site, transporting vehicles shall stay on designated haul roads and shall at no time endanger improvements by rutting, overloading, or pumping.

2.4 SOURCE QUALITY CONTROL

A. Laboratory testing of materials proposed for use in the project shall be by the Independent Testing Laboratory at no cost to Owner. The Contractor shall provide samples of material obtained off-site.

B. In areas to receive pavement, California Bearing Ratio (CBR) or Limerock Bearing Ratio (LBR) tests shall be performed for each type of material that is imported from off-site. CBR or LBR value shall be equal to or above pavement design subgrade CBR or LBR value indicated on Construction Drawings

C. Following tests shall be performed on each type of on-site or imported soil material used as compacted fill:

1. Moisture and Density Relationship: ASTM D 698 or ASTM D 1557.
2. Mechanical Analysis: AASHTO T 88 or ASTM D422.
3. Plasticity Index: ASTM D 4318

PART 3 - EXECUTION

3.1 PREPARATION

A. Identify required lines, levels, contours, datum, elevations, and grades necessary for construction as shown on the drawings.

B. Notify utility companies to remove or relocate public utilities that are in conflict with proposed improvements.

C. Protect plant life, lawns, fences, existing structures, sidewalks, paving, and curbs, unless otherwise noted on the drawings from excavating equipment and vehicular traffic.

D. Protect benchmarks, property corners, and other survey monuments from damage or displacement. If marker needs to be removed it shall be referenced by licensed land surveyor and replaced, as necessary, by same.

E. Remove from site, material encountered in grading operations that, in opinion of Owner or the Contractor's Independent Testing Laboratory (ITL) is unsuitable or undesirable for backfilling, subgrade, or foundation purposes. Dispose of in manner satisfactory to Owner. Backfill areas with layers of suitable material and compact as specified herein.

F. Prior to placing fill in low areas, such as previously existing creeks, ponds, or lakes, perform following procedures:

1. Drain water out by gravity with ditch having flow line lower than lowest elevation in low area. If drainage cannot be performed by gravity ditch, use adequate pump to obtain the same results.
2. After drainage of low area is complete, remove muck, mud, debris, and other unsuitable material by using acceptable equipment and methods that will keep natural soils underlying low area dry and undisturbed.
3. All muck, mud, and other materials removed from low areas shall be dried on-site by spreading in thin layers for observation by the ITL. Material shall be inspected and, if found to be suitable for use as fill material, shall be incorporated into lowest elevation of

site filling operation, but not under building subgrade or within 8'-0" of perimeter of building subgrade or paving subgrade. If, after observation by the ITL, material is found to be unsuitable, unsuitable material shall be removed from site.

G. Locate and identify utilities that have previously been installed and protect from damage.

H. Locate and identify existing utilities that are to remain and protect from damage.

I. Maintain in operating condition existing utilities, previously installed utilities, and drainage systems encountered in utility installation. Repair surface or subsurface improvements shown on The Drawings.

J. Verify location, size, elevation, and other pertinent data required making connections to existing utilities and drainage systems as indicated on The Drawings.

K. Over excavate and properly prepare areas of subgrade that are not capable of supporting proposed systems. Stabilize these areas by using acceptable geotextile fabrics or aggregate material placed and compacted.

3.2 DEWATERING

A. General:

1. Provide dewatering systems as required for excavations.
2. Design and provide dewatering system using accepted and professional methods consistent with current industry practice to eliminate water entering the excavation under hydrostatic head from the bottom or sides. Design system to prevent differential hydrostatic head, which would result in floating out soil particles in a manner, termed as a "quick" or "boiling" condition. System shall not be dependent solely upon sumps or pumping water from within the excavation where differential head would result in a quick condition, which would continue to worsen the integrity of the excavation's stability.
3. Provide dewatering system of sufficient size and capacity to prevent ground and surface water flow into the excavation and to allow Work to be installed in a dry condition.
4. Control, by acceptable means, all water regardless of source. Contractor shall be responsible for disposal of the water.
5. Confine discharge piping or ditches to available easement or to additional easement obtained by Contractor. Provide necessary permits or easement.
6. Control groundwater in a manner that preserves strength of foundation soils, does not cause instability or raveling of excavation slopes, and does not result in damage to existing structures. Where necessary, lower water level in advance of excavation utilizing wells, wellpoints, jet educators, or similar positive methods. The water level as measured by piezometers shall be maintained a minimum of 3 feet below prevailing excavation level.
7. Commence dewatering prior to any appearance of water in excavation and continue until Work is complete to the extent that no damage results from hydrostatic pressure, flotation, or other causes.
8. Open pumping with sumps and ditches will be allowed provided it does not result in boils, loss of fines, softening of the ground, or instability of slopes.
9. Install wells or wellpoints, if required, with suitable screens and filters so that continuous pumping of fines does not occur. Arrange discharge to facilitate collection of samples by the Owner. During normal pumping and upon development of wells, levels of fine sand or silt in the discharge water shall not exceed 5 ppm. Install sand tester on discharge of each pump during testing to verify that levels are not exceeded.

10. Control grading around excavations to prevent surface water from flowing into excavation areas.

11. No additional payment will be made for any supplemental measures to control seepage, groundwater, or artesian head.

B. Design:

1 Designate and obtain the services of a qualified dewatering specialist to provide dewatering plan as may be necessary to complete the Work.

2. Contractor shall be responsible for the accuracy of the drawings, design data, and operational records required.

3. Contractor shall be responsible for the design, installation, operation, maintenance, and any failure of any component of the system.

C. Damages:

1. Contractor shall be responsible for and shall repair any damage to work in place, other contractor's equipment, utilities, residences, highways, roads, railroads, private and municipal well systems, adjacent structures, natural resources, habitat, existing wells, and the excavation. Contractor responsibility shall also include, damage to the bottom due to heave and including but not limited to, removal and pumping out of the excavated area that may result from Contractor's negligence, inadequate or improper design and operation of the dewatering system, and any mechanical or electrical failure of the dewatering system.

2. Remove subgrade materials rendered unsuitable by excessive wetting and replace with approved backfill material at no additional cost to the Owner.

D. Maintaining Excavation in Dewatering Condition:

1. Dewatering shall be a continuous operation. Interruptions due to power outages, or any other reason will not be permitted.

2. Continuously maintain excavation in a dry condition with positive dewatering methods during preparation of subgrade, installation of pipe, and construction of structures until the critical period of construction or backfill is completed to prevent damage of subgrade support, piping, structure, side slopes, or adjacent facilities from flotation or other hydrostatic pressure imbalance.

3. Provide standby equipment on site, installed, wired, and available for immediate operation if required to maintain dewatering on a continuous basis in the event any part of the system becomes inadequate or fails. If dewatering requirements are not satisfied due to inadequacy or failure of dewatering system, perform such work as may be required to restore damaged structures and foundation soils at no additional cost to Owner.

4. System maintenance shall include but not be limited to 24-hour supervision by personnel skilled in the operation, maintenance, and replacement of system components, and any other work required to maintain excavation in dewatered condition.

E. System Removal: Upon completion of the work, remove dewatering equipment from the site, including related temporary electrical service.

F. Wells shall be removed or cut off a minimum of 3 feet below final ground surface, capped, and abandoned in accordance with regulations by agencies having jurisdiction.

3.3 TOPSOIL EXCAVATION

A. Cut heavy growths of grass from areas before stripping and remove cuttings with remainder of cleared vegetative material.

B. Strip topsoil to a depth of not less than 6 inches from areas that are to be filled, excavated, landscaped, or re-graded to such depth that it prevents intermingling with underlying subsoil or questionable material.

C. Stockpile topsoil in storage piles in areas shown on The Drawings or where directed by Owner. Construct storage piles to freely drain surface water. Cover storage piles as required to prevent windblown dust. Dispose of unsuitable topsoil as specified for waste material, unless otherwise specified by Owner. Remove excess topsoil from site unless specifically noted otherwise on The Drawings.

3.4 GENERAL EXCAVATION

A. Classification of Excavation: The Contractor shall assure himself by site investigation or other necessary means that he is familiar with the type, quantity, quality, and character of excavation work to be performed. Excavation shall be considered unclassified excavation, except as indicated in the Contract Documents.

B. When performing grading operations during periods of wet weather, provide adequate dewatering, drainage and ground water management to control moisture of soils.

C. Shore, brace, and drain excavations as necessary to maintain excavation as safe, secure, and free of water at all times.

D. Excavate building areas to line and grade as shown on the Drawings being careful not to over excavate beyond elevations needed for building subgrades.

E. Place suitable excavated material into project fill areas.

F. Include an Undercut Allowance in the project. Stipulated cubic yards (CY) quantity to be provided by the Geotechnical Engineer. The Undercut Allowance is to include provisions for the removal, replacement and compaction of unsuitable soil. Provide unit pricing for actual quantity adjustment. Refer to Bid Form Supplements, Appendix A – Unit Prices, for schedule.

G. Unsuitable excavated material shall be disposed of in manner and location that is acceptable to Owner and local governing agencies.

H. Perform excavation using capable, well-maintained equipment and methods acceptable to Owner and local governing agencies.

3.5 TRENCHING EXCAVATION FOR UTILITIES

A. Contact local utility companies before excavation begins. Dig trench at proper width and depth for laying pipe, conduit, or cable. Cut trench banks vertical, if possible, and remove stones from bottom of trench as necessary to avoid point-bearing. Over excavate wet or unstable soil, if encountered, from trench bottom as necessary to provide suitable base for continuous and uniform bedding. Replace overexcavation with suitable and dispose of unsuitable material.

B. Trench excavation sidewalls shall be sloped, shored, sheeted, braced, or otherwise supported by means of sufficient strength to protect workmen in accordance with applicable rules and regulations established for construction by the Department of Labor, Occupational Safety and Health Administration (OSHA), and by local ordinances. Lateral travel distance to exit ladder or steps shall not be greater than 25 feet in trenches 4 feet or deeper.

C. Perform trench excavation as indicated on the Drawings for specified depths. During excavation, stockpile materials suitable for backfilling in orderly manner far enough from bank of trench to avoid overloading, slides, or cave-ins.

D. Remove excavated materials not required or not suitable for backfill or embankments and waste off-site or at on-site locations approved by the Owner and in accordance with governing regulations. Dispose of structures discovered during excavation as specified in Section 02220.

E. Prevent surface water from flowing into trenches or other excavations by temporary grading or other methods, as required. Remove accumulated water in trenches and other excavations as specified.

F. Open cut excavation with trenching machine or backhoe. Where machines other than ladder or wheel-type trenching machines are used, do not use clods for backfill.

G. Accurately grade trench bottom to provide uniform bearing and support for each section of pipe on bedding material at every point along entire length except where necessary to excavate for bell holes, proper sealing of pipe joints, or other required connections. Dig bell holes and depressions for joints after trench bottom has been graded. Dig no deeper, longer, or wider than needed to make joint connection properly.

H. Trench width below top of pipe shall not be less than 12 inches nor more than 18 inches wider than outside surface of pipe or conduit that is to be installed to designated elevations and grades. Other trench width for pipe, conduit, or cable shall be least practical width that will allow for proper compaction of trench backfill.

I. Trench depth requirements measured from finished grade or paved surface shall meet the following requirements or applicable codes and ordinances, whichever is more stringent:

1. Water Mains: 30 inches to top of pipe barrel or 6 inches below frost line, established by local building official, whichever is deeper.
2. Sanitary Sewer: Elevations and grades as indicated on the drawings and as specified in Section 02535.
3. Storm Sewer: Elevations and grades as indicated on the Drawings.
4. Electrical Conduits: 24 inches minimum to top of conduit or as required by NEC 300-5, NEC 710-36 codes, or local utility company requirements, whichever is deeper.
5. TV Conduits: 18 inches minimum to top of conduit or as required by local utility company, whichever is deeper.
6. Telephone Conduits: 18 inches minimum to top of conduit, or as required by local utility company, whichever is deeper.
7. Gas Mains and Service: 30 inches minimum to top of pipe, or as required by local utility company, whichever is deeper.

3.6 SUBGRADE PREPARATION

A. Scarification and Compaction: Areas exposed by excavation or stripping and on which subgrade preparations are to be performed shall be scarified to minimum depth of 8 inches and compacted as specified hereinafter.

B. Proofrolling: Subgrades shall be proofrolled to detect areas of insufficient compaction. Proofrolling shall be accomplished by making minimum of 2 complete passes with fully-loaded tandem-axle dump truck with a maximum weight of 20 tons, or approved equal, in each of 2 perpendicular directions while

under the supervision and direction of the independent testing laboratory. Document and explain proofrolling inspection procedures and results in the laboratory inspection report. Areas of failure shall be excavated and recompacted as specified herein. Continual failure areas shall be stabilized in accordance with Section 02340 at no additional cost to Owner. Subgrade exposed longer than 48 hours or on which precipitation has occurred shall be re-proofrolled.

3.7 FILLING

A. Fill areas to contours and elevations shown on the Drawings with unfrozen materials.

B. Place fills in continuous lifts specified herein.

C. Fill within proposed building subgrade and paving subgrade shall not contain rock or stone greater than 6 inches in any dimension.

D. Unless otherwise specified for rock fill, rock or stone less than 6-inches in largest dimension may be used in fill below structures, paving, and graded areas, up to 24 inches below surface of proposed subgrade or finish grade of graded areas when mixed with suitable material. Rock or stone less than 2 inches in largest dimension may be used in fill within the upper 24 inches of proposed subgrade or finish grade of graded areas when mixed with suitable material.

E. Fill materials used in preparation of subgrade shall be placed in lifts or layers not to exceed 8 inches loose measure and compacted as specified hereinafter.

F. Material imported from off-site shall have CBR or LBR value equal to or above pavement design subgrade CBR or LBR value indicated on The Drawings.

G. Building area subgrade pad shall be that portion of site directly beneath and 10 feet beyond building and appurtenances, including limits of future building expansion areas as shown on the Drawings.

H. Prepare building area subgrade pad in strict accordance with the Geotechnical Engineering Report.

I. Unless specifically stated otherwise in foundation design and site grading recommendations, the following table stipulates maximum allowable values for plasticity index (PI) and liquid limit (LL) of suitable materials to be used as fill in specified areas:

Location	PI	LL
Building area 20	45	
Paving area	20	45

3.8 TRENCH BACKFILLING

A. Materials used for trench backfill shall comply with requirements as specified herein.

B. Backfill and compact in accordance with fill and compaction requirements in accordance with ASTM D 2321 unless otherwise shown on the drawings.

C. Do not backfill trenches until required tests are performed and utility systems comply with and are accepted by applicable governing authorities.

D. Backfill trenches to contours and elevations shown on the Drawings.

E. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.

3.9 BORINGS AND CASINGS UNDER ROADS, HIGHWAYS, AND RAILROAD CROSSINGS

A. When indicated by the Drawings, street, road, highway, or railroad crossings for utility mains installed by jacking and boring method shall be in accordance with area specifications and governing authorities.

B. Excavation of approach pits and trenches within right-of-way of street, road, highway, or railroad shall be of sufficient distance from paving or railroad tracks to permit traffic to pass without interference.Tamp backfill for approach pits and trenches within right-of-way in layers not greater than 6-inches thick for entire length and depth of trench or pit. Compact backfill to 98 percent of maximum density in accordance with ASTM D698, (or 95 percent of maximum density, in accordance with ASTM D1557) obtained at optimum moisture as determined by AASHTO T 180. Mechanical tampers may be used after cover of 6 inches has been obtained over top of barrel of pipe.

C. Accomplish boring operation using commercial type boring rig. Bore hole to proper alignment and grade. Bore hole shall be within 2 inches of same diameter as largest outside joint diameter of pipe installed. Install pipe in hole immediately after bore has been made and in no instance shall hole be left unattended while open.

D. In event subsurface operations result in failure or damage to pavement or railroad tracks within 1 year of construction, make necessary repairs to pavement or railroad tracks. If paving cracks on either side of pipe line or is otherwise disturbed or broken due to construction operations, repair or replace disturbed or broken area.

E. Clean, prime, and line interior and exterior of casing pipe with two coats of asphalt coating in accordance with and governing authorities.

F. Butt weld steel casing. Welds shall be full penetration single butt-welds in accordance with AWWA C206.

G. Install casing and utility pipe with end seals, vent pipe, and other special equipment in accordance with area specifications and governing authorities.

3.10 COMPACTION

A. Compact as follows:

	Percent of Maximum Laboratory Density	
Location	ASTM D698	ASTM D1557
Subgrade & Fill Below Structures	95	95
Subgrade & Fill Below Pavement	95	92

B. Maintain moisture content of not less than 1 percent below and not more than 3 percent above optimum moisture content of fill materials to attain required compaction density.

C. Exercise proper caution when compacting immediately over top of pipes or conduits. Water jetting or flooding is not permitted as method of compaction.

D. Corrective Measures for Non-Complying Compaction: Remove and recompact deficient areas until proper compaction is obtained. Continual failure areas shall be stabilized in accordance with Section 02340 at no additional cost to Owner.

3.11 MAINTENANCE OF SUBGRADE

A. Verify finished subgrades to ensure proper elevation and conditions for construction above subgrade.

B. Protect subgrade from excessive wheel loading during construction, including concrete trucks, dump trucks, and other construction equipment.

C. Remove areas of finished subgrade found to have insufficient compaction density to depth necessary and replace in manner that will comply with compaction requirements by use of material with CBR or LBR equal to or better than that specified on the drawings. Surface of subgrade after compaction shall be firm, uniform, smooth, stable, and true to grade and cross-section.

D. Construct temporary ditches and perform such grading as necessary to maintain positive drainage away from subgrade at all times.

3.12 BORROW AND SPOIL SITES

A. Comply with NPDES and local erosion control permitting requirements for any and all on-site and off-site, disturbed spoil and borrow areas. Upon completion of spoil or borrow operations, clean up spoil or borrow areas in a neat and reasonable manner to the satisfaction of Owner or off-site property owner, if applicable.

3.13 FINISH GRADING

A. Check grading of building subgrades by string line from grade stakes (blue tops) set at not more than 50-foot centers. Allowable tolerance shall be plus or minus 0.10 feet from plan grade. Provide engineering and field staking as necessary for verification of lines, grades, and elevations.

B. Grade areas where finish grade elevations or contours are indicated on the Drawings, other than paved areas and buildings, including excavated areas, filled and transition areas, and landscaped areas. Graded areas shall be uniform and smooth, free from rock, debris, or irregular surface changes. Ground surfaces shall vary uniformly between indicated elevations. Grade finished ditches to allow for proper drainage without ponding and in manner that will minimize erosion potential. For topsoil, sodding, and seeding requirements refer to Section 329300.

C. Correct settled and eroded areas within 1 year after date of completion at no additional expense to Owner. Bring grades to proper elevation.

3.14 FIELD TESTING

A. Field density tests for in-place materials will be performed by the Contractor’s Independent Testing Laboratory (ITL) as follows:

1. Building Subgrade Areas, Including 8'-0" Outside of Exterior Building Lines: In cut areas, not less than 1 compaction test for every 2,500 sq. ft. In fill areas, same rate of testing for each 8-inch lift, measured loose.

2. Areas of Construction Exclusive of Building Subgrade Areas: In cut areas, not less than 1 compaction test for every 10,000 sq. ft. In fill areas, same rate of testing for each 8-inch lift, measured loose.

3. Utility Trench Backfill: Intervals not exceeding 200-feet of trench for first and every other 8-inch lift of compacted trench backfill.

4. Test Method: In-place nuclear density, ASTM D 2922 (Method B-Direct Transmission).

B. Corrective Measures For Non-Complying Compaction: Remove and recompact deficient areas until proper compaction is obtained at no additional expense to Owner. Adjust moisture content as necessary to conform to the requirements of this section.

C. Field testing, frequency, and methods may vary as determined by and between the Contractor and the ITL.

END OF SECTION

SECTION 31 22 00

EXCAVATION, BACKFILL, AND COMPACTION FOR STRUCTURES

PART 1 - GENERAL

1. 1 SECTION INCLUDES

A. Excavation to line, grade, and configuration as shown on Construction Drawings for proposed structures and future expansion areas.

B. Fill to line, grade, and configuration as shown on Construction Drawings for proposed structures and future expansion areas.

C. Compacting for materials in acceptable manner as specified herein.

1. 2 RELATED SECTIONS

A. Section 312000 - Earthwork

B. Section 312600 - Aggregate Material

C. Construction drawings

1.3 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM) latest edition
1. D422 Standard Test Method For Particle – Size Analysis of Soil
2. D 698 Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN.m/m^3))
3. D 1557 Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2,700 Kn.m/m^3))
4. D 2216 Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil-Aggregate Mixtures
5. D 2487 Classification of Soils for Engineering Purposes
6. D 2922 Density of Soil and Soil-Aggregate In Place by Nuclear Methods (Shallow Depth)
7. D 3017 Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
8. D 4318 Liquid Limit, Plastic Limit, and Plasticity Index of Soils

B. American Association of State Highway and Transportation Officials (AASHTO) latest edition
1. T 88 Particle Size Analysis of Soils
2. State Department of Transportation (DOT): Standard Specifications for Construction and Materials, Latest Edition

1.4 QUALITY ASSURANCE

A. An independent testing laboratory, selected and paid by Contractor, will be retained to perform construction testing on filling operations and subgrade analysis as specified in Section 312000 and as specified herein.

B. Testing shall be in accordance with Part 3, “Field Quality Control”.

1. 5 SUBMITTALS

A. Shop drawings or details pertaining to excavating and filling for structures are not required unless otherwise shown on Construction Drawings or if contrary procedures to Contract Documents are proposed.

B. Submit 30-pound sample of each type of material from off-site borrow sources that is to be used in backfilling in air-tight container(s) to the independent testing laboratory or submit gradation and certification of aggregate material that is to be used at the site to the independent testing laboratory for review.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Fill material from on-site as specified in Section 312000 and approved by Owner.

B. Fill material from off-site as specified in Section 312000 and approved by Owner.

C. Aggregate material as specified in Section 312600.

2.2 EQUIPMENT

A. Transport off-site materials to the project using well-maintained and operating vehicles. Once on site, transporting vehicles shall stay on designated haul roads and shall at no time endanger improvements by rutting, overloading, or pumping.

PART 3 - EXECUTION

3.1 PREPARATION

A. Identify lines, elevations, and grades necessary to construct building subgrades as shown on Construction Drawings.

B. Protect benchmarks, property corners, and other survey monuments from damage or displacement. If marker needs to be removed it shall be referenced by licensed land surveyor and replaced, as necessary, by same.

C. Locate and identify utilities that have previously been installed and protect from damage.

D. Locate and identify existing utilities that are to remain and protect from damage.

E. Over excavate and properly prepare areas of subgrade that are not capable of supporting proposed structures. Stabilize these areas by using acceptable geotextile fabrics or aggregate materials placed and compacted as specified.

3.2 EXCAVATION

A. Excavate building areas to line and grade as shown on Construction Drawings being careful not to over excavate beyond elevations needed for building subgrades unless otherwise required by the Contract Documents.

B. Place suitable excavated material into project fill areas as specified in Section 312000.

C. Unsuitable excavated material is to be disposed of in manner and location that is acceptable to Owner and local governing agencies.

D. Perform excavation using capable, well-maintained equipment and methods acceptable to Owner and local governing agencies.

3.3 FILLING AND SUBGRADE PREPARATION

A. Building area subgrade pad shall be that portion of site directly beneath and 8-feet beyond building and appurtenances, including limits of future building expansion areas as shown on Construction Drawings.

B. Prepare building area subgrade pad in strict accordance with the Geotechnical Engineering Report. Rocks larger than 6-in. shall not be part of building subgrade fill.

C. Areas exposed by excavation or stripping and on which building subgrade preparations are to be performed shall be scarified to a minimum depth of 8-inches and compacted to minimum of 98 percent of maximum density, in accordance with ASTM D 698, (or 95 percent of maximum density, in accordance with ASTM D 1557) at moisture content of not less than 2 percent below and not more than 3 percent above optimum moisture content. Proofroll these areas to detect areas of insufficient compaction. Accomplish proofrolling by making a minimum of 2 complete passes with a fully-loaded tandem-axle dump truck with a maximum weight of 20 tons, or approved equal, in each of 2 perpendicular directions while under supervision and direction of the independent testing laboratory. Excavate and recompact areas of failure as specified herein. Continual failure areas shall be stabilized at no additional cost to Owner.

D. Place fill materials used in preparation of subgrade in lifts or layers not to exceed 8-inches loose measure and compacted to at least 95 percent Standard Proctor in accordance with ASTM D 698 at moisture content of not less than 2 percent below and not more than 3 percent above optimum moisture content. Unless specifically stated otherwise in The Geotechnical Engineering Report or Construction Drawings, following table stipulates maximum allowable values for plasticity index (PI) and liquid limit (LL) of suitable materials to be used as fill in specified areas:

Location	PI	LL
Building area	20	45

3.4 COMPACTION

A. Maintain optimum moisture content of fill materials as specified above to attain required compaction density.

B. Test materials in accordance with Section 312000.

C. Corrective measures for non-complying compaction: Remove and recompact deficient areas until proper compaction is obtained at no additional expense to Owner.

3.5 MAINTENANCE OF SUBGRADE

A. Verify finished subgrades to ensure proper elevation and conditions for construction above subgrade.

B. Protect subgrade from excessive wheel loading during construction, including concrete trucks, dump trucks, and other construction equipment.

C. Remove areas of finished subgrade found to have insufficient compaction density to depth necessary and replace in manner that will comply with compaction requirements by use of material equal to or better than that specified for fill herein. Surface of subgrade after compaction shall be firm, uniform, smooth, stable, and true to grade and cross-section.

D. Construct temporary ditches and/or perform such grading as necessary to maintain positive drainage away from subgrade at all times.

3.6 FINISH GRADING

A. Finish grading shall be in accordance with Section 312000 and as specified herein.

B. Check grading of building subgrades by string line from grade stakes (blue tops) set at not more than 50-foot centers. Tolerance of 0.10-foot will be permitted. Contractor to provide engineering and field staking necessary for verification of lines, grades, and elevations.

3.7 FIELD QUALITY CONTROL

A. See Section 312000, “Field Testing”.

END OF SECTION

SECTION 31 23 00

EXCAVATION, BACKFILL, AND COMPACTION FOR UTILITIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Excavation of trenches for installation of utilities.

B. Backfilling trenches with bedding material as specified and filling trenches with suitable material to proposed subgrade.

C. Compacting backfill materials in acceptable manner.

D. Borings and casings under roads.

1.2 RELATED SECTIONS

A. Section 310000 - Site Demolition

B. Section 312000 - Earthwork

C. Section 334100 - Storm Drainage

D. Section 312600 - Aggregate Materials

E. Construction Drawings

1.3 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM) latest edition

1. D422 Standard Test Method For Particle – Size Analysis of Soil
2. D 698 Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN.m/m^3))
3. D 1557 Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2,700 Kn.m/m^3))
4. D 2216 Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil-Aggregate Mixtures
5. D 2487 Classification of Soils for Engineering Purposes
6. D 2922 Density of Soil and Soil-Aggregate In Place by Nuclear Methods (Shallow Depth)
7. D 3017 Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
8. D 4318 Liquid Limit, Plastic Limit, and Plasticity Index of Soils

B. American Association of State Highway and Transportation Officials (AASHTO) latest edition
1. T 88 Particle Size Analysis of Soils
2. State Department of Transportation (DOT): Standard Specifications for Construction and Materials, Latest Edition

1.4 QUALITY ASSURANCE

A. An independent testing laboratory will perform testing at intervals not exceeding 200-feet of trench for first and every other 8-inch lift of compacted trench backfill and furnish copies of results as specified herein.

B. Testing shall be in accordance with Part 3, “Field Quality Control”.

1.5 SUBMITTALS

A. Shop drawings or details pertaining to site utilities are not required unless required by regulatory authorities or unless uses of materials, methods, equipment, or procedures that are contrary to Construction Drawings or Specifications are proposed. Do not perform work until Owner has accepted required shop drawings.

B. Contact utility companies and determine if additional easements will be required to complete project. Provide written confirmation of the status of all easements to Owner at time of Preconstruction Conference or no later than 90 days prior to project possession date.

C. Submit 30-pound sample of each type of fill material from off-site borrow sources that is to be used in backfilling, in air-tight container(s), to the independent testing laboratory or submit gradation and certification of aggregate material that is to be used at the site to the independent testing laboratory for review.

1.6 PROJECT RECORD DOCUMENTS

A. Accurately record actual locations of subsurface utilities, structures, and obstructions installed or encountered.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Bedding Material: Aggregate Type as indicated on the plans and as specified in Section 312600.

B. Haunching Material: As specified in Section 312600. Aggregate Type as indicated on the plans and as specified in Section 312600.

C. Backfill material from the site as specified in Section 312000 and approved by Owner.

D. Backfill material from off-site as specified in Section 312000 and approved by Owner.

E. Steel Casing Pipe: Comply with AWWA C200 minimum grade B, size, and wall thickness as indicated on Construction Drawings.

F. Backfill material shall not contain rock or stone with a maximum size greater than 2 inches.

2.2 LOCATOR TAPE

A. Locator tape shall be heavy duty 6" wide underground warning tape. Tape shall be made from polyethylene material, 3.5 mils thick, with a minimum tensile strength of 1,750 psi. Place the

tape at one-half the minimum depth of cover for the utility line or a maximum of 3', whichever is the lesser, but never above the top of subgrade. Color of tape shall be determined by APWA Color Standards: Natural Gas- Yellow, Electric - Red, Telephone – Orange, Water – Blue, Sanitary Sewer – Green.

2.3 EQUIPMENT

A. Transport off-site materials to project using well-maintained and operating vehicles. Once on site, transporting vehicles shall stay on designated haul roads and shall at no time endanger improvements by rutting, overloading, or pumping.

PART 3 - EXECUTION

3.1 PREPARATION

A. Set lines, elevations, and grades for proposed systems.

B. Protect benchmarks, property corners, and other survey monuments from damage or displacement. If marker needs to be removed it shall be referenced by licensed land surveyor and replaced, as necessary, by same.

C. Maintain in operating condition existing utilities, previously installed utilities, and drainage systems encountered in utility installation. Repair surface or subsurface improvements shown on Construction Drawings.

D. Verify location, size, elevation, and other pertinent data required making connections to existing utilities and drainage systems as indicated on Construction Drawings.

E. Over excavate and properly prepare areas of subgrade that are not capable of supporting proposed systems. Stabilize these areas by using acceptable geotextile fabrics or additional bedding material placed and compacted.

F. Provide dewatering systems as required for utility excavations. Dewatering systems shall comply with requirements of Section 312000.

3.2 EXCAVATION

A. Contact local utility companies before excavation begins. Dig trench at proper width and depth for laying pipe, conduit, or cable. Cut trench banks vertical, if possible, and remove stones from bottom of trench as necessary to avoid point-bearing. Over excavate wet or unstable soil, if encountered, from trench bottom as necessary to provide suitable base for continuous and uniform bedding.

B. Trench excavation sidewalls shall be sloped, shored, sheeted, braced, or otherwise supported by means of sufficient strength to protect workmen in accordance with applicable rules and regulations established for construction by the Department of Labor, Occupational Safety and Health Administration (OSHA), and by local ordinances. Lateral travel distance to exit ladder or steps shall not be greater than 25-feet in trenches 4-feet or deeper.

C. Perform excavation as indicated on Construction Drawings for specified depths. During excavation, stockpile materials suitable for backfilling in orderly manner far enough from bank of trench to avoid overloading, slides, or cave-ins.

D. Remove excavated materials not required or not suitable for backfill or embankments and waste off site or at on-site locations approved by the Owner and in accordance with governing regulations. Dispose of structures discovered during excavation as specified in Section 310000.

E. Prevent surface water from flowing into trenches or other excavations by temporary grading or other methods, as required. Remove accumulated water in trenches and other excavations as specified in Section 312000.

F. Open cut excavation with trenching machine or backhoe. Where machines other than ladder or wheel-type trenching machines are used, do not use clods for backfill. Dispose of unsuitable material and provide other suitable material at no additional cost to Owner.

G. Accurately grade trench bottom to provide uniform bearing and support for each section of pipe on bedding material at every point along entire length, except where necessary to excavate for bell holes, proper sealing of pipe joints, or other required connections. Dig bell holes and depressions for joints after trench bottom has been graded. Dig no deeper, longer, or wider than needed to make joint connection properly.

H. For pipes 12 inches in diameter or smaller, total trench width below top of pipe shall be the outside diameter plus not less than 12 inches nor more than 18 inches with the pipe or conduit that is to be installed to designated elevations and grades centered in the trench. For pipe diameters greater than 12 inches, trench width below the top of pipe shall be wide enough to accommodate workmen and equipment but not less than 18 inches. Other trench width for pipe, conduit, or cable shall be least practical width that will allow for proper compaction of trench backfill.

I. Trench depth requirements measured from finished grade or paved surface shall meet the following requirements or applicable codes and ordinances, whichever is more stringent:
   1. Water Mains: 30-inches to top of pipe barrel or 6-inches below frost line, established by local building official, whichever is deeper.
   2. Sanitary Sewer: Elevations and grades as indicated on Construction Drawings.
   3. Storm Sewer: Elevations and grades as indicated on Construction Drawings.
   4. Electrical Conduits: 24-inches minimum to top of conduit or as required by NEC 300-5, NEC 710-36 codes, or local utility company requirements, whichever is deeper.
   5. TV Conduits: 18-inches minimum to top of conduit or as required by local utility company, whichever is deeper.
   6. Telephone Conduits: 18-inches minimum to top of conduit, or as required by local utility company, whichever is deeper.
   7. Gas Mains and Service: 30-inches minimum to top of pipe, or as required by local utility company, whichever is deeper.

3.3 PIPE BEDDING

A. Accurately cut trenches for pipe or conduit that is to be installed to designated elevations, 4 inches below bottom of pipe and to the width as specified herein. Place 4 inches of bedding material, compact in bottom of trench, and accurately shape to conform to lower portion of pipe barrel.

3.4 BACKFILLING

A. Criteria: Do not backfill trenches until required tests are performed and utility systems comply with and are accepted by applicable governing authorities. Backfill trenches as specified in Sections 312000 and one or more of the following sections, as applicable: 312200 for trenches below structures or 312400 for trenches below pavements. If improperly backfilled, reopen to depth required to obtain proper compaction. Backfill and compact, as specified herein, to properly correct the condition in an acceptable manner.

B. Backfilling: After pipe or conduit has been installed, bedded, and tested as required, backfill trench or structure excavation with specified material placed as given in the Construction Documents.

C. Backfill trenches to contours and elevations shown on Construction Drawings with unfrozen materials.

D. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.

3.5 COMPACTION

A. Exercise proper caution when compacting immediately over top of pipes or conduits. Water jetting or flooding is not permitted as method of compaction.

B. Maintain optimum moisture content of fill materials as specified in Section 312000 to attain required compaction density.

C. Materials used for backfill shall comply with requirements of Section 312600 and as specified herein.

3.6 BORINGS AND CASINGS UNDER ROADS, HIGHWAYS, AND RAILROAD CROSSINGS

A. When indicated by Construction Drawings, street, road, highway, or railroad crossings for utility mains installed by jacking and boring method shall be in accordance with area specifications and governing authorities.

B. Excavation of approach pits and trenches within right-of-way of street, road, highway, or railroad shall be of sufficient distance from paving or railroad tracks to permit traffic to pass without interference. Tamp backfill for approach pits and trenches within right-of-way in layers not greater than 6-inches thick for entire length and depth of trench or pit. Compact backfill to 95 percent of maximum density in accordance with ASTM D698, (or 95 percent of maximum density, in accordance with ASTM D1557) obtained at optimum moisture as determined by AASHTO T 180. Mechanical tampers may be used after cover of 6 inches has been obtained over top of barrel of pipe.

C. Accomplish boring operation using commercial type boring rig. Bore hole to proper alignment and grade. Bore hole shall be within 2 inches of same diameter as largest outside joint diameter of pipe installed. Install pipe in hole immediately after bore has been made and in no instance shall hole be left unattended while open.

D. In event subsurface operations result in failure or damage to pavement or railroad tracks within 1 year of construction, make necessary repairs to pavement or railroad tracks at no additional

cost to Owner. If paving cracks on either side of pipe line or is otherwise disturbed or broken due to construction operations, repair or replace disturbed or broken area at no additional cost to Owner.

E. Clean, prime, and line interior and exterior of casing pipe with two coats of asphalt in accordance with area specifications and governing authorities.

F. Butt weld steel casing. Welds shall be full penetration single butt-welds in accordance with AWWA C206 and AWS D7-0-62.

G. Install casing and utility pipe with end seals, vent pipe, and other special equipment in accordance with area specifications and governing authorities.

3.7 FIELD QUALITY CONTROL

See Section 312000, “Field Quality Control”.

END OF SECTION

SECTION 31 24 00

EXCAVATION, BACKFILL, AND COMPACTION FOR PAVEMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Excavation to line, grade, and configuration as shown on Construction Drawings for proposed and future pavement areas.

B. Fill to line, grade, and configuration as shown on Construction Drawings for proposed and future pavement areas.

C. Compacting fill materials in acceptable manner as specified herein.

1.2 RELATED SECTIONS

A. Section 312000 - Earthwork

B. Section 321206 - Base Course

C. Section 312600 - Aggregate Materials

D. Section 321216 - Asphaltic Concrete Paving

E. Section 321333 - Curbs and Sidewalks

F. Construction Drawings

1.3 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM) latest edition
   1. D422 Standard Test Method For Particle – Size Analysis of Soil
   2. D 698 Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN.m/m^3))
   3. D 1557 Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2,700 Kn.m/m^3))
   4. D 2216 Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil-Aggregate Mixtures
   5. D 2487 Classification of Soils for Engineering Purposes
   6. D 2922 Density of Soil and Soil-Aggregate In Place by Nuclear Methods (Shallow Depth)
   7. D 3017 Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
   8. D 4318 Liquid Limit, Plastic Limit, and Plasticity Index of Soils

B. American Association of State Highway and Transportation Officials (AASHTO) latest edition
   1. T 88 Particle Size Analysis of Soils
   2. State Department of Transportation (DOT): Standard Specifications for Construction and Materials, Latest Edition

1.4 QUALITY ASSURANCE

A. Independent Testing Laboratory, selected and paid by Contractor, will be retained to perform construction testing on filling operations and subgrade analysis as specified in Section 02300 and as specified herein.

B. Testing shall be in accordance with Part 3, Section 3.07, “Field Quality Control”.

1.5 SUBMITTALS

A. Shop drawings or details pertaining to excavating and filling for pavement are not required unless otherwise required by the Construction Documents or if contrary procedures to Construction Documents are proposed.

B. Submit 30-pound sample of each type of off-site fill material that is to be used in backfilling in air-tight container to independent testing laboratory or submit gradation and certification of aggregate material that is to be used to independent testing laboratory for review.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Fill material from on-site as specified in Section 312000 and approved by Owner.

B. Fill material from off-site as specified in Section 312000 and approved by Owner.

C. Aggregate material as indicated on the plans and as specified in Section 312600.

2.2 EQUIPMENT

A. Transport off-site materials to project using well-maintained and operating vehicles. Once on site, transporting vehicles shall stay on designated haul roads and shall at no time endanger improvements by rutting, overloading, or pumping.

PART 3 - EXECUTION

3.1 PREPARATION

A. Identify lines, elevations, and grades necessary to construct pavements, curb, curb and gutter, bases, sidewalk, and roadways as shown on Construction Drawings.

B. Protect benchmarks, property corners, and other survey monuments from damage or displacement. If marker needs to be removed it shall be referenced by licensed land surveyor and replaced, as necessary, by same.

C. Locate and identify site utilities that have previously been installed and protect from damage.

D. Locate and identify existing utilities that are to remain and protect from damage.

E. Over-excavate and properly prepare areas of subgrade that are not capable of supporting proposed systems. Stabilize these areas by using acceptable geotextile fabrics or aggregate material placed and compacted.

3.2 EXCAVATION

A. Excavate roadway and pavement areas to line and grade as shown on Construction Drawings.

B. Place suitable material into project fill areas as specified in Section 02300.

C. Unsuitable excavated material is to be disposed of in manner and location that is acceptable to Owner and local governing agencies.

D. Perform excavation using capable, well-maintained equipment and methods acceptable to Owner and local governing agencies.

3.3 FILLING AND SUBGRADE PREPARATION

A. Areas exposed by excavation or stripping and on which subgrade preparations for paving are to be performed, including future pavement areas, shall be scarified to minimum depth of 8-inches and compacted to not less than 95 percent of maximum density, in accordance with ASTM D 698 (or 95 percent of maximum density, in accordance with ASTM D 1557) at moisture content of not less than 2 percent below and not more than 3 percent above optimum moisture content. Proofroll these areas to detect areas of insufficient compaction. Accomplish proofrolling by making minimum of 2 complete passes with fully-loaded tandem-axle dump truck with a maximum loaded weight of 20 tons, or approved equal, in each of 2 perpendicular directions until acceptable. Excavate and recompact areas of failure as specified herein. Continual failure areas shall be stabilized at no additional cost to Owner.

B. Place fill materials used in preparation of the subgrade in lifts or layers not to exceed 8-inches loose measure and compacted to minimum density of not less than 95 percent of maximum density, in accordance with ASTM D 698, (or 95 percent of maximum density, in accordance with ASTM D 1557) at moisture content of not less than 2 percent below and not more than 3 percent above optimum moisture content.

C. Following table stipulates maximum allowable values for plasticity index (PI) and liquid limit (LL) of suitable fill materials to be used in specified areas, unless specifically stated otherwise on Construction Drawings:

	PI	LL
Paving Area	20	45

D. Fill material imported from off-site or fill material removed from onsite cut areas shall have CBR or LBR value equal to or greater than pavement design subgrade CBR or LBR value indicated on Construction Drawings.

3.4 COMPACTION

A. Maintain optimum moisture content of fill materials as specified herein to attain required compaction density.

B. Test materials in accordance with Section 312000.

C. Corrective measures for non-complying compaction: Remove and recompact deficient areas until proper compaction is obtained at no additional expense to Owner.

D. Construct temporary ditches and/or perform such grading as necessary to maintain positive drainage away from subgrade at all times.

3.5 MAINTENANCE OF SUBGRADE

A. Verify finished subgrades to ensure proper elevation and conditions for construction above subgrade.

B. Protect subgrade from excessive wheel loading during construction including concrete trucks, dump trucks, and other construction equipment.

C. Remove areas of finished subgrade found to have insufficient compaction density to depth necessary and replace in manner that will comply with compaction requirements by use of material equal to or better than best subgrade material on site. Surface of subgrade after compaction shall be hard, uniform, smooth, stable, and true to grade and cross-section.

3.6 FINISH GRADING

A. Finish grading shall be in accordance with Section 312000 and as specified herein.

B. Check grading of paving areas by string line from grade stakes (blue tops) set at not more than 50-foot centers. Tolerances of 0.10-foot, more or less, will be permitted. Contractor is to provide engineering and field staking necessary for verification of lines, grades, and elevations.

3.7 FIELD QUALITY CONTROL

A. See Section 312000, “Field Quality Control”.

END OF SECTION

SECTION 31 26 00

AGGREGATE MATERIALS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Aggregate materials for use as specified in other Sections.

1.2 RELATED SECTIONS

A. Section 310000 – Site Demolition

B. Section 311000 – Site Clearing

C. Section 312000 – Earthwork

D. Section 312200 – Excavation, Backfill, and Compaction for Structures

E. Section 312300 – Excavation, Backfill, and Compaction for Utilities

F. Section 312400 – Excavation, Backfill, and Compaction for Pavement

G. Section 312800 – Erosion Control and Sedimentation

H. Construction Drawings

1.3 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM) latest edition

1. C136 Method for Sieve Analysis of Fine and Coarse Aggregates
2. D698 Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN.m/m^3))
3. D1557 Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2,700 Kn.m/m^3))
4. D2216 Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil-Aggregate Mixtures
5. D2487 Classification of Soils for Engineering Purposes
6. D2922 Density of Soil and Soil-Aggregate In Place by Nuclear Methods (Shallow Depth)
7. D3017 Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
8. D4318 Liquid Limit, Plastic Limit, and Plasticity Index of Soils

B. American Association of State Highway and Transportation Officials (AASHTO) latest edition

1. T 88 Particle Size Analysis of Soils

C. State Department of Transportation (DOT): Standard Specifications for Construction and Materials, Latest Edition.

1.4 QUALITY ASSURANCE

A. Tests and analysis of aggregate materials will be performed in accordance with ASTM and AASHTO procedures specified herein.

1.5 SUBMITTALS

A. Submit 30-pound sample of each aggregate or mixture that is to be incorporated into project in air-tight containers to the independent testing laboratory or submit gradation and certification of aggregate material that is to be incorporated into project to the independent testing laboratory for review.

B. Submit name of each material supplier and specific type and source of each material. Any change in source requires approval of Owner.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Construction and materials shall meet or exceed requirements of this Section and applicable state highway department specifications section(s) referred to or noted on the Construction Drawings which pertain to paving base course design, materials, preparation, and execution. Materials shall be as indicated in the Construction Documents and shall comply with state highway department specifications regarding source, quality, gradation, soundness, absorption, liquid limit, plasticity index, and mix proportioning.

B. Soil Materials

1. Class II: Coarse-Grained Soils; conforming to ASTM D2487 Group Symbol, GW, GP, SW and SP.
2. Class III: Coarse-Grained Soils with Fines; conforming to ASTM D2487 Symbol GM, GC, SM and SC.
3. Class IV-A: Fine-Grained Soils (inorganic); conforming to ASTM D2487 Group Symbol ML and CL.
4. Class IV-B: Fine Grained Soils (inorganic); conforming to ASTM D2487 Group Symbol MH and CH.
5. Class V: Organic Soils; conforming to ASTM D2487 Group Symbol OL, OH, and PT.

C. Aggregate Material

1. Coarse Aggregate Type A1: Material shall be sound crushed limestone, crushed slag, granulated slag, crushed gravel, or other types of suitable material meeting the requirements of this section. Crushed limestone, crushed slag and crushed gravel shall meet the following grading requirements:

Sieve Size	Percent Passing
1 1/2 inches	100
1 inch	75-100
3/4 inch	60-100
3/8 inch	35-75
No. 4	30-60
No. 30	7-30
No. 200	0-5

2. Coarse Aggregate Type A2: Material shall be crushed carbonate, crushed gravel, crushed air-cooled slag, granulated slag, a mixture of crushed and granulated slag, or other types of suitable material meeting the requirements of this item. Crushed carbonate stone or mixtures of crushed and granulated slags shall meet the following gradation requirements:

Sieve Size	Percent Passing
2 inches	100
1 inch	70-100
3/4 inch	50-90
No. 4	30-60
No. 30	7-30
No. 200	0-5

3. Aggregate Type A3: Pea Gravel – Natural stone; washed, free of clay, shale, organic matter; graded in accordance with ASTM C136 and D2487; to the following limits:

    a. Minimum size: 1/4 inch
    b. Maximum Size: 5/8 inch

4. Fine Aggregate Type A4: Sand – Natural river or bank sand; washed; free of silt, clay, loam, friable or soluble materials, and organic matter; graded in accordance with ASTM C136 and D2487; within the following limits:

Sieve Size	Percent Passing
No. 4	90-100
No. 50	7-40
No. 200	0-5

5. Class I-A: Material shall be sound crushed limestone, crushed slag, granulated slag, crushed gravel, or other types of suitable material meeting the requirements of this item. Crushed limestone, crushed slag and crushed gravel shall meet the following grading requirements:

Sieve Size	Percent Passing
1-1/2 inches	100
No. 4	$\leq$ 10
No. 200	< 5

6. Class I-B: Material shall be crushed carbonate, crushed gravel, crushed air-cooled slag, granulated slag, a mixture of crushed and granulated slag, or other types of suitable material meeting the requirements of this item. Crushed carbonate stone or mixtures of crushed and granulated slags shall meet the following gradation requirements:

Sieve Size	Percent Passing
1-1/2 inches	100
No. 4	≤50
No. 200	< 5

2.2 EQUIPMENT

A. Transport off-site materials to project using well-maintained and operating vehicles. Once on site, transporting vehicles shall stay on designated haul roads and shall at no time endanger any improvements by rutting, overloading, or pumping.

PART 3 - EXECUTION

3.1 STOCKPILING

A. Stockpile on-site at locations indicated by Owner in such manner that there will be no standing water or mixing with other materials.

3.2 BORROW AND SPOIL SITES

A. Upon completion of borrow and/or spoil operations, clean up borrow and/or spoil areas as indicated on Construction Drawings in neat and reasonable manner to satisfaction of property owner and Owner.

END OF SECTION

SECTION 31 28 00

EROSION AND SEDIMENTATION CONTROL

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes
   1. Installation of temporary and permanent erosion and sedimentation control systems.
   2. Installation of temporary and permanent slope protection systems.

B. Related Sections
   1. Section 311000 - Site Clearing
   2. Section 312000 - Earthwork
   3. Storm Water Pollution Prevention Plan
   4. Construction Drawings (“Site Maps”)

1.2 ENVIRONMENTAL REQUIREMENTS

A. Protect adjacent properties, any identified endangered or threatened species or critical habitat, any identified cultural or historic resources, and receiving water resources from erosion and sediment damage until final stabilization.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Seed, sod, and ground covers for the establishment of vegetation.

B. Sediment control devices as specified on the Construction Drawings.

C. Rolled erosion control products according to Erosion Control Technology Council (ECTC) standard specifications.

D. Temporary mulches such as loose, straw, wood cellulose, or agricultural silage.

E. Temporary and permanent outfall structures as specified on the drawings.

PART 3 – EXECUTION

3.1 PREPARATION

A. Review the drawings and Storm Water Pollution Prevention Plan.

B. Revise SWPPP as necessary to address potential pollution from site identified after issuance of the SWPPP at no additional cost to owner.

C. Conduct storm water pre-construction meeting with Site Contractor, all ground-disturbing Sub-contractors, site engineer of record or someone from their office familiar with the site and SWPPP, and state or local agency personnel in accordance with requirements of the special conditions.

3.2 EROSION AND SEDIMENTATION CONTROL AND SLOPE PROTECTION IMPLEMENTATION

A. Place erosion and sediment control systems in accordance with the drawings and Storm Water pollution Prevention Plan or as may be dictated by site conditions in order to maintain the intent of the specifications and permits.

B. Deficiencies or changes on the drawings or Storm Water Pollution Prevention Plan shall be corrected or implemented as site conditions change. Changes during construction shall be noted in the Storm Water Pollution Prevention Plan and posted on the drawings (Site Maps).

C. Owner has authority to limit surface area of erodible earth material exposed by clearing and grubbing, excavation, borrow and embankment operations and to direct Contractor to provide immediate permanent or temporary pollution control measures.

D. Maintain temporary erosion and sedimentation control systems as dictated by site conditions, indicated in the construction documents, or as directed by governing authorities or Owner to control sediment until final stabilization. Contractor shall respond to maintenance or additional work ordered by Owner or governing authorities immediately, but in no case, within not more than 48 hours if required at no additional cost to the Owner.

E. Contractor shall incorporate permanent erosion control features, paving, permanent slope stabilization, and vegetation into project at earliest practical time to minimize need for temporary controls.

F. Permanently seed and mulch cut slopes as excavation proceeds to extent considered desirable and practical.

G. Unless required within a shorter timeframe by the applicable General Permit for Storm Water Discharges Associated with Construction Activity, slopes that erode easily or that will not be graded for a period of 14 days or more, shall be temporarily stabilized as work progresses with vegetation or other acceptable means unless otherwise specified in the Contract Documents. In the event it is not practical to seed areas, slopes must be stabilized with mulch and tackifier, bonded fiber matrix, netting, blankets or other means to reduce the erosive potential of the area.

END OF SECTION

SECTION 31 31 16

TERMITE CONTROL

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Soil treatment for termite control at new building. Includes applying toxicant to designated soil, re-treating during warranty period when subsequent active termite infestation is detected.

1.2 REFERENCES

A. Environmental Protection Agency:
   1. EPA FIFRA - Federal Insecticide, Fungicide and Rodenticide Act.

B. National Pest Management Association:
   1. NPMA WDO - Wood Destroying Organism Library.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal procedures.

B. Product Data: Submit toxicants to be used, composition by percentage, dilution schedule, intended application rate. Include product label information.

C. Test Reports: Indicate regulatory agency approval reports.

D. Manufacturer's Application Instructions: Indicate caution requirements and in accordance with current product label of chosen pesticide.

1.4 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements : Requirements for submittals.

B. Project Record Documents: Record moisture content of soil before application, date and rate of application, areas of application, and diary of toxicity meter readings and corresponding soil coverage.

C. Operation and Maintenance Data: Indicate re-treatment schedule.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum 5 years documented experience.

B. Applicator: Company specializing in performing the Work of this section with minimum 10 years documented experience, approved by manufacturer and licensed at Project location.

1.6 WARRANTY

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for warranties.

B. Furnish five year warranty.

C. Warranty: Include coverage for damage and repairs to building and building contents caused by termites. Repair damage. Re-treat where required.

D. Inspect and report annually to Owner in writing.

E. Owner has option of extending damage guarantee contract at an annual fee mutually agreed upon by the Owner and the applicator. Owner reserves the right to cancel as of any anniversary date.

F. The contract is non-cancellable by the applicator.

PART 2 PRODUCTS

2.1 MATERIALS

A. Toxicant Chemical: Local authority approved; synthetically color dyed to permit visual identification of treated soil.

B. Diluent: Recommended by toxicant manufacturer.

2.2 MIXES

A. Mix toxicant to manufacturer's instructions, to a uniform consistency.

B. Provide quantity required for application at the label volume and rate for the maximum specified concentration of termiticide, so that a continuous horizontal and vertical termiticidal barrier or treated zone is established around and under building construction.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify soil surfaces are unfrozen, sufficiently dry to absorb toxicant, and ready to receive treatment.

C. Verify final grading and excavation are complete.

D. Apply toxicant just prior to installation of vapor barrier under slabs-on-grade in accordance with product label supplemented by the NPCA’s ARP for termiticiding or local requirements.

3.2 APPLICATION

A. Apply toxicant at Project building site, before footings and slabs are placed.

B. Apply extra treatment to structure penetration surfaces including pipe or ducts, and soil penetrations including grounding rods or posts.

C. Re-treat disturbed treated soil with same toxicant as original treatment.

D. When inspection or testing identifies presence of termites, re-treat soil and re-test.

3.3 PROTECTION OF FINISHED WORK

A. Section 01 70 00 - Execution and Closeout Requirements: Protecting finished Work.

B. Do not permit soil grading over treated work.

C. Re-treat disturbed treated soil with same toxicant as original treatment.

END OF SECTION

SECTION 32 12 06

BASE COURSE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes
   1. Aggregate base for asphaltic concrete and Portland cement concrete paving including sand/shell base and hot-mix sand asphalt base.

B. Related Sections
   1. Section 312000 – Earthwork

1.2 REFERENCES

A. Asphalt Institute

B. State Highway Department Standard Specifications

1.3 QUALITY ASSURANCE

A. An independent testing laboratory, selected and paid by Contractor, will be retained to perform construction testing of in-place base course for compliance with requirements for thickness, compaction, density, and tolerances. Paving base course tolerances shall be verified by rod and level readings on not more than 50-foot centers to be not more than 0.05-feet above design elevation which will allow for paving thickness as shown on Construction Drawings. Contractor shall provide instruments and suitable benchmark.

1.4 SUBMITTALS

A. Submit materials certificate to the independent testing laboratory that is signed by materials producer and Contractor, certifying that materials comply with, or exceed, requirements specified herein or on the Construction Drawings.

B. Submit certification of base course materials and placement as specified in Parts 2 and 3 hereinafter.

1.5 WEATHER LIMITATIONS

A. Do not place aggregate when base surface temperature is less than 40 degrees F, nor when air temperature is below 45 degrees F. Do not place aggregate when surface is wet or frozen. Do not place aggregate when weather conditions are unfavorable otherwise.

PART 2 - PRODUCTS

2.1 BASE COURSE MATERIAL

A. Aggregate Base Course: Aggregate base course shall consist of a well graded, durable aggregate uniformly moistened and mechanically stabilized by compaction. Base course may consist of a granular base (crushed slag, stone, or gravel, etc), sand/shell base material, or a hot-mix sand asphalt base.

B. Base course shall be as shown on the drawings, or when not shown, shall be as specified herein.

C. Aggregate base material requirements from State or other local highway agency specifications may be use for aggregate base course for roads, streets, or similar use pavements if the following conditions are met:
   1. Percentage of material by weight passing the No. 200 sieve will not exceed 10.
   2. Portion of the material passing the No. 40 sieve must have a liquid limit not greater than 25 and a plasticity index not greater than 5.

D. Aggregate shall consist of clean, sound, durable particles of crushed stone, crushed slag, crushed gravel, angular sand, or other approved material. Aggregate shall be free of lumps of clay, organic matter, and other objectionable materials or coatings. The portion retained on the No. 4 sieve shall be known as coarse aggregate; that portion passing the No. 4 sieve shall be known as fine aggregate.
   1. Coarse aggregates shall be angular particles of uniform density.
   2. Fine aggregates shall be angular particles of uniform density. Fine aggregate shall consist of screenings, angular sand, crushed recycled concrete fines, or other finely divided mineral matter processed or naturally combined with the coarse aggregate.

E. Gradation: The specified gradation requirements shall apply to the completed base course. The aggregates shall have a maximum size of 2 inches and shall be continuously well graded within the following limits:

GRADATION OF AGGREGATES
Percentage by Weight Passing Square-Mesh Sieve

Sieve Designation	No. 1	No. 2	No. 3
2 inch	100	----	----
1-1/2 inch	70-100	100	----
1 inch	45-80	60-100	100
1/2 inch	30-60	30-65	40-70
No. 4	20-50	20-50	20-50
No. 10	15-40	15-40	15-40
No. 40	5-25	5-25	5-25
No. 200	0-10	0-10	0-10

NOTE: Particles having diameters less than 0.0008 inch shall not be in excess of 3 percent by weight of the total sample tested.

F. Hot-mix Sand Asphalt Bases: Asphalt Institute Type VI, VII, or VIII Mixes for Hot-mix Sand Asphalt Bases. Hot-Mix base shall be used only under asphaltic concrete surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Contractor shall verify to the Owner in writing that the subgrade has been inspected, tested, and gradients and elevations are correct, dry, and properly prepared in accordance with Section 02300.

3.2 CONSTRUCTION

A. Perform base course construction in accordance with the applicable State standard specifications or as shown or specified.

B. Perform base course construction in a manner that will drain the surface properly and prevent runoff from adjacent areas from draining onto base course construction.

C. Compact base material to not less than 95 percent of optimum density, as determined by ASTM D 698 unless otherwise indicated on the Drawings.

D. Construct to thickness indicated on Construction Drawings.
   1. Granular Base: Apply in lifts or layers not exceeding 8-inches, measured loose.
   2. Sand/Shell Base: Apply in lifts or layers not exceeding 4-inches, measured loose.
   3. Hot-mix Sand Asphalt Bases: Apply in lifts or layers not exceeding 3-inches, measured loose.

3.3 FIELD QUALITY CONTROL

A. Field testing specified below will be performed by the Contractor's Independent Testing Laboratory at no cost to the Owner.

B. Field testing, frequency, and methods may vary as determined by and between the Contractor and the Contractor's Testing Laboratory.

C. Field density tests for in-place materials will be performed in accordance with the following:
   1. Nuclear Method: ASTM D 2922 (Method B-Direct Transmission)
   2. Base material thickness: One test for each 20,000 sq. ft. of in-place base material area.
   3. Base material compaction: One test in each lift for each 20,000 sq. ft. of in-place base material area.

D. The independent testing laboratory will prepare reports that indicate test location, elevation data, and test results. Owner and Contractor shall be provided with copies of the reports within 96 hours of the time the test was performed. In the event that the test results show failure to meet any of the Specifications; Owner and Contractor will be notified immediately by the independent testing laboratory.

E. The Contractor shall certify in writing to the Owner that base course placement is in accordance with specification requirements prior to subsequent work thereon.

F. The Contractor shall pay for retesting due to failures at no additional expense to Owner. Contractor shall provide free access to the site for testing activities.

END OF SECTION

SECTION 32 12 16

ASPHALTIC CONCRETE PAVING

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 WORK INCLUDED

A. Prepare subgrade to receive base course.

B. Provide compacted base course.

C. Place base course and place asphaltic concrete hot mix (ACHM) binder course.

D. Tack base course and place ACHM surface course.

1.3 RELATED WORK

A. Section 312000 - Earthwork

B. Section 334100 - Storm Drainage

C. Section 321333 - Concrete Curb and Gutters

D. Section 033000 - Cast in Place Concrete

1.4 REFERENCES

A. Arkansas State Highway and Transportation Dept. (AHTD):

1. Standard Specifications for Highway Construction, Edition of 2003, hereafter referred to as "AHTD Standard Specifications".

PART 2 - PRODUCTS

2.1 BASE COURSE MATERIALS

A. Crushed Stone: Class 7, meeting the requirements of section 303 of the AHTD Standard Specifications, or approved equal.

B. Tack Coat: Shall be applied as specified and meeting the requirements of section 401 of the AHTD Standard Specifications.

2.2 ASPHALT PAVEMENT MATERIALS

A. ACHM Surface Course:

1. Type 2 mix as described in Sections 407 and 409 of the AHTD Standard Specifications.
2. The surface course shall be composed of a mixture of mineral aggregate and asphalt cement in the proportions by weight for the type mixture designated.

B. ACHM Binder Course:

1. Type 2 mix as described in Sections 405 and 409 of the AHTD Standard Specifications.
2. The base course shall be composed of a mixture of mineral aggregate and asphalt cement in the proportions by weight for the type mixture designated.

PART 3 - EXECUTION

3.1 SUBGRADE PREPARATION

A. Ensure grading of the subgrade to the required elevation.

B. Scarify to a depth of six inches the subgrade where the base course is to be placed.

C. Water and thoroughly mix subgrade until optimum moisture content is obtained when deficiency of moisture content exists. When excess of moisture exists, rework and aerate subgrade until optimum moisture content is obtained.

D. Re-compact the subgrade to not less than 98 percent of optimum density as determined by ASTM D 698 or 95 percent of optimum density, as determined by ASTM D 1557 unless otherwise indicated on the Drawings.

E. Before final rolling, shape the entire area to the required cross section, adding additional subsoil as required and compact the subgrade surface to the required density.

3.2 PLACEMENT OF BASE COURSE

A. Place the crushed stone base material over the prepared subgrade in accordance with the construction methods described in section 303 of the AHTD Standard Specifications.

B. Place the crushed stone base material over the prepared building pad at 4 inches in depth. The building slab will be placed over the compacted base material.

C. Add water during compaction to bring the base course materials to optimum moisture content. When an excess moisture exists, rework the base course materials until optimum moisture content is obtained.

D. Compact the base course to not less than 95 percent of optimum density, as determined by ASTM D 1557 unless otherwise indicated on the Drawings.

3.3 PLACING TACK COATS

A. Apply the bituminous tack coat to the prepared base at the rate of 0.03 gallon to 0.10 gallon per square yard as designated by the Architect/ Engineer.

B. Clean the base course surface and place the tack coats in accordance with the requirements of section 401 of the AHTD Standard Specifications.

3.4 PLACING ACHM SURFACE COURSE

A. Construction Methods: Section 410, AHTD Standard Specifications.

B. Temperature range of mix:

1. When discharged from mixer: 285 degrees F. to 325 degrees F.
2. When placed on base course: 275 degrees F. 325 degrees F.

C. Temperature of air: Do not place ACHM when air temperature in the shade is below 40 degrees F.

D. Place asphalt pavement to compacted depth shown on Drawing.

E. Compact to required density, with approved rolling equipment. Start compaction as soon as pavement will bear equipment without checking or undue displacement.

F. Required density: 92 percent of maximum theoretical density.

G. Carry out compaction in three operations in pass sequence. Ensure each pass of roller overlaps previous passes to ensure smooth surface free of roller marks. Keep roller wheels sufficiently moist so as not to pick up material.

H. Perform hand tamping in areas not accessible to rolling equipment.

I. Ensure joints made during paving operations and at connection to existing pavement are straight, clean vertical and free of broken or loose material.

J. Ensure surface of completed asphalt pavement is true to lines, profiles and elevations indicated, and is free from depressions exceeding 1/4 inch when measured with a 10 foot straight-edge.

K. Do not allow vehicular traffic on newly paved areas until surface has cooled to atmospheric temperature.

3.5 FIELD QUALITY CONTROL

A. Testing laboratory will make in-place tests of density and moisture content of the subgrade and the base course in accordance with ASTM D 2922-78.

B. Testing laboratory will make density tests of compacted asphalt paving in accordance with ASTM D 107-76.

END OF SECTION

SECTION 32 13 13

PORTLAND CEMENT CONCRETE PAVING

PART 1 - GENERAL

1.1 SUMMARY

1.2 Section Includes

1. Preparation and placement of Portland cement concrete parking areas.
2. Preparation and placement of Portland cement concrete roads and entrances.

1.3 Related Sections

1. Section 312000 - Earthwork
2. Section 321206 - Base Course
3. Section 321313 - Pavement Markings

1.4 REFERENCS

A. American Concrete Institute (ACI)

1. ACI 301 -Structural Concrete for Buildings.
2. ACI 305R - Hot Weather Concreting
3. ACI 306R - Standard Specification for Cold Weather Concreting
4. ACI 308 - Standard Practice for Curing Concrete

B. American Society for Testing and Materials (ASTM)

1. ASTM A185 - Steel Welded Wire Fabric, Plain, for Concrete Reinforcement
2. ASTM A615 - Deformed and Plain Billet-Steel for Concrete Reinforcement
3. ASTM C 31 - Test Methods of Making and Curing Concrete Test Specimens in the Field.
4. ASTM C33 - Concrete Aggregates
5. ASTM C 39 - Test Method for Comprehensive Strength of Cylindrical Concrete Specimens.
6. ASTM C42 - Obtaining And Testing Drilled Cores And Sawed Beams Of Concrete
7. ASTM C94 - Ready-Mixed Concrete
8. ASTM C 138 - Test Method for Unit Weight, Yield, and Air Content (Gravemetric) of Concrete.
9. ASTM C143 - Method for Slump of Hydraulic Cement Concrete
10. ASTM C150 - Portland Cement
11. ASTM C 172 - Method of Sampling Freshly Mixed Concrete.
12. ASTM C231 - Air-Content of Freshly Mixed Concrete by the Pressure Method
13. ASTM C260 - Air-Entraining Admixtures for Concrete
14. ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete
15. ASTM C920 - Standard Specification for Elastomeric Joint Sealants
16. ASTM C1064 - Temperature Of Freshly Mixed Portland Concrete Cement
17. ASTM D994 - Preformed Expansion Joint Filler for Concrete (Bituminous)
18. ASTM D1751 - Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
19. ASTM D2628 - Preformed Polychloroprene Elastomeric Joint Seals for Concrete Pavements

C. Federal Specifications (FS)

1. FS HH-F-341 - Fillers, Expansion Joint: Bituminous (Asphalt & Tar)

D. State Highway Department Standard Specifications

1.5 QUALITY ASSURANCE

A. Establish and maintain required lines and elevations.

B. Check surface areas at intervals necessary to eliminate ponding areas. Remove and replace unacceptable paving as directed by Owner.

1.6 SUBMITTALS

A. Submit certified laboratory test data or manufacturer's certificates and data for the items listed below certifying that materials are in conformance requirements specified herein. Submit to the Engineering Consultant of Record and the Independent Testing Laboratory for review and approval and within 7 calendar days after receipt of Notice-to-Proceed.
   1. Portland cement concrete mix
   2. Aggregate gradations
   3. Preformed expansion joint filler
   4. Field molded/poured sealant
   5. Dowel bars
   6. Expansion sleeves
   7. Tie bars
   8. Reinforcing steel bars
   9. Welded wire fabric
   10. Air entraining admixtures
   11. Water-reducing and set-retarding admixtures (if used)

B. Submit certification that joint sealant has been installed in accordance with the manufacturer's instructions. Include copy of written instructions.

1.7 PROJECT CONDITIONS

A. Maintain access for vehicular and pedestrian traffic as required for other construction activities. Utilize temporary striping, flagmen, barricades, warning signs, and warning lights as required.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Concrete: Mix concrete and deliver in accordance with ASTM C94.
   1. Design mix shall produce normal weight concrete consisting of Portland cement, aggregate, water-reducing admixture, air-entraining admixture, and water to produce following:
      a. Compressive Strength: 4,000 psi, minimum at 28 days, unless otherwise indicated on Construction Drawings.
      b. Slump Range: 1"-3" for hand placed concrete, 1-1/4" to 3" for machine placed (slipform) concrete
      c. Air Entrainment: 5 to 7 percent

B. Forms: Steel, wood, or other suitable material of size and strength to resist movement during concrete placement and to retain horizontal and vertical alignment until removal. Use straight forms, free of distortion and defects. Use flexible spring steel forms or laminated boards to form radius bends as required. Coat forms with nonstaining type of coating that will not discolor or deface surface of concrete.

C. Welded Wire Mesh: Welded plain cold-drawn steel wire fabric, ASTM A185. Furnish in flat sheets.

D. Reinforcing Bars: Deformed steel bars, ASTM A615, Grade 60.

E. Portland Cement: ASTM C150, Type I

F. Joint Fillers: Resilient premolded bituminous impregnated fiberboard units complying with ASTM D994, D1751, D2628; FS HH-F-341, Type II, Class A.

G. Joint Sealants: ASTM C920, non-priming, pourable, self-leveling polyurethane.
   1. Acceptable sealants include Sonneborn “SL1”, Sonneborn "SL2", Sonneborn “Sonomeric 1”, Sonneborn “Sonomeric 2”, Mameco "Vulkem 245", or Woodmont Products "Chem-Caulk".

H. Aggregate: ASTM C33.

I. Water: Clean and potable

J. Dowel Bars: ASTM A615, grade 60, and plain steel bars.

K. Air Entraining Mixture: ASTM C260, Sika AER by Sika Corporation or Air Mix by the Euclid Chemical Corporation.

L. Curing Compound: ASTM C309, Hydrocide by Sonneborn of Rexnord Chemical Products, Inc. or Polyseal 4 in 1 by Chem Masters Corporation.

M. Joint Backup Rods: CCEVA Rod 100 by E-Poxy Industrials, Inc., or Sealtight BACKER ROPE by W.R. Meadows, Inc.

PART 3 - EXECUTION

3.1 PREPARATION

A. Proofroll prepared base material surface to check for unstable areas in accordance with Section 312000 including documentation and re-proof rolling as required. Paving work shall begin only after unsuitable areas have been corrected and are ready to receive paving.

B. Remove loose material from compacted base material surface to produce firm, smooth surface immediately before placing concrete.

3.2 INSTALLATION

A. Form Construction
   1. Set forms to required grades and lines, rigidly braced and secured.
   2. Install sufficient quantity of forms to allow continuance of work and so that forms remain in place minimum of 24 hours after concrete placement.
   3. Check completed formwork for grade and alignment to following tolerances:
      a. Top of forms not more than 1/8-inch in 10'-0".
      b. Vertical face on longitudinal axis, not more than1/4-inch in 10'-0".
   4. Clean forms after each use and coat with form release agent as often as required to ensure separation from concrete without damage.

B. Reinforcement: Fasten reinforcing bars or welded wire fabric (if required) accurately and securely in place with suitable supports and ties. Remove from reinforcement all dirt, oil, loose mill scale, rust, and other substances that will prevent proper bonding of the concrete to the reinforcement.

C. Concrete Placement
1. Concrete may be mixed and placed when the air temperature in the shade and away from artificial heat is a minimum of 35 degrees F and rising. Hot and cold weather concreting shall be in accordance with ACI 305R and 306R, respectively.
2. Do not place concrete until base material and forms have been checked for line and grade. Moisten base material if required to provide uniform dampened condition at time concrete is placed. Concrete shall not be placed around manholes or other structures until they are at required finish elevation and alignment.
3. Place concrete using methods that prevent segregation of mix. Consolidate concrete along face of forms and adjacent to transverse joints with internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Consolidate with care to prevent dislocation of reinforcing, dowels, and joint devices.
4. Deposit and spread concrete in continuous operation between transverse joints, as far as possible. If interrupted for more than 1/2 hour, place construction joint.

D. Joint Construction: Construct expansion, weakened-plane control (contraction), and construction joints straight with face perpendicular to concrete surface. Construct transverse joints perpendicular to centerline, unless otherwise detailed.
1. Weakened-Plane Control or Contraction Joints: Provide joints at spacing of 15'-0" on centers, maximum each way. Construct control joints for depth equal to at least 1/4 of the concrete thickness, as follows:
    a. Form tooled joints in fresh concrete by grooving top with recommended tool and finishing edge with jointer.
    b. Form sawed joints using powered saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut joints into hardened concrete as soon as surface will not be torn, abraded, or otherwise damaged by cutting action.
2. Construction Joints: Place construction joints at end of placements and at locations where placement operations are stopped for period of more than 1/2 hour, except where such placements terminate at expansion joints. Construct joints in accordance with standard details.
3. Transverse Expansion Joints: Locate expansion joints at maximum of 180'-0" on centers, maximum each way unless otherwise shown on the Construction Drawings. Provide premolded joint filler for expansion joints abutting concrete curbs, catch basins, manholes, inlets, structures, sidewalks, and other fixed objects.
4. Butt Joints: For joints against existing pavement, place 16” long dowels eight inches into holes drilled into center of existing slab. Epoxy dowels into holes with approved epoxy compound. Place dowels prior to concrete placement for new concrete. Dowel spacing to be 24” on center unless otherwise shown on Construction Drawings. Saw joint and fill with joint sealer.

E. Joint Fillers: Extend joint fillers full-width and depth of joint, and not less than 1/2-inch or more than 1-inch below finished surface where joint sealer is indicated. Furnish joint fillers in 1-piece lengths for full width being placed, wherever possible. Where more than 1 length is required, lace or clip joint filler sections together.

F. Joint Sealants: Joints shall be sealed with approved exterior pavement joint sealants and shall be installed in accordance with manufacturer's recommendations.

3.3 CONCRETE FINISHING

A. After striking off and consolidating concrete, smooth surface by screeding and floating. Adjust floating to compact surface and produce uniform texture. After floating, test surface for trueness with 10'-0" straightedge. Distribute concrete as required to remove surface irregularities and refloat repaired areas to provide continuous smooth finish.

B. Work edges of slabs and formed joints with edging tool, rounding edge to 1/2-inch radius. Eliminate tool marks on concrete surface. After completion of floating and troweling, when excess moisture or surface sheen has disappeared, complete surface finishing, as follows:
   1. Inclined Slab Surfaces: Provide coarse, nonslip finish by scoring surface with stiff-bristled broom perpendicular to flow of traffic so as to produce regular corrugations not over 1/16 of an inch deep.
   2. Paving: Provide coarse, nonslip finish by scoring surface with stiff-bristled broom perpendicular to flow of traffic so as to produce regular corrugations not over 1/16 of an inch deep.

C. Do not remove forms for 24 hours after concrete has been placed. After form removal, clean ends of joints and point up minor honeycombed areas. Remove and replace areas or sections with major defects, as directed by Owner.

D. Protect and cure finished concrete paving using either membrane curing compound or moist-curing methods described in "water-curing" section of ACI 308.

3.4 CLEANING AND ADJUSTING

A. The Contractor shall certify in writing that placement is in accordance with specification requirements.

B. Sweep concrete pavement and wash free of stains, discolorations, dirt, and other foreign material just prior to final inspection.

C. Protect concrete from damage until acceptance of work. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials.

3.5 FIELD QUALITY CONTROL

A. Field quality control tests specified herein will be conducted by the Contractor’s Independent Testing Laboratory at no cost to the Owner in accordance with Section 01458. The Contractor shall perform additional testing as considered necessary by the Contractor for assurance of quality control. Retesting required as a result of failed initial tests shall be at the Contractor’s expense.

B. Field testing, frequency, and methods may vary as determined by and between the Contractor and the Contractor’s Testing Laboratory.

C. Review the Contractor's proposed materials and mix design for conformance with specifications.

D. Perform testing in accordance with ACI 301 and testing standards listed herein.

E. Strength Tests:
   1. Secure composite samples in accordance with ASTM C 172. Sample at regularly spaced intervals from middle portion of the batch. Sampling time shall not exceed 15 minutes.
   2. Mold and cure specimens in accordance with ASTM C 31.

a. A minimum of four concrete test cylinders shall be taken for every 100 cubic yards or less of each class of concrete placed each day and not less than once for each 5000 square feet of paved area.
b. During the initial 24 hours (plus or minus 8 hours) after molding, the temperature immediately adjacent to the specimens shall be maintained in the range of 60 to 80 degrees F. Control loss of moisture from the specimens by shielding from the direct rays of the sun and from radiant heating devices.
c. Specimens transported prior to 48 hours after molding shall not be demolded, but shall continue initial curing at 60 to 80 degrees F until time for transporting.
d. Specimens transported after 48 hours age shall be demolded in 24 hours (plus or minus 8 hours). Curing shall then be continued but in saturated limewater at 73.4 degrees (plus or minus 3 degrees F) until the time of transporting.
e. Wet cure cylinders under controlled temperature until testing.

3. Test cylinders in accordance with ASTM C 39.
a. Date test cylinders and number consecutively. Give each cylinder of each set an identifying letter (i.e. A, B, C, D). Prepare a sketch of the building plan for each test set identifying location of placed concrete.
b. Test one cylinder (A) at 7 days for information. If the compressive strength of the concrete sample is equal to or above the 28 day specified strength, test another cylinder (B) at 7 days. The average of the breaks shall constitute the compressive strength of the concrete sample.
c. Test two cylinders (B and C) at 28 days and the average of the breaks shall constitute the compressive strength of the concrete sample.
d. Retain fourth cylinder (D) for further testing if needed, but do not retain cylinder more than 60 days.

4. Evaluation and Acceptance:
a. Strength level of concrete will be considered satisfactory if the average of all sets of three consecutive strength tests equal or exceed specified strength and no individual strength test (average of two cylinders) results are below specified compressive strength by more than 500 psi.
b. Complete concrete work will not be accepted unless requirements of ACI 301, have been met, including dimensional tolerances, appearance, and strength of structure.
c. Where average strength of cylinders, as shown by tests is not satisfactory, Owner reserves the right to require Contractor to provide improved curing conditions of temperature and moisture to secure required strength. If average strength of laboratory control cylinders should fall so low as to cause portions of structure to be in question by Owner, follow core procedure set forth in ASTM C42. If results of core test indicate, in opinion of Owner, that strength of structure is inadequate, provide without additional cost to Owner, replacement, load testing, or strengthening as may be ordered by Owner. If core tests are so ordered and results of such tests disclose that strength of structure is as required, cost of test will be paid by Owner.

F. Slump Test: Conduct slump test for each cylinder set taken in accordance with ASTM C 143. Make additional slump tests for every other load from a stationary mixer or truck to test consistency. Sampling shall be in accordance with ASTM C 172.

G. Air Content: Conduct air content test for each cylinder set for concrete exposed to freeze-thaw in accordance with ASTM C 231, ASTM C 173, or ASTM C 138. Indicate test method on report. Make test at same time as slump test.

H. Unit Weight: ASTM C 138.

I. Temperature Test: Conduct temperature test for each cylinder set taken in accordance with ASTM C 1064. Test hourly when air temperature is 40 F and below or 80 F and above. Determine temperature of concrete sample and ambient air for each strength test.

J. In addition to required information noted previously in this Section, record the following information on concrete compression reports:
1. Test cylinder number and letter.
2. Specific foundations or structures covered by this test.
3. Proportions of concrete mix or mix identification.
4. Maximum size coarse aggregate.
5. Specified compressive strength.
6. Tested compressive strength.
7. Slump, air-content (when applicable) and concrete temperature.
8. Concrete plastic unit weight.
9. Concrete Temperature.
10. Elapsed time from batching at plant to discharge from delivery truck at project.
11. Date and time concrete was placed.
12. Ambient temperature, wind speed, and relative humidity during concrete placement.
13. Name of technician securing samples.
14. Curing conditions for concrete strength test specimens (field and laboratory).
15. Date strength specimens transported to laboratory.
16. Age of strength specimens when tested.
17. Type of fracture during test.

K. At the start of each day's mixing, report any significant deviations from approved mix design including temperature, moisture and condition of aggregate.

L. Certify each delivery ticket of concrete. Report type of concrete delivered, amount of water added and time at which cement and aggregate were loaded into truck, and time at which concrete was discharged from truck

M. In Place Pavement Testing: The Contractor’s Independent Testing Laboratory will randomly core pavement at minimum rate of 1 core per 20,000 sq. ft of pavement, with minimum of 3 cores from heavy-duty areas and 3 cores from light duty areas. Cores will be sampled and tested in accordance with ASTM C 42. Core will be tested for thickness and quality of aggregate distribution. Core holes shall be patched by the Contractor immediately with Portland cement concrete and shall be finished to provide level surface as specified herein.

N. Additional Tests: Additional in-place tests shall be conducted as directed by the Owner when specified concrete strengths and other characteristics have not been attained in the structures.

END OF SECTION

SECTION 32 13 23

PAVEMENT MARKINGS

PART 1 - GENERAL

1.1 SUMMARY

1.2 Section Includes

1. Painting and marking of pavements, curbs, guard posts, and light pole bases.

1.3 REFERENCE STANDARDS

A. American Association of State Highway and Transportation (AASHTO)
   1. AASHTO M248 - Ready-Mixed White and Yellow Traffic Paints

B. American Society for Testing and Materials (ASTM)
   1. ASTM D4414 - Standard Practice for Measurement of Wet Film Thickness by Notched Gauges.

C. Federal Specifications (FS)

   1. FS A-A-2886 - Paint, Traffic, Solvent Based (supersedes FS TT-P-85 and FS TT-P-115, Type I)
   2. FS TT-P-1952 - Paint, Traffic And Airfield Marking, Waterborne

1.4 PROJECT CONDITIONS

A. Maintain access for vehicular and pedestrian traffic as required for other construction activities. Utilize flagmen, barricades, warning signs, and warning lights as required.

1.4 QUALITY ASSURANCE

B. Use trained and experienced personnel in applying the products and operating the equipment required for properly performed work.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Paint shall be waterborne or solvent borne, colors as shown or specified herein. Pavement marking paints shall comply with applicable state and local laws enacted to ensure compliance with Federal Clean Air Standards. Paint materials shall conform to the restrictions of the local Air Pollution Control District.

B. Waterborne Paint: Paints shall conform to FS TT-P-1952.

C. Solvent Borne Paint: Paint shall conform to FS A-A-2883 or AASHTO M248. Paint shall be non-bleeding, quick-drying, and alkyd petroleum base paint suitable for traffic-bearing surface and be mixed in accordance with manufacture's instructions before application for colors White, Yellow, Blue, and Red.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine the work area and correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

3.2 PREPARATION

A. Sweep and clean surface to eliminate loose material and dust.

B. Where existing pavement markings are indicated on Construction Drawings to be removed or would interfere with adhesion of new paint, a motorized abrasive device shall be used to remove the markings. Equipment employed shall not damage existing paving or create surfaces hazardous to vehicle or pedestrian traffic. Within public rights-of-way, appropriate governing authority shall approve method of marking removal.

C. New pavement surfaces shall be allowed to cure for not less than 30 days before application of marking materials.

3.3 CLEANING EXISTING PAVEMENT MARKINGS

A. In general, markings shall not be placed over existing pavement marking patterns. Existing pavement markings, which are in good condition but interfere or conflict with the newly applied marking patterns, shall be removed. Deteriorated or obscured markings that are not misleading or confusing or do not interfere with the adhesion of the new marking material do not require removal. Whenever grinding, scraping, sandblasting or other operations are performed, the work shall be conducted in such a manner that the finished pavement surface is not damaged or left in a pattern that is misleading or confusing. When these operations are completed the pavement surface shall be blown off with compressed air to remove residue and debris resulting from the cleaning work.

3.4 APPLICATION

A. Apply two coats of paint at manufacturer's recommended rate, without addition of thinner, with maximum of 100 square feet per gallon or as required to provide a minimum wet film thickness of 15 mils and dry film thickness of 7 ½ mils per coat. Paint shall be applied for a total dry film thickness of 15 mils. Apply with mechanical equipment to produce uniform straight edges. At sidewalk curbs and crosswalks, use straightedge to ensure uniform, clean, and straight stripe.

B. Install pavement markings according to manufacturer's recommended procedures for the specified material.

C. Following items shall be painted with colors noted below:
   1. Pedestrian Crosswalks: White
   2. Exterior Sidewalk Curbs, Light Pole Bases, and Guard posts: Yellow
   3. Fire Lanes: Red or per local code
   4. Lane Striping where separating traffic moving in opposite directions: Yellow
   5. Lane Striping where separating traffic moving in the same direction: White
   6. ADA Symbols: Blue or per local code
   7. ADA parking space markings as shown on the drawings.
   8. Parking Stall Striping: Yellow, unless otherwise noted on Construction Drawings

3.5 FIELD QUALITY CONTROL

A. Inspection: After the paint has thoroughly dried, visually inspect the entire application and touch up as required to provide clean, straight lines and surfaces throughout.

B. Testing: Testing of wet film thickness shall be performed a minimum of two times on each parking row (including striped islands) and pedestrian cross walks, and a minimum of one test on each lane/alignment striping. At least one test shall be performed after refilling paint striping machine, changing operators of striping machine, and changing paint types, brands, etc. This shall be performed in addition to the testing stated above. These tests shall be performed on each coat applied. Testing shall be performed in accordance with ASTM D4414.

3.6 CLEANING

A. Waste materials shall be removed at the end of each workday. Upon completion of the work, all containers and debris shall be removed from the site. Paint spots upon adjacent surfaces shall be carefully removed by approved procedures that will not damage the surfaces and the entire job left clean and acceptable.

END OF SECTION

SECTION 32 13 33

CURBS AND SIDEWALKS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes
   1. Portland cement concrete curb, gutter, and sidewalk.

B. Related Sections
   1. Section 312000 - Earthwork

1.2 REFERENCS

A. American Concrete Institute (ACI)
   1. ACI 305R - Hot Weather Concreting
   2. ACI 306R - Standard Specification for Cold Weather Concreting
   3. ACI 308 - Standard Practice for Curing Concrete

B. American Standards for Testing and Materials (ASTM) latest edition
   1. ASTM A185 - Steel Welded Wire Fabric, Plain, for Concrete Reinforcement
   2. ASTM A615 - Deformed and Plain Billet-Steel for Concrete Reinforcement
   3. ASTM C94 - Ready-Mixed Concrete
   4. ASTM C260 - Air-Entraining Admixtures for Concrete
   5. ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete
   6. ASTM D994 - Preformed Expansion Joint Filler for Concrete (Bituminous)
   7. ASTM D1190 - Concrete Joint Sealer, Hot Poured, Elastic Type
   8. ASTM D1751 - Performed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
   9. ASTM D2628 - Preformed Polychloroprene Elastomeric Joint Seals for Concrete Pavements

C. Federal Specifications (FS)
   1. FS HH-F-341 - Fillers, Expansion Joint: Bituminous (Asphalt & Tar)

D. State Highway Department Standard Specifications

1.3 SUBMITTALS

A. Submit materials certificate from materials producer and Contractor, certifying that materials comply with, or exceed requirements specified herein to the Engineering Consultant of Record and the Independent Testing Laboratory for review and approval and within 7 calendar days after receipt of Notice-to-Proceed, submit for approval, certified laboratory test data or manufacturers certificates and data for the following items:
   1. Portland cement concrete mix
   2. Aggregate gradations
   3. Preformed expansion joint filler
   4. Field molded/poured sealant
   5. Dowel bars
   6. Expansion sleeves
   7. Tie bars

8. Reinforcing steel bars
9. Welded wire fabric
10. Air entraining admixtures
11. Water-reducing and set-retarding admixtures (if used)

1.4 QUALITY ASSURANCE

A. Establish and maintain required lines and elevations.

B. Check surface areas at intervals necessary to eliminate ponding areas. Remove and replace unacceptable work as directed by Owner.

1.5 PROJECT CONDITIONS

A. Maintain access for vehicular and pedestrian traffic as required for other construction activities. Utilize temporary striping, flagmen, barricades, warning signs, and warning lights as required.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Concrete: Mix concrete and deliver in accordance with ASTM C94.
1. Design mix shall produce normal weight concrete consisting of Portland cement, aggregate, water-reducing admixture, air-entraining admixture, and water to produce following:
a. Compressive Strength: 4,000 psi, minimum at 28 days, unless otherwise indicated on Construction Drawings.
b. Slump Range: 1”-3” for hand placed concrete, 1-1/4” to 3” for machine placed (slipform) concrete
c. Air Entrainment: 5 to 7 percent

B. Forms: Steel, wood, or other suitable material of size and strength to resist movement during concrete placement and to retain horizontal and vertical alignment until removal. Use straight forms, free of distortion and defects. Use flexible spring steel forms or laminated boards to form radius bends as required. Forms shall be of depth equal to depth of curbing or sidewalk, and so designed as to permit secure fastening together at tops. Coat forms with nonstaining type of coating that will not discolor or deface surface of concrete.

C. Welded Wire Mesh: Welded plain cold-drawn steel wire fabric, ASTM A 185. Furnish in flat sheets.

D. Reinforcing Steel: Deformed steel bars, ASTM A 615, Grade 60.

E. Portland Cement: Shall conform to ASTM C150, Type I

F. Joint Fillers: Resilient premolded bituminous impregnated fiberboard units complying with ASTM D994, D1751, D2628; FS HH-F-341, Type II, Class A or approved equal.

G. Joint Sealants: Conforming to ASTM D1190, non-priming, pourable, self-leveling polyurethane. Acceptable sealants are Sonneborn "Sonolastic Paving Joint Sealant", Sonneborn "Sonomeric CT 1 Sealant", Sonneborn "Sonomeric CT 2 Sealant", Mameco "Vulken 245", or Woodmont Products "Chem-Caulk".

H. Aggregate: ASTM C33.

I. Water: Clean and potable

J. Dowel Bars: ASTM A615, grade 60, and plain steel bars.

K. Air Entraining Mixture: ASTM C260; Sika AER by Sika Corporation or Air Mix by the Euclid Chemical Corporation.

L. Curing Compound: ASTM C309; Hydrocide by Sonneborn of Rexnord Chemical Products, Inc. or and Polyseal 4 in 1 by Chem Masters Corporation.

M. Joint Backup Rods: CCEVA Rod 100 by E-Poxy Industrials, Inc., Sealtight BACKER ROPE by W.R. Meadows, Inc. or approved equal.

PART 3 - EXECUTION

3.1 PREPARATION

A. Begin paving work only after unsuitable areas have been corrected and are ready to receive paving.

B. Remove loose material from compacted base material surface to produce firm, smooth surface immediately before placing concrete.

3.2 INSTALLATION

A. Form Construction
   1. Set forms to required grades and lines, rigidly braced and secured.
   2. Install sufficient quantity of forms to allow continuance of work and so that forms remain in place minimum of 24 hours after concrete placement.
   3. Check completed formwork for grade and alignment to following tolerances:
      a. Top of forms not more than 1/8-inch in 10'-0".
      b. Vertical face on longitudinal axis, not more than 1/4-inch in 10'-0".
   4. Clean forms after each use and coat with form release agent as often as required to ensure separation from concrete without damage.

B. Reinforcement: Fasten reinforcing bars or welded wire fabric (if required) accurately and securely in place with suitable supports and ties. Remove from reinforcement all dirt, oil, loose mill scale, rust, and other substances that will prevent proper bonding of the concrete to the reinforcement.

C. Concrete Placement
   1. Concrete shall be mixed and placed when the air temperature in the shade and away from artificial heat is a minimum of 35 degrees F and rising. Hot and cold weather concreting shall be in accordance with ACI 305R and 306R, respectively.
   2. Do not place concrete until base material and forms have been checked for line and grade. Moisten base material if required to provide uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until set at required finish elevation and alignment.
   3. Place concrete using methods that prevent segregation of mix. Consolidate concrete along face of forms and adjacent to transverse joints with internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Consolidate with care to prevent dislocation of reinforcing, dowels, and joint devices.
   4. Deposit and spread concrete in continuous operation between transverse joints, as far as possible. If interrupted for more than 1/2 hour, place construction joint. Automatic machine

may be used for curb and gutter placement. Machine placement shall be at required cross section, line, grade, finish, and jointing as specified for formed concrete. If results are not acceptable, remove and replace with formed concrete as specified herein.

D. Joint Construction

1. Contraction Joints: Construct concrete curb or combination concrete curb and gutter, where specified on Construction Drawings, in uniform sections of length specified on Construction Drawings. Form joints between sections either by steel templates, 1/8-inch in thickness, of length equal to width of curb and gutter, and with depth which will penetrate at least 2-inches below surface of curb and gutter; or with 3/4-inch thick performed expansion joint filler cut to exact cross section of curb and gutter; or by sawing to depth of at least 2-inches while concrete is between 4 and 24 hours old. If steel templates are used, they shall be left in place until concrete has set enough to hold it's shape, but shall be removed while forms are still in place.
2. Longitudinal Construction Joints: Tie concrete curb or combination concrete curb and gutter, where specified on Construction Drawings, to concrete pavement with 1/2-inch round deformed reinforcement bars of length and spacing shown on Construction Drawings.
3. Transverse Expansion Joints: Concrete curb, combination concrete curb and gutter, or concrete sidewalk shall have filler cut to exact cross section of curb, gutter, or sidewalk. Joints shall be similar to type of expansion joint used in adjacent pavement.

E. Joint Fillers: Extend joint fillers full-width and depth of joint, and not less than 1/2-inch or more than 1-inch below finished surface where joint sealer is indicated. Furnish joint fillers in 1-piece lengths for full width being placed, wherever possible. Where more than 1 length is required, lace or clip joint filler sections together.

F. Joint Sealants: Install in accordance with manufacturer's recommendations.

3.3 CONCRETE FINISHING

A. After striking off and consolidating concrete, smooth surface by screeding and floating. Adjust floating to compact surface and produce uniform texture. After floating, test surface for trueness with 10'-0" straightedge. Distribute concrete as required to remove surface irregularities, and refloat repaired areas to provide continuous smooth finish.

B. Work edges of sidewalks, gutters, back top edge of curb, and formed joints with edging tool, rounding edge to 1/2-inch radius. Eliminate tool marks on concrete surface. After completion of floating and trowelling, when excess moisture or surface sheen has disappeared, complete surface finishing, as follows:

1. Curbs, gutters, and sidewalks: Broom finish by drawing fine-hair broom across surface perpendicular to flow of traffic. Repeat operation as necessary to produce fine line texture.

C. Do not remove forms for 24 hours after concrete has been placed. After form removal, clean ends of joints and point up minor honeycombed areas. Remove and replace areas or sections with major defects as directed Owner.

D. Protect and cure finished concrete paving using acceptable moist-curing methods in accordance with "water-curing" section of ACI 308.

3.4 BACKFILL

A. After concrete has set sufficiently, spaces on either side of concrete curb, combination concrete curb and gutter, or concrete sidewalk shall be refilled to required elevation with suitable material compacted in accordance with Section 312000.

3.5 CLEANING AND PROTECTION

A. Sweep concrete pavement and wash free of stains, discolorations, dirt, and other foreign material just prior to final inspection.

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

END OF SECTION

SECTION 32 83 00

SITE SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes
   1. Traffic control signs.
   2. Site signs.

1.2 REFERENCES

A. American Standard for Testing Materials (ASTM)
   1. ASTM C94 - Ready Mix Concrete

B. US Department of Transportation, Federal Highway Administration
   1. Manual on Uniform Traffic Control Devices (MUTCD).

PART 2 - PRODUCTS

2.1 SIGNS: All signs will be furnished and installed by the Contractor. Conform to the following and MUTCD classification is shown in parentheses:

A. "STOP" Signs: 30-inches x 30-inches, Octagon, white legend and border on red background (R1-1)

B. "YIELD" Signs: 36-inches x 36-inches x 36-inches, Triangle, red legend and border band with white interior (R1-2)

C. "SPEED LIMIT 10MPH" Signs: 12-inches x 18-inches, black legend and border on white background (R2-1)

D. "NO RIGHT TURN" (or "NO LEFT TURN") Signs: 24-inches x 24-inches, black legend and border, red circle and bar, and white background (R3-1 and R3-2)

E. "RIGHT TURN ONLY" (or "LEFT TURN ONLY") Signs: 30-inches x 36-inches, black legend and border on white background (R3-5)

F. "DO NOT ENTER" Signs: 30-inches x 30-inches, white legend, bar, and background and red circle (R5-1)

G. "NO TRUCKS" Signs: 24-inches x 24-inches, black truck symbol, red circle and bar, on white background (R5-2)

H. "ACCESSIBLE PARKING SYMBOL" Signs: 18-inches x 24-inches, green legend and border, white symbol on blue box, and white background (R7-8)

I. "PED XING" Signs: 30-inches x 30-inches, black legend and border on yellow background (W11-2)

J. Miscellaneous Signs: See Construction Drawings

2.2 POSTS

A. 2” diameter galvanized steel pipe with galvanized sign-mounting hardware for each sign.

2.3 CONCRETE

A. Mix concrete and deliver in accordance with ASTM C94.

B. Design mix to produce normal weight concrete consisting of Portland cement, aggregate, water-reducing admixture, air-entraining admixture, and water to produce following:
   1. Compressive Strength: 3,500 psi, minimum at 28 days, unless otherwise indicated on Construction Drawings.
   2. Slump Range: 1 to 3-inches at time of placement
   3. Air Entrainment: 5 to 8 percent

PART 3 - EXECUTION

3.1 PREPARATION

A. Contractor shall field verify underground utilities prior to sign installation. Primary utilities of concern of shallow depths are lawn sprinkler systems, electric, telephone, fiber optic, cable and gas.

B. Cost related to repair of damaged surface and subsurface facilities shall be paid for by the Contractor at no additional expense to the Owner.

3.2 INSTALLATION

A. Install posts in 12 inch diameter x 24 inch deep concrete foundations. Set posts vertical and plumb with bottom of sign at minimum 7'-0" above finish grade unless otherwise indicated on the Construction Drawings. Mount signs in accordance with manufacturer's instructions. Existing concrete shall be core-drilled as necessary.

END OF SECTION

SECTION 328400

LANDSCAPE IRRIGATION SYSTEM

PART 1-GENERAL

1.1 WORK INCLUDED

A. Installation of automatic lawn and shrub sprinkler system providing uniform moisture coverage.

B. Furnishing of materials and installation of a complete automatic lawn and shrub sprinkler system providing uniform moisture coverage. The work shall include all materials, equipment and labor required to complete the project as outlined in the project drawings, documents and this specification.

C. Installation of backflow preventer, pressure regulator, irrigations lines (pressurized), automatic control valves, valve boxes, control and coming wiring, lateral lines, sprinkler heads, automatic controller as shown on the project drawings and irrigation plan.

D. Excavation and Backfill.

E. Tests including system pressure and performance test.

F. Pipe and fittings.

G. Sprinkler heads.

H. Control system and connection to electrical supply.

I. Trenching, installation of system and connection to water source; testing and backfilling.

J. Sleeving.

1. Direct and coordinate with the General Contractor for desired sleeve locations and sizes. It is the responsibility of the Irrigation Contractor to do this otherwise the Irrigation Contractor is responsible for the irrigation sleeving.

1.2 RELATED WORK

A. Section 329200 - Turf and Grasses

B. Section 329300 – Planting

1.3 REFERENCES

A. ANSI/ASTM D2564 – Solvent Cements for Poly Vinyl Chloride (PVC) Plastic Pipe and Fittings.

B. ASTM D2241 – Poly Vinyl Chloride (PVC) Plastic Pipe (SDR-PR).

C. ASTM – American Society of Testing Materials

D. AWWA – American Water Works Association

E. NSF – National Sanitary Foundation

F. NEC – National Electric Code

1.4 DESCRIPTION

A. Electric solenoid controlled underground sprinkler system consisting of PVC plastic pipe and fittings, with fixed spray and variable arc rotary pop-up heads in a multi-station electric control system, programmed as approved by Owner.

1.5 SUBMITTALS

A. Provide (3) copies of manufacturer's product data for each type of sprinkler head, swing joint assemblies, electric control valves, automatic and manual drain valves, isolation valves, valve boxes, pipe, fittings including tapping tees and saddles, control wire, waterproof wire connectors, irrigation controller, backflow preventer, booster pump and rain and freeze sensors proposed for use.

B. Provide manufacturer's product data, each type of sprinkler head and valve proposed for use.

C. Upon completion and final review of system by Owner, Contractor shall provide record or as-built drawings (reproducibles) of completed facilities as installed. Drawings shall be provided to contractor in a) electronic form (Autocad format) b) three (3) copies of the as-built drawing in or photocopy form and size. As-built drawings shall show the measured distance from easily identified, fixed locations to isolation valves, electric control valves, manual drain valves and wire splices.

D. Upon completion and final review of system by Owner, Contractor shall provide three (3) binders containing manufacturer's installation, operation and maintenance instructions as well as a parts breakdown and catalog for each piece of equipment installed on the project. As a minimum the binders shall include information for the irrigation controller, booster pump, backflow preventer, pressure regulators, isolation valves, electric control valves, drain valves, air relief valves, all spray and rotary sprinkler heads, rain and freeze moisture sensors.

E. Upon completion and final review of system by Owner, contractor shall provide a plastic laminated (sealed) reduced drawing of the irrigation system indicating the area or zones of the irrigation system controlled by each electric control valve. For clarity, drawing may be divided into two sections and shown on both sides of the laminated sheet. Reduced drawings shall be placed on the inside of the controller door. Drawing shall be approved for clarity by Contractor prior to acceptance of system.

1.6 OPERATION/MAINTENANCE DATA AND DEMONSTRATION

A. Provide instructions for operation and maintenance of system and controls, and manufacturer's parts catalog.

B. Provide schedule indicating length of time each valve is required to be open to provide determined amount of water.

C. Provide a recommended schedule for runt times and frequency of watering for the first two weeks, the first two months and the first twelve months (including all seasonal change requirements) after completion of the installation.

1.7 EXTRA STOCK

A. Provide the following extra stock items:

1. Two sprinkler heads of each type and size.
2. Two valve keys for manual valves.
3. Two keys for valve markers.
4. Two wrenches for each type head core and for removing and installing each type head.
5. Two couplers for each size of quick coupling valve.

1.8 SYSTEM SERVICE

A. Inspect system at two and four weeks after Date of Substantial Completion and make necessary adjustments.

1.9 WARRANTY

A. Entire sprinkler system will be unconditionally guaranteed against defects in material and workmanship, including repair of settling of backfilled areas below grade and adjusting heads to proper level for a period of one year from Date of Substantial Completion.

B. Minor adjustments, any defective electrical controls, valves, sprinkler heads or other working parts will be repaired or replaced without cost to the Owner for a period of one year from the date of acceptance.

C. Damage by others during the one-year guarantee period will be Owner's responsibility.

D. Warrant sprinkler system to have 100 percent uniform moisture coverage of areas shown to be sprinkled.

PART 2 – PRODUCTS

2.1 MATERIALS – GENERAL

A. The specified materials to be used shall be as designated on the contract drawings and this specification. All materials to be incorporated in this work shall be new and of the best quality, meeting the requirements for such materials and for the purposes intended. The irrigation lines on the contract drawings are diagrammatic. The Contractor shall be responsible for computing and supplying the required pipe, fittings, control wires and electrical accessories required to complete the project.

B. Acceptable Manufacturers

1. Hunter or Rain Bird or approved equal. Equipment may be mixed.

C. Substitutions: All material shall be supplied and installed according to this specification and the specifications of the equipment and material manufacturers. Should contractor desire to substitute materials or equipment other than that described in this specification, the following procedures shall be followed:

1. Provide manufacturer's specification for the proposed equipment and show how it is equal or better than the specified equipment.
2. Demonstrate, if required by Owner, the actual performance of the equipment.
3. Receive, from Owner, written approval for the proposed substitutions.

D. Material Storage: A specific area shall be provided in which all materials to be used on the project shall be stored when not in use. Provision of this land is for the purpose of keeping the property neat and orderly and in no way waives any requirements of the Contractor to protect his equipment and materials from damage by the elements, from theft or from vandalism.

2.2 PIPE AND FITTING MATERIALS

A. Pressurized Main Line Pipe: All 2 ½" and smaller main line pipe shall meet the latest requirements of ASTM D 1785 Standard Specification for Schedule 40 Poly (vinyl chloride) PVC pipe with size as shown on the project drawings. Solvent-weld sockets.

All main line pipe to be installed in curved sleeves shall be copper, Type L Soft and shall be the size required to meet the requirements of this specification. All transition fittings to PVC shall be copper sweat socket with threaded MIPT or FIPT connections to the PVC main line pipe.

B. Lateral Pipe: All lateral pipe, downstream of the control valves, shall have solvent weld joints and shall meet the latest requirements of ASTM D 2241 Standard Specification for Poly (vinyl chloride)(PVC) Plastic Pipe with standard dimension ratio (SDR) of 21 and a Pressure Rating (PR) of 200 PSI.

C. Sleeving Pipe: All sleeving (straight sections) to protect pipe or control wires at roads, sidewalks or below grade crossings shall be PVC Schedule 40. All sleeves (curved sections) to protect pipe or control wires at sidewalks and below grade crossing shall be high-density polyethylene with a working pressure of 160 psi. Sleeves shall be a minimum of two (2) times the diameter of the crossing pipe or that shown on the project drawings. Minimum sleeve size shall be 2" diameter. All irrigation control wires shall be routed in a separate sleeve with a minimum diameter of 2".

D. Fittings:

1. Tees attaching the electric control valves and quick coupling valves onto the mainline (2 ½" and smaller) shall be PVC Schedule 80 solvent welded or threaded fittings and shall meet ASTM D 2467 and ASTM D 2464 respectively. PVC Schedule 80 fittings and nipples shall be used on all fittings required between the mainline tap and the electric control valve as well as the threaded connection between the electric control valve and the lateral piping. Schedule 80 fittings shall be Spears Manufacturing or approved equal. Contract shall use manufacturer's recommended sealing compounds and/or Teflon tape according to manufacturer's recommended practice for the specific application.

   Mainline fittings (2 ½" and smaller) at all points of direction change such as 22.5, 45, tees, or 90 degree turns shall be solvent weld with a minimum of Schedule 40 dimensions and shall meeting requirements of ASTM Specification D 2466-78. Schedule 40 fittings shall be Spears Manufacturing or approved equal.

   Fittings for gasket-joint PVC pipe, for all directional changes, pipe reductions and plugs shall be deep bell push-on gasket joint ductile iron fittings for PVC pipe. Fittings shall be manufactured of ductile iron, grade 70-55-05 in accord with ASTM A536 and gaskets shall meet ASTM F477. Fittings shall be as manufactured by Harrington Corporation, Harco, or equal. For main line pipe to zone valve/lateral pipe connections, Harco or equal push-on gasket joint ductile iron service tees or ductile iron saddles. Ductile iron saddles shall be equal to Harco Ductile Iron Saddles as manufactured by Harrington Corporation. The saddles shall provide full support around the circumference of the pipe and an O'ring seal shall be provided so that there is no gap between the installed saddle and pipe and hydraulic pressure will complete the seal.
2. Lateral Line Fittings – Solvent welded fittings shall be Schedule 40 dimensions and wall thickness and shall meet the requirements of ASTM Specification D 2466 and shall be used on all piping downstream of electric control valves.
3. Solvent Cement: ANSI/ASTM D2564 for PVC pipe and fittings.
4. All ½" inlet spray heads shall be connected to the irrigation piping utilizing ½" thick walled polyethylene tubing (Rain Bird Model SPX-100) and appropriate insert fittings (Rain Bird Models SBE-050, SBE-075, SBA-050, SBA-075). Sufficient lengths of flexible pipe shall be used to form a sweeping arc to insure that spray heads are supported properly and allow for vertical adjustment and movement during service.
5. Any quick coupling valves shall be installed on prefabricated, manufactured swing joint assembly rated for 315 psi with pre-lubricated buttress threads and O'rings seals equal to Spears Manufacturing Co. Series 5807-01012.

E. Swing Joints: Prefabricated, schedule 80 PVC, equal to Spears. Use for ground level pop-up impact driven heads, gear-driven rotary heads, hydrant and quick-coupler valves.

2.3 SPRINKLER HEADS AND NOZZLES

A. Sizes and types noted on Drawing(s).

2.4 VALVES

A. Automatic Control Valves: Remote, electrically operated, normally closed, diaphragm globe valves. The valve shall have a 200 psi CWP rating. Flow control stem shall be non-rising. The valve cover shall be secured to the body with stainless steel threaded studs and nuts. Bleeding of water during manual operations shall be either internal or external. Control valves shall be contamination resistant, glass filled high strength nylon body and bonnet. Sizes and types as indicated on Drawings(s).

B. Isolation Valve for the Electric Control Valve: Ball type, plastic construction, with threaded ends. Valves shall have a maximum pressure rating of 235 psi at 73 degrees F. The valves shall be equal to Spears Model 2131-OXX sized the same as the control valve.

C. Gate Valves (Isolation Shut off Valves): 2 ½" and smaller – shall be bronze, threaded, screw-in bonnet with non-rising stem rated for a 125 psi WSP and 200 psi non-shock WOG. The valve shall be domestic manufacture, shall meet Federal Specifications MSS SP-80 equal to Hammond Model IB645.

D. Automatic Drain Valves: Equal to King Technology, Inc. Model 22, ½" inlet.

E. Manual Drain Valve: Bronze body, angle type 150 psi class, with cross-type operating handle designed to receive a valve operating key.

F. Backflow Preventer: Provide a Reduced Pressure Backflow Preventer for irrigation system use located adjacent to the irrigation water meter. RPZ to be housed in fiberglass enclosure on concrete base.

2.5 WATER METER

A. The Irrigation Contractor is responsible for setting the meter. Comply with local codes for installation requirements and permitting. Contractor to provide meter, and obtain permits and inspection.

2.6 CONTROLLER

A. Type noted on Drawing(s), including fittings and accessories.

2.7 VALVE BOXES AND MARKERS

A. For Automatic Control Valves: Equal to Carson Industries Inc. model 1419-3 with 1419-6X extensions as required.

B. For Manual Drain Valve: Equal to Carson Industries, Inc. model 910-10 w/corrugated plastic pipe for extension.

1. For Quick Coupling Valves: Equal to Carson Industries Inc. model 1419-3 with 1419-6X extensions as required.

C. For Above Grade Backflow Preventers In Exterior Locations: Fiberglass enclosure equal to “Hot Box” manufactured by Northeast Florida Enterprises, Inc. 1/800-736-0238. Place on concrete slab and anchor with 4 bolts. Size to fit backflow preventer. Provide electrical connection and heater or heater cable as recommended by enclosure manufacturer.

2.8. CONTROL VALVE WIRING

A. Wire: Type AWG-1UF, bearing U.S. approval, minimum 14 gauge. One common wire, No. 12 UF is required for each controller, or as required for the Hunter ACC-99D controller. Provide all grounding as required by manufacturer.

B. Splicing Materials: Sta-Kon no. P7-70 connector and Scotchlok no. 3576 sealing pack. Scotchcote sealer for splices, or as required for the Hunter ACC-99D controller.

2.9 ENVIRONMENT CONDITION SENSEORS

A. Rain Sensor – Equal to WSS manufactured by Hunter

B. Freeze Sensor- Equal to WSS manufactured by Hunter

PART 3 – EXECUTION

3.1 PREPARATION

A. Head locations and pipe routing are diagrammatic only and shall be adjusted during installation to compensate for prevailing winds, gradient, and landscaping to insure proper coverage with minimal overthrow.

3.2 TRENCHING

A. Trench for sprinkler system to provide proper grades and slopes to drain points.

B. Keep trenches free of debris, material or other obstructions that may damage pipe.

3.3 INSTALLATION

A. Install sleeves under paving and other improvements prior to construction. Install where required to accommodate piping at proper depth to prevent damage by other construction activities and to provide specified burial depth for irrigation pipe. Location of sleeves to be recorded and marked.

B. Install pipe, valves, controls and sprinklers in accordance with manufacturer's instructions. Connect to water and electrical service. All work to be accomplished in accordance with applicable codes.

C. All main line piping to be installed will a minimum of 18 inches cover and lateral piping with 12 inches minimum cover. Bed pipe on solid base free from rocks and other deleterious materials.

D. Set sprinkler heads and valve box covers at finish grade. Valve boxes shall be placed in groundcover areas where possible. Rectangular valve boxes to be placed parallel to nearby curbs and walks or other improvements.

E. Provide for thermal movement.

F. Install automatic drain valves at all low sections of lateral piping (lines downstream from valves) to insure complete drainage of system when not in use. Wrap each valve with approved filter fabric.

G. Install manual drain valves at all low sections to mainline (upstream lines) piping to permit complete drainage of system when not in use. Provide 12-inch depth gravel sump below each valve.

H. Install all heads on approved swing-joints or nipple connections as shown on Drawings.

I. Spray nozzles in shrub or other planting bed to be installed on risers of specified materials unless otherwise noted. Height of riser to be sufficient to provide complete coverage and allow for 1 to 2 years of plant growth.

J. Install subsurface drip in locations indicated on plans and in accordance with manufacturer's recommendations. All such tubing to be completely concealed from view by covering with mulch.

K. Install control wiring:

1. Place the excess wire in a 10 inch expansion coil at each valve to which controls are connected and at 100 foot intervals. Control wiring may be installed in the same trenches with the irrigation piping. Wiring shall be bundled and taped with electrical tape at 10 foot intervals the entire length of each run. Wiring shall be installed on the north or east side of the pipes. Wire shall not be taut in the trench and expansion loops shall be provided to prevent the wire from being tensioned by backfilling or other subsequent construction. The side of the trench in which the wires are located shall be free of stones and other hard material which might injure the wire insulation. Backfill material placed against the wires shall be select material especially free from stones or other material which might injure the insulation.

   A minimum of 24" wire for an expansion loop shall be allowed at each valve for contraction of wire or tightening of wire due to back-filling of trenches or possible valve services or replacement.

Splices outside of valve locations are not allowed. All connections at the electric control valves shall be water-proofed with the system in Section 2.08 “Wiring”.

2. Install four (4) additional control wires from the controller to the furthest points along the main line with two wires on each side of the main. Terminate the wires with waterproof connections at the furthest valve-box location from the controller and note location on the as-built drawing.

L. After piping is installed, before sprinkler heads are installed and backfilling commences, open valves and flush system with full head of water.

M. Backfill trench and compact to finish grade elevation. Fill material placed within 12 inch of pipe to contain no rock or gravel particles greater than ½ inch in diameter. Protect piping from displacement. All settlement after backfill to be repaired.

N. Arrange and coordinate installation of water meter.

O. Provide concrete thrust blocks at changes in direction (at ells and tees) of mains and at termination of mains. One cubic foot minimum. Size of blocks and location to be in strict accordance with pipe manufacturer’s specifications. Size shall be adequate and so placed to take all thrust created by maximum internal water pressure.

P. Set valve box covers level at finish grade. Rectangular valve boxes to be placed parallel to nearby curbs and walks or other improvements. Valves and valve boxes shall be installed where shown or directed, and shall be set plumb. Valve boxes shall be centered on the valves. Where feasible, valves shall be located outside the area of natural walkways or paths and shall be placed in groundcover areas where possible. Earth fill shall be carefully tamped around each valve box. Valve boxes should be supported or blocked such that any surface loads on the valve boxes will not be transmitted below to the pipe or valves. Washed gravel sumps shall be provided below all valve boxes to permit drainage of water away from valves. Minimum depth of gravel sump is 8 inches.

Q. Install at least two (2) automatic drain valves per zone at all low points sections of lateral piping (lines downstream from valves) to insure complete drainage of system when not in use.

R. All sprinklers shall be installed on flexible connections or swing joints as specified in Section 2.2 “Pipe and Fitting Materials” and shall be set plumb and level with the final turf grade.

S. All trenches shall be carefully backfilled with the excavated materials approved for backfilling, consisting of earth, loam, sandy clay, sand, soft shale, or other approved materials, free from large clods or earth or stone. Rock, broken concrete or pavement, and large boulders shall not be used as backfill material. The backfill shall be thoroughly compacted and evened off with the adjacent soil level. Selected fill dirt or sand shall be used if soil conditions are as discussed above. The fill dirt or sand shall be used in filling four (4) inches above the pipe. The remainder of the backfill shall contain no lumps or rocks larger than one (1) inch. The top six (6) inches of backfill shall be free of rocks or gravel particles over one-half (1/2) inch in diameter, subsoil or trash. Open trenches or partially backfilled trenches shall be kept to a minimum and effort shall be made to completely backfill that trench opened each day. The Contractor will be responsible for restoration of all settlement for a period of one year from acceptance.

T. The irrigation controller shall be mounted inside the specified cabinet securely, level and plumb at the specified location shown on the contract drawings according to manufacturer's recommendations. Electrical conduit PVC sweep ells shall be used for the entering and exiting of the 24 volt control wires into the conduit entering the controller. Controllers shall be connected to the appropriate valves as indicated on the contract drawings. Electrical power supply to the controller shall be installed according to local electrical codes and shall be provide contractor.

U. Rain and freeze sensors shall be installed according to manufacturer's recommendations and shall be installed at locations approved by Owner.

V. Clean area and remove all debris and excess materials from site.

W. Install pre-fabricated enclosure over backflow preventer. Place on 4" thick concrete pad sized to accommodate attachment per manufacturer's requirements. Provide electrical connection and install heater or heat cable.

3.4 TESTS

A. Static Pressure Test

1. The entire main line system shall be constructed to successfully withstand, when completed, a full static pressure of 100 psi (whichever is greater) for a period of 6 hours with no resulting flow or pressure loss.
2. The testing for leakage shall be conducted with the observation of the Owner and all pipe, joints and appurtenances will be inspected while the system is under test pressure and leaks corrected as directed. The testing shall extend over a period of up to six (6) hours to allow for a complete inspection.

B. Performance Test

1. Upon completion of the irrigation system installation including all pressure tests, Contractor shall conduct a performance test of the complete system to insure that all components are functioning properly. Performance test shall consist of operating the system through a complete irrigation cycle per day for two (2) consecutive days. Contractor shall be at the site to monitor the performance tests and make any adjustments and corrections as needed during the testing period.
2. The Contractor shall balance and adjust the various components of the system so that overall operation of the system is most efficient. This includes adjustment to pressure regulators, part-circle sprinkler heads and individual station adjustments on the controllers.
3. Repair grades and re-dress mulch in planted areas disturbed by final testing and adjustment.

END OF SECTION 328400

SECTION 329300

PLANTING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Plants
2. Planting soils
3. Tree Stabilization
4. Landscaping edgings

1.3 DEFINITIONS

A. Backfill: The earth used to replace or the act of replacing earth in an excavation.

B. Balled and Burlapped Stock: Plants dug with firm, natural balls of earth in which they were grown, with ball size not less than sized indicated; wrapped with burlap, tied, rigidly supported, and drum laced with twine with the root flare visible at the surface of the ball as recommended by ANSI Z60.1.

C. Balled and Potted Stock: Plants dug with firm, natural balls of earth in which they are grown and placed, unbroken, in a container. Ball size is not less than sizes indicated.

D. Bare-Root Stock: Plants with a well-branched, fibrous-root system developed by transplanting or root pruning, with soil or growing medium removed, and with not less than minimum root spread according to ANSI Z60.1 for type and size of plant required.

E. Container-Grown Stock: Healthy, vigorous, well-rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.

F. Fabric Bag-Grown Stock: Healthy, vigorous, well-rooted plants established and grown in-ground in a porous fabric bag with well-established root system reaching sides of fabric bag. Fabric bag size is not less than diameter, depth, and volume required by ANSI Z60.1 type and size of plant.

G. Finish Grade: Elevation of finished surface of planting soil.

H. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.

I. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.

J. Pests: Living organisms that occur where they are not desired, or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

K. Planting Area: Areas to be planted.

L. Planting Soil: Standardized topsoil; native surface topsoil; in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth. Topsoil to be free of rocks and debris and free of noxious weeds.

M. Plant; Plants; Plant Material: Test terms refer to vegetation in general, including trees, shrubs, vines, ground covers, ornamental grasses, bulbs, corms, tubers, or herbaceous vegetation.

N. Root Flare: Also called “trunk flare”. The area at the base of the plant’s stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.

O. Stem Girdling Roots: Roots that encircle the stems (trunks) of trees below the soil surface.

P. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

Q. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

R. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil be subsoil.

1.4 SUBMITTALS

A. Product Date: For each type of product indicated, including soils.

1. Plant Materials: Include quantities, sizes, quality, and sources for plant materials as well as clear photograph’s of plant material samples indicated for Landscape Architect’s acceptance.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscape Installer whose work has resulted in successful establishment of plants.

1. Experience: Five (5) years' experience in landscape installation.
2. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
3. Pesticide Applicator: State licensed, commercial.

C. Measurements: Measure according to ANSI Z60.1. Do not prune to obtain required sizes.

1. Trees and Shrubs: Measure with branches and trunks or canes in their normal position. Take height measurements from or near the top of the root flare for field-grown stock and container grown stock. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip to tip. Take caliper measurements 6 inches above the root flare for trees up to 4-inch caliper size, and 12 inches above the root flare for larger sizes.
2. Other Plants: Measure with stems, petioles, and foliage in their normal position.

D. Plant Material Observation: Landscape Architect may observe plant material either at place of growth or at site before planting for compliance with requirements for genus, species, variety, cultivar, size, and quality. Landscape Architect retains right to observe trees and shrubs further for size and condition of balls and root systems, pests, disease symptoms, injuries, and latent defects and to reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site.

1. Notify Landscape Architect of sources of planting materials seven days in advance of delivery to site.

E. Preinstallation Conference: Conduct conference at Project site if required for this project.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Packaged Materials: Deliver packaged materials in original, unopened contains showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws if applicable.

B. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Accompany each delivery of bulk fertilizers and soil amendments with appropriate certificates.

C. Deliver bare-root stock plants freshly dug. Immediately after digging up bare-root stock, pack root system in wet straw, hay, or other suitable material to keep root system moist until planting.

D. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do no bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.

E. Handle planting stock by root ball.

F. Deliver plants after preparations for planting have been completed, and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.

1. Heel-in bare-root stock. Soak roots that are in dry condition in water for two hours. Reject dried-out plants.
2. Set balled stock on ground and cover ball with soil, peat moss, sawdust, or other acceptable material.
3. Do not remove container-grown stock from containers before time of planting.
4. Water root systems of plants stored on-site deeply and thoroughly with a fine-mist spray. Water as often as necessary to maintain root systems in a moist, but not overly-what condition.

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.

B. Interruption of Existing Services of Utilities: Do not interrupt services or utilities to facilities occupied by Owner or other unless permitted under the following conditions and then only after arranging to provide temporary services or utilities according to requirements indicated:

1. Notify Landscape Architect no fewer than two days in advance of proposed interruption of each service or utility.
2. Do not proceed with interruption of services or utilities without Landscape Architect's written permission.

C. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.

D. Coordination with Turf Areas (Lawns): Plant trees, shrubs, and other plants after finish grades are established and before planting turf areas unless otherwise indicated.

1. When planting trees, shrubs, and other plants after planting turf areas, protect turf areas, and promptly repair damage caused by planting operations.

1.8 WARRANTY

A. Special Warranty: Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within one year after Substantial Completion.

1. Failures include, but are not limited to, the following:

a. Death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, or neglect by Owner, or incidents that are beyond Contractor's control.
b. Structural failures including plantings falling or blowing over.
c. Faulty performance of tree stabilization, edgings.
d. Deterioration of metals, metal finishes, and over materials beyond normal weathering.

2. Warranty Periods from Date of Substantial Completion:

a. Trees, Shrubs, Vines, and Ornamental Grasses: 12 months
b. Ground Covers, Biennials, Perennials, and Other Plants: 12 months.
c. Annuals: Two months.

3. Include the following remedial actions as a minimum:

a. Immediately remove dead plants and replace unless required to plant in the succeeding planting season.
b. Replace plants that are more than 25 percent dead or in an unhealthy condition at end of warranty period.
c. A limit of one replacement of each plant will be required except for loses or replacements due to failure to comply with requirements.
d. Provide extended warranty for period equal to original warranty period, for replacement plant material.

1.9 MAINTENANCE SERVICE

A. Initial Maintenance Service for Trees and Shrubs: Provide maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established but for not less than maintenance period below.

1. Maintenance Period: Until all items on the punch list are complete or until final acceptance by owner.

B. Initial Maintenance Service for Ground Cover and Other Plants: Provide maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established but for not less than maintenance period below.

1. Maintenance Period: Until all items on the punch list are complete or until final acceptance by owner.

PART 2 – PRODUCTS

2.1 PLANT MATERIAL

A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem, form shearing, and other features indicated in Plant Schedule or Plant Legend shown on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.

1. Trees with damaged, crooked, or multiple leaders; tight vertical branches where bark is squeezed between two branches or between branch and trunk (“included bark”); crossing trunks; cut-off limbs more than ¾ inch in diameter; or with stem girdling roots will be rejected.
2. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless otherwise indicated.

B. Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Plants of a larger size may be used if acceptable to Landscape Architect, with a proportionate increase in size of roots or balls.

C. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which shall begin at root flare according to ANSI Z60.1. Root flare shall be visible before planting.

D. Labeling: Label at least one plant of each variety, size, and caliper with a securely attached waterproof tag bearing legible designation of common name and full scientific name, including genus and species. Include nomenclature for hybrid, variety, or cultivar, if applicable for the plant as shown on Drawings.

E. If formal arrangements or consecutive order of plants is shown on Drawings, select stock for uniform height and spread, and number the labels to assure symmetry in planting.

F. Annuals: Provide healthy, disease-free plants of species and variety shown or listed, with well-established root systems reaching to side of the container to maintain a firm ball, but not with excessive root growth encircling the container. Provide only plants that are acclimated to outdoor conditions before delivery.

2.2 INORGANIC SOIL AMENDMENTS

A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:

1. Class: T, with a minimum of 99 percent passing through No. 8 sieve and a minimum of 75 percent passing through No. 60 sieve.
2. Class: O, with a minimum of 95 percent passing through No. 8 sieve and a minimum of 55 percent passing through No. 60 sieve.
3. Provide lime in form of ground dolomitic limestone.

B. Sulfur: Granular, biodegradable, and containing a minimum of 90 percent sulfur, with a minimum of 99 percent passing through No. 6 sieve and a maximum of 10 percent passing through No. 40 sieve.

C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.

D. Aluminum Sulfate: Commercial grade, unadulterated.

E. Perlite: Horticultural perlite, soil amendment grade.

F. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through No. 50 sieve.

G. Sand: Clean, washed, natural or manufactured, and free of toxic materials.

H. Diatomaceous Earth: Calcined, 90 percent silica, with approximately 140 percent water absorption capacity by weight.

I. Zeolites: Mineral clinoptilolite with at least 60 percent water absorption by weight.

2.3 ORGANIC SOIL AMENDMENTS

A. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through ¾-inch sieve; soluble salt content of 5 to 10 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:

1. Organic Matter Content: 50 to 60 percent of dry weight.

2. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.

B. Sphagnum Peat: partially decomposed sphagnum peat moss, finely divided or granular texture, with a pH range of 3.4 to 4.8.

C. Muck Peat: Partially decomposed moss peat, native peat, or reed-sedge peat, finally divided or of granular texture, with pH range of 6 to 7.5, and having a water-absorbing capacity of 1100 to 2000 percent.

D. Wood Derivatives: Decomposed, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture and free of chips, stones, sticks, soil, or toxic materials.

1. In lieu of decomposed wood derivatives, mix partially decomposed wood derivatives with ammonium nitrate at a minimum rate of 0.15 lb/cu. ft of loose sawdust or ground bark, or with ammonium sulfate at a minimum rate of 0.25 lb/cu. ft. of loose sawdust or ground bark.

E. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, debris, and material harmful to plant growth.

2.4 FERTILIZERS

A. Bonemeal: Commercial, raw or steamed, finely ground; a minimum of four (4) percent nitrogen and ten (10) percent phosphoric acid.

B. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20 percent available phosphoric acid.

C. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast-and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:

1. Composition: 1lb/1000 sq. ft. of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.
2. Composition: Nitrogen, phosphorous, and potassium in amount recommended in soil reports from a qualified soil-testing laboratory.

D. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:

1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.
2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

E. Planting Tablets: Tightly compressed chip type, long-lasting, slow-release, commercial-grade planting fertilizer in tablet form. Tablets shall break down with soil bacteria, converting nutrients into a form that can be absorbed by plant roots.

1. Size: 10-gram tablets
2. Nutrient Composition: 20 percent nitrogen, 10 percent phosphorous, and 5 percent potassium, by weight plus micronutrients.

F. Chleated Iron: Commercial-grade FeEDDHA for dicots and woody plants, and commercial-grade FeDTPA for ornamental grasses and monocots.

2.5 PLANTING SOILS

A. Planting Soil: ASTM D 5268 topsoil, with pH range of 5.5 to 7, a minimum of 4 percent organic material content; free of stones and other extraneous materials harmful to plant growth. Mix ASTM D 5268 topsoil with the following soil amendments and fertilizers in the following quantities to produce planting soil:

1. Ratio of Loose Compost to Topsoil by Volume: 1.4.

2.6 MULCHES

A. Organic Mulch: Free from deleterious materials and suitable as a top dressing of trees and shrubs, consisting of one of the following:

1. Type: shredded pine bark.
2. Size Range: 3 inches maximum, ½ inch minimum.
3. Color: Natural.

B. Compost Mulch: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content to 35 to 55 percent by weight; 100 percent passing through 1-inch sieve; soluble salt content on 2 to 5 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:

1. Organic Matter Content: 50 to 60 percent of dry weight.

2. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.

C. Mineral Mulch:

1. ¾-1” washed river gravel. Minimum 2” deep installed over weed barrier fabric.

2.7 PESTICIDES

A. General: Pesticide registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

B. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination of growth of weeds within planted areas at the soil level directly below the mulch layer.

C. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.

2.8 TREE STABILIZATION MATERIALS

A. Stakes and Guys:

1. Guying: ARBORGUY PRO 40 Tree Anchoring System, install per manufacturer's recommendations.

2.9 LANDSCAPE EDGINGS

A. Steel Edging: Standard commercial-steel edging, rolled edge, fabricated in sections of standard lengths, with loops stamped from or welded to face of sections to receive stakes.

1. Manufacturer:

a. Pro-Steel or Col Met

2. Edging Size: 3/16 inch wide by 4 inches deep. (Non aluminum)
3. Stakes: Tapered steels a minimum of 12 inches long.
4. Accessories: Standard tapered ends, corners, and splicers.
5. Finish: Standard paint.
6. Paint Color: Green.

2.10 MISCELLANEOUS PRODUCTS

A. Antidesiccant: Water-insoluble emulsion, permeable moisture retarder, film forming, for trees and shrubs. Deliver in original, sealed, and fully labeled containers and mix according to manufacturer's written instructions.

B. Burlap: Non-sythetic, biodegradable.

PART 3- EXECUTION

3.1 EXAMINATION

A. Examine areas to receive plants for compliance with requirements and conditions affecting installation and performance.

1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
3. Suspend soil spreading, grading, and tiling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.

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

C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Landscape Architect and replace with new planting soil.

3.2 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities and turf areas and existing plants from damage caused by planting operations.

B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

C. Lay out individual tree and shrub locations and areas for multiple plantings. Stake locations, outline areas, adjust locations when requested, and obtain Landscape Architect's acceptance of layout before excavating or planting. Make minor adjustments as required.

D. Lay out plants at locations directed by Landscape Architect. Stake locations of individual trees and shrubs and outline areas for multiple plantings.

3.3 PLANTING AREA ESTABLISHMENT

A. Loosen subgrade of planting areas to a minimum depth of 6 inches. Remove stones larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

1. Apply fertilizer directly to subgrade before loosening.

2. Spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil.

    a. Delay mixing fertilizer with planting soil if planting will not proceed within a few days.
    b. Mix lime with dry soil before mixing fertilizer.

3. Spread planting soil to a depth of 6 inches but not less than required to meet finish grades after natural settlement. Do no spread if planting soil or subgrade is frozen, muddy, or excessively wet.

    a. Spread approximately one-half the thickness of planting soil over loosened subgrade. Mix thoroughly into top 2 inches of subgrade. Spread remainder of planting soil.

B. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

C. Before planting, obtain Landscape Architect's acceptance of finish grading; restore planting area if eroded or otherwise disturbed after finish grading.

3.4 EXCAVATION FOR TREES AND SHRUBS

A. Planting Pits and Trenches: Excavate circular planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are not acceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.

1. Excavate approximately three times as wide as ball diameter for balled and burlapped stock.
2. Excavate at least 12 inches wider than root spread and deep enough to accommodate vertical roots for bare-root stock.
3. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.
4. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.
5. Maintain required angles of repose of adjacent materials as shown on the Drawings. Do not excavate subgrades of adjacent paving, structures, hardscapes, or other new or existing improvements.
6. Maintain supervision of excavations during working hours.
7. Keep excavations covered or otherwise protected when unattended by Installer's personnel.
8. If drain tile is shown on Drawings or required under planting areas, excavate to top of porous backfill over tile.

B. Subsoil and topsoil removed from excavations may be used as planting soil.

C. Obstructions: Notify Landscape Architect if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.

1. Hardpan Layer: Drill 6-inch diameter holes, 24 inches apart, into free-draining strata or to a depth of 10 feet, whichever is less, and backfill with free-draining materials.

D. Drainage: Notify Landscape Architect if subsoil conditions evidence unexpected water seepage or retention in tree or shrub planting pits.

E. Fill excavations with water and allow to percolate away before positioning trees and shrubs.

3.5 TREE, SHRUB, AND VINE PLANTING

A. Before planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.

B. Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.

C. Set balled and burlapped stock plumb and in center of planting pit or trench with root flare 1 inch above adjacent finish grades.

1. Use planting soil for backfill.
2. After placing some backfill around root ball to stabilize plant, carefully cut and remove burlap, rope, and wire baskets from tops of root balls and from sides, but do not remove from under root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during plant operation.
3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
4. Place planting tablets in each planting pit when pit is approximately one-half filled; in amounts recommended in soil reports from soil-testing laboratory. Place tablets beside the root ball about 1 inch (25 mm) from root tips; do not place tablets in bottom of the hole.
5. Continue backfilling process. Water again after placing and tamping final layer of soil.

D. Set container-grown stock plumb and in center of planting pit or trench with root flare 1 inch above adjacent finish grades.

1. Use planting soil for backfill.
2. Carefully remove root ball from container without damaging root ball or plant.
3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.

4. Place planting tablets in each planting pit when pit is approximately one-half-filled; in amounts recommended in soil reports from soil-testing laboratory. Place tablets beside the root about 1 inch from root tips; do not place tablets in bottom of the hole.
5. Continue backfilling process. Water again after placing and tamping final layer of soil.

E. Set fabric bag-grown stock plumb and in center of planting pit or trench with root flare 1-inch above adjacent finish grades.

1. Use planting soil for backfill.
2. Carefully remove root ball from fabric bag without damaging root ball or plant. Do not use planting stock if root ball is cracked or broken before or during planting operation.
3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
4. Place planting tablets in each planting pit when pit is approximately one-half filled; in amounts recommended in soil reports from soil-testing laboratory. Place tablets beside the root ball about 1 inch from root tips; do not place tablets in bottom of the hole.
5. Continue backfilling process. Water again after placing and tamping final layer of soil.

F. Set and support bare-root stock in center of planting pit or trench with root flare 1 inch above adjacent finish grade.

1. Use planting soil for backfill.
2. Spread roots without tangling or turning toward surface, and carefully work backfill around roots by hand. Puddle with water until backfill layers are completely saturated. Plumb before backfilling, and maintain plumb while working backfill around roots and placing layers above roots.
3. Place planting tablets in each planting pit when pit is approximately one-half filled; in amounts recommended in soil reports from soil-testing laboratory. Place tablets beside soil-covered roots about 1-inch from root tips; do not place tablets in bottom of the hole or touching the roots.
4. Continue backfilling process. Water again after placing and tamping final layer of soil.

G. When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.

3.6 TREE, SHRUB, AND VINE PRUNING

A. Remove only dead, dying, or broken branches. Do not prune for shape.

B. Prune, thin, and shape trees, shrubs, and vines as directed by Landscape Architect.

C. Prune, thin and shape trees, shrubs, and vines according to standard professional horticultural and arboricultural practices. Unless otherwise indicated by Landscape Architect, do not cut tree leaders; remove only injured, dying, or dead branches from trees and shrubs; and prune to retain natural character.

D. Do not apply pruning paint to wounds.

3.7 TREE STABILIZATION

A. Install trunk stabilization as follows unless otherwise indicated:

1. Upright Staking and Tying: Stake trees of 2-through 5-inch caliper. Stake trees of less than 2-inch caliper only as required to prevent wind tip out. Use a minimum of two stakes of length required to penetrate at least 18 inches below bottom of backfilled excavation and to extend one-third of trunk height above grade. Set vertical stakes and space to avoid penetrating root balls or root masses.
2. Use two stakes for trees up to 12 feet height and 2-1/2 inches or less in caliper; three stakes for trees less than 14 feet high and up to 4 inches in caliper. Space stakes equally around trees.
3. Support trees with bands of flexible ties at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree.
4. Support trees with two strands of tie wire, connected to the brass grommets of tree-tie webbing at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree.

B. Staking and Guying: Stake and guy trees more than 14 feet in height and more than 3 inches in caliper unless otherwise indicated. Securely attach no fewer than three guys to stakes 30 inches long, driven to grade.

1. Site-Fabricated Staking-and-Guying Method:

    a. For trees more than 6 inches in caliper, anchor guys to wood deadmen buried at least 36 inches below grade. Provide turnbuckle for each guy wire and tighten securely.
    b. Support trees with bands of flexible ties at contact points with tree trunk and reaching to turnbuckle. Allow enough slack to avoid rigid restraint of tree.
    c. Support trees with strands of cable or multiple strands of tie wire, connected to the brass grommets of tree-tie webbing at contact points with tree trunk and reaching to turnbuckle. Allow enough slack to avoid rigid restraint of tree.
    d. Attach flags to each guy wire, 30 inches above finish grade.
    e. Paint turnbuckles with luminescent white paint.

2. Proprietary Staking and Guying Device: Install staking and guying system sized and positioned as recommended by manufacturer unless otherwise indicated and according to manufacturer's written instructions.

3.8 GROUND COVER AND PLANT PLANTING

A. Set out and space ground cover and plants other than trees, shrubs, and vines as indicated in even rows with triangular spacing.

B. Use planting soil for backfill.

C. Dig holes large enough to allow spreading of roots.

D. For rooted cutting plants supplied in flats, plant each in a manner that will minimally disturb the root system but to a depth not less than two nodes.

E. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.

F. Water thoroughly after planting, take care not to cover plant crowns with wet soil.

G. Protect plans from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.

3.9 PLANTING AREA MULCHING

A. Mulch backfilled surfaces of planting areas and other areas indicated.

1. Trees in Turf Areas: Apply organic mulch ring of 3-inch average thickness, with 36-inch radius around trunks or stems.
2. Organic Mulch in Planting Areas: Apply 3-inch average thickness of organic mulch over whole surface of planting area, and finish level with adjacent finish grades.

3.10 EDGING INSTALLATION

A. Steel Edging: Install steel edging where indicated according to manufacturer's written instructions. Anchor with steel stakes spaced approximately 30 inches apart, driven below top elevation of edging.

3.11 PLANT MAINTENANCE

A. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, adjusting and repairing tree-stabilization devices, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings. Spray or treat as required to keep trees and shrubs free of insects and disease.

B. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.

C. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated past management practices whenever possible to minimize the use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.

3.12 PESTICIDE APPLICATION

A. Apply pesticides and other chemical products and biological control agents in accordance with authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.

B. Pre-Emergent Herbicides (Selective and Non-Selective): Apply to tree, shrub, and ground-cover areas in accordance with manufacturer's written recommendations. Do not apply to seeded areas.

C. Post-Emergent Herbicides (Selective and Non-Selective): Apply only as necessary to treat already-germinated weeds and in accordance with manufacturer's written recommendations.

3.13 CLEANUP AND PROTECTION

A. During planting, keep adjacent paving and construction clean and work area in an orderly condition.

B. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protected during installation and maintenance periods. Treat, repair, or replace damaged plantings.

C. After installation and before Substantial Completion, remove nursery tags, nursery stakes, tie tape, labels, wire, burlap, and other debris from plant material, planting areas, and Project site.

3.14 DISPOSAL

A. Remove surplus soil and waste material including excess subsoil, unsuitable soil, trash, and debris and legally dispose of them off Owner's property.

END OF SECTION 329300

SECTION 330800

SEWER MANHOLES, FRAMES, AND COVERS

GENERAL

1.1 SUMMARY

1.2 Section Includes

1. Monolithic concrete, modular precast concrete, masonry, and precast polyethylene manhole assemblies.

1.3 Related Sections

1. Section 031200 - Earthwork. Excavation, backfill, and compaction
2. Section 334100 - Storm Drainage

1.4 REFERENCE STANDARDS

A.

1. ASTM A 48 - Gray Iron Castings
2. ASTM C 55 - Concrete Building Brick
3. ASTM C 478 - Precast Reinforced Concrete Manhole Sections
4. ASTM C 923 - Resilient Connectors Between Reinforced Concrete Manhole Structures and Pipes
5. ASTM D 1248 - Polyethylene Plastics Molding and Extrusion Materials

B. International Masonry Industry All-Weather Council (IMIAC)

1. Recommended Practices and Guide Specification for Cold Weather Masonry Construction

C. State Department of Transportation (DOT), Construction and Material Specifications

1.5 SUBMITTALS

A. Shop Drawings: Indicate reference to Construction Drawings of manhole locations, elevations, piping with sizes, locations, and elevations of penetrations.

B. Product Data: Provide data for manhole covers, component construction, features, configuration, and dimensions.

PART 2 - PRODUCTS

2.1 MANHOLES

A. Cast-In-Place Concrete: Nonreinforced cast in place concrete barrel.

1. Concrete: 3500 psi concrete
2. Forms: Steel sheet accurately shaped and fabricated of sufficient strength to form dense watertight walls to true dimensions.

B. Precast Concrete: Reinforced precast concrete barrel.

1. Manhole sections conforming to ASTM C 478 with gaskets in accordance with ASTM C 923.
2. Construct manholes of precast concrete sections as required by Construction Drawings to size, shape, and depth indicated.

C. Concrete Brick: ASTM C 55, Grade N Type I-moisture controlled, normal weight, of same grade, type and weight as block units, nominal modular size of 3 5/8-inches x 7 5/8-inches x 2 1/4-inches

D. Precast Polyethylene:
   1. Manufacturer: Advanced Drainage Systems (ADS) or approved equal.
   2. Precast polyethylene in accordance with ASTM D 1248. Nominal cylinder internal diameter shall be 48-inches and shall be designed to accept concrete filled polyethylene manhole lids and standard cast iron frames with lid or grate.
   3. Manholes shall have compressive strength that meets ASTM D 2412 standards.

E. Mortar and Grout: Mortar for finishing and sealing shall be Class "C". Honeycombing less than 2-inches deep shall be repaired using Class "D" mortar.

F. Brick Transition Reinforcement: Formed steel 8-gauge wire with galvanized finish.

G. Configuration:
   1. Barrel Construction: Concentric with eccentric cone top section.
   2. Shape: Cylindrical
   3. Clear Inside Dimensions: 48-inches diameter minimum or as indicated on Construction Drawings.
   4. Design Depth: As indicated on Construction Drawings.
   5. Clear Lid Opening: 22-inches minimum
   6. Pipe Entry: Provide openings as indicated on Construction Drawings
   7. Main and Lateral Pipes: Neatly cut off main and lateral pipes flush with inside of manhole or inlet where they enter structure walls. Point up irregularities and rough edges with nonshrinking grout.

H. Inverts: Shape inverts for smooth flow across structure floor as indicated on Construction Drawings. Use concrete and mortar to obtain proper grade and contour. Finish surface with fine textured wood float.

2.2 COMPONENTS

A. Lid and Frame:
   1. Manufacturer: Neenah Foundry Company, East Jordan Iron Works, or approved equal.
   2. ASTM A 48, Class 30B heavy duty cast iron construction, machined flat bearing surface.
   3. Removable lid, closed or open as indicated on Construction Drawings, sealing gasket.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify items specified by other Sections are properly sized and located.

B. Verify that built-in items are in proper location and ready for roughing into work.

C. Verify that the excavation for manholes is correct.

3.2 PREPARATION

A. Coordinate placement of inlet and outlet pipe or duct sleeves as indicated on Construction Drawings.

3.3 PRECAST MANHOLE CONSTRUCTION

A. Place base pad to proper elevation and location and trowel top surface level for placement of manhole barrel.

B. Place manhole barrel plumb and level to correct elevations and anchor to base pad.
   1. After completion of slab foundation, lower first joint of manhole barrel into position, grooved end first, and set level and plumb on concrete base. Align and adjust to proper grade prior to placing and forming invert. Pour invert immediately after setting of first section of manhole barrel.
   2. Prior to setting subsequent manhole barrel sections, apply primer to tongue and groove ends and allow to set in accordance with manufacturer's recommendations. Place "Ram-nek", or equivalent, plastic rope on tongue end. Lower next section into position, and remove excess material from interior of structure. Add additional material on exterior of joint, if necessary, for completely watertight joint.

C. Set cover frames and lids level without tipping, to correct elevations. Utilize pre-cast rings or brick and mortar to achieve final rim elevation. Maximum limit, 4 courses.

3.4 CAST-IN-PLACE MANHOLE CONSTRUCTION

A. Cast-in-place shall conform to the applicable requirements. Utilize steel forms.

B. Place base pad to proper elevation and location and pour monolithically with invert. Base shall support pipe to first joint.

C. Deposit concrete in evenly distributed layers of about 18 inches, with each layer vibrated to bond to preceding layer.

D. Place gasket between all joints and paint exterior of manhole within 5’ of the joint with mastic waterproofing.

E. Place precast concrete cone.

F. Set section cover frames and lids level without tipping, to correct elevations. Utilize pre-cast rings or brick and mortar to achieve final rim elevation. Maximum limit, 4 courses.

3.5 MASONRY MANHOLE CONSTRUCTION

A. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

B. Lay masonry units in running bond. Course 3 brick units and 3 mortar joints to equal 8 inches.

C. Form flush mortar joints

D. Lay masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.

E. Install joint reinforcement 16 inches on center

F. Place joint reinforcement in first and second horizontal joints above base pad and below lid frame opening

G. As work progresses, build in fabricated metal items

H. Cut and fit masonry for pipes as specified herein

I. Set cover frames and covers level to correct elevations without tipping.

3.6 TESTING

A. General:

1. All sanitary sewer manholes shall be inspected and tested tested for water tightness or damage prior to acceptance by the owner and engineer. If a manhole fails the test, the Contractor shall locate the leak and make proper repairs and re-test. The owner or engineer reserves the right to refuse leaking manholes, in which case the Contractor will replace the manhole at his expense.

END OF SECTION

SECTION 33 41 00

STORM DRAINAGE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes
1. Storm sewer drainage piping, fittings, and accessories.
2. Storm drainage structures.

1.2 Related Requirements
1. Section 312000 - Earthwork
2. Section 312800 - Erosion and Sedimentation Control
3. Section 033000 - Cast-In-Place Concrete

1.3 REFERENCE STANDARDS

A. American Association of State Highway and Transportation Officials (AASHTO)
1. AASHTO M36 - Zinc Coated (Galvanized) Corrugated Iron or Steel Culverts and Under Drains
2. AASHTO M190 - Bituminous Coated Corrugated Metal Culvert Pipe and Arches
3. AASHTO M252 - Corrugated Polyethylene Drainage Tubing, 3 to 10 Inch Diameter
4. AASHTO M294 - Corrugated Polyethylene Drainage Tubing, 12 to 48 Inch Diameter
5. AASHTO MP7-97 - Corrugated Polyethylene Drainage Tubing, 54 to 60 Inch Diameter
6. AASHTO M198 - Joints for Circular Sewer and Culvert Pipe Using Flexible Watertight Gaskets
7. AASHTO H170 – Reinforced Concrete Culvert, Storm Drain and Sewer Pipe

B. American Society for Testing and Materials (ASTM)
1. ASTM A74 - Cast Iron Soil Pipe and Fittings
2. ASTM A185 - Steel welded Wire Fabric, Plain, for Concrete Reinforcement
3. ASTM A615 - Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
4. ASTM A746 - Ductile Iron Gravity Sewer Pipe
5. ASTM C76 - Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
6. ASTM C150 - Portland Cement
7. ASTM C206 - Finished Hydrated Lime
8. ASTM C443 - Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets
9. ASTM C564 - Rubber Gasket for Cast Iron Soil Pipe and Fittings
10. ASTM C969 - Infiltration and Exfiltration Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines
11. ASTM D3034 - Type PSM Polyvinyl Chloride (PVC) Sewer Pipe and Fittings
12. ASTM D3212 - Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
13. ASTM F477 - Elastomeric Seals (Gaskets) for Joining Plastic Pipe
14. ASTM F949 – Poly (Vinyl Chloride)(PVC) Corrugated Sewer Pipe with Smooth Interior and Fittings

C. American Concrete Institute (ACI)
1. ACI301 - Structural Concrete for Buildings

1.4 SUBMITTALS

A. Product Data: Provide data on pipe materials, pipe fittings, and accessories. Provide shop drawings for precast inlets, catch basins and junction boxes.

B. Manufacturer's Certificate: Certify that products meet or exceed specified local requirements.

C. Project Record Documents
   1. Accurately record actual locations of pipe runs, connections, catch basins, cleanouts, and invert elevations.
   2. Identify and describe unexpected variations to subsoil conditions and location of uncharted utilities.

1.5 PROJECT CONDITIONS

A. Coordinate work with termination of storm sewer connection outside building including connection to municipal storm sewer system.

PART 2 - PRODUCTS

2.1 PIPE AND FITTINGS

A. Reinforced Concrete Pipe (RCP): ASTM C76, Class III unless noted otherwise on Drawings, installed with flexible plastic, bitumen gaskets at joints.
   1. Gaskets: AASHTO M 198 751, Type B or ASTM C 443, installed in accordance with manufacturer’s recommendations.
   2. Flared end sections shall be per ASTM C76 or AASHTO H170 (for sections with toe wall)

B. High Density Polyethylene Pipe (HDPE): AASHTO Designation M252 Type S, M294 Type S and MP7-97 Type S, smooth interior/annular exterior. Only permitted when specifically indicated on Drawings. Pipe shall be installed in accordance with pipe manufacturer's installation Guidelines for Culvert Storm Drainage Applications.
   1. Pipe Joints and fittings shall conform to AASHTO M252 and M294.
   2. Acceptable manufacturers: Advanced Drainage Systems, Inc. "ADS N-12", HANCOR, INC. "Hi-Q", or approved equal.

C. Spiral Rib Metal Pipe: ASTM A 760 Type 1R or Type IIR. Coatings shall meet requirements of ASTM A929 and shall be galvanized, aluminized, or bituminous coated as specified on Drawings. Only permitted when specifically indicated on Drawings.
   1. Pipe ends shall be re-corrugated and installed with semi-corrugated “Hugger” type bands and “O” ring gaskets in accordance with pipe manufacturer’s installation requirements.
   2. Pipe gauge shall be as specified on construction drawings or if no gauge is given then the minimum gauges are as follows: 15” to 42” diameter round pipe – 16 gauge (0.064”), 48” to 60” round pipe – 14 gauge (0.079”), 66” to 78” round pipe – 12 gauge (0.109”), 15” to 30” pipe arch – 16 gauge (0.064”), 36” to 42” pipe arch – 14 gauge (0.079”), and 48” to 78” pipe arch – 12 gauge (0.109”). Gauges for larger diameters shall be indicated on the drawings.
   3. Installation shall be in accordance with ASTM A798 and A796 as they apply, manufacturer’s requirements, and as indicated on the drawings.
   4. Standard corrugated steel pipe as described in section E of these specifications shall not be substituted for any diameter of Spiral Rib Steel Pipe.
   5. Manufacturer: Contech, Inc. “Ultra Flo or Ultra Flo II”, Southeast Culvert, Inc. “Max Flow”, St. Regis Culvert, Inc. “Max Flow”, Thompson Culvert, Inc. “Max Flow”, or approved equal.

D. Polyvinyl Chloride (PVC) Pipe: ASTM D3034, rated SDR 35 (or ASTM 949 for Profile Pipe) continually marked with manufacturer's name, pipe size, cell classification, SDR rating, and ASTM D 3034 classification. Only permitted when specifically indicated on Drawings.
   1. Pipe joints: ASTM D 3212 using restrained gasket conforming to ASTM F477.

E. Corrugated Steel (Metal) Pipe (CSP or CMP): ASTM A 760, 16 gauge unless another gauge is indicated on Drawings. Galvanized, aluminized (Type 1R), or bituminous coated as specified on Drawings. Only permitted when specifically indicated on Drawings. Corrugated steel pipe may be round pipe, arch pipe, or slotted drainpipe as indicated on Drawings. Slotted drainpipe shall have 1.75-inches wide drain waterway openings and 6 inches minimum height drain guide
   1. CSP, bands and appurtenances shall be uniformly coated inside and outside with a 0.05 inch minimum thickness bituminous coating in accordance with AASHTO M190. .
   2. CSP shall be supplied with paved inverts or fully lined to provide a smooth interior, smooth flow lining only as indicated on the drawings.

F. Ductile Iron Pipe (DIP): ASTM A746
   1. Fittings: Cast iron conforming to ASTM A74
   2. Joint Material: Rubber gasket conforming to the requirements of ASTM C564 for compression joints.

G. Subdrains: Perforated, PVC or flexible corrugated plastic pipe as specified herein of the size indicated on the drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that trench cut and excavation is ready to receive work and excavations, dimensions, and elevations are as indicated on Drawings.

3.2 PREPARATION

A. Hand trim excavations to required elevations. Correct over excavation with bedding material.

B. Remove large stones or other hard matter that could damage piping or impede consistent backfilling or compaction.

C. Protect benchmarks, property corners, and other survey monuments from damage or displacement. If marker needs to be removed it shall be referenced by licensed land surveyor and replaced, as necessary, by same.

3.3 INSTALLATION - PIPE

A. The pipe shall be inspected for defects and cracks before being lowered into the trench, piece by piece. Any defective, damaged or unsound pipe or any pipe that has had its grade disturbed after laying shall be taken up and replaced. Open ends shall be protected with a stopper to prevent earth or other material from entering the pipe during construction. The interior of the pipe shall be free from dirt, excess water and other foreign materials as the pipe laying progresses and left clean at the completion of the installation.

B. Excavate pipe trench and place bedding material in accordance with Section 312000.

C. Installation shall commence at the lowest point for each segment of the route. RCP shall be laid with the groove or bell end upstream. Riveted CSP shall be placed with the inside circumferential laps pointing downstream. Repair damaged bituminous coating on CSP by applying bituminous material conforming to AASHTO M190.

D. Lay pipe to the required line and slope gradients with the necessary fittings, bends, manhole, risers and other appurtenances placed at the required location as noted on Drawings.

E. Do not displace or damage pipe when compacting.

F. No pipe shall be laid in water or when trench conditions are unsuitable for such work.

G. Joints:
   1. Joints shall be constructed as described herein and in accordance with manufacturer's installation instructions with the intent that they be made watertight.
   2. For RCP, the joint surface shall be cleaned and washed with water, if necessary, before the joints are made. For tongue and groove joints in smaller sizes, make joints butting the inside of the bell with a cement mortar before joining. The inside joint shall be wiped clean of excess mortar by brush or a squeegee drawn through the pipe as the laying operations progress. In the lager diameters, which permit the entry of a man, annular space between pipe sections shall be completely filled with mortar and finished off smooth with the inside surface of the pipe.
   3. CSP shall be joined by standard corrugated connecting bands. Keep dirt or gravel out from between the pipes and band so that corrugations fit snugly. While being tightened, the bands shall be tapped with a mallet to take up slack and insure a tight joint.
   4. PVC fittings shall be attached to the pipe by solvent welding according to the manufacturer's recommendations.

3.4 SUBDRAINS

A. Subdrains shall be installed in accordance with the details and at the locations shown on the drawings

3.5 INSPECTION AND TESTING

A. General
   1. Strom sewer systems and culverts, upon completion or at such time as directed, shall be cleaned, inspected and tested. The system or culvert shall have a true grade and line. Actual elevations shall be within 0.08 feet of the elevations given on the drawings.
   2. After completion of the Work, or any part thereof, the job shall be tested to determine that it has been installed in accordance with the drawings and specifications. In general, the Work shall prove to be in good condition, installed in accordance with the drawings and specifications and ready for use.

B. Cleaning and Testing
   1. Visibly inspect and remove all debris and obstructions from storm pipe. Test for infiltration and exfiltration by hydrostatic testing per ASTM C969. Manholes and pipe shall conform to ASTM C969 leakage criteria.

C. Alignment Test

1. After backfill has been placed and compacted to a depth not less than one foot above top of pipe, a visual inspection shall be made by flashing a light between manholes. Any displacement or misalignment of invert shall be corrected.

END OF SECTION

D3696LSG/LSGX-Series Specifications

1.01 GENERAL

The contractor shall provide labor, material, equipment, and incidentals required to provide ___2___ (QTY) centrifugal grinder pumps as specified herein. The pump models covered in this specification are LSG/LSGX-Series single/three-phase grinder pumps. The pump furnished for this application shall be model __D3696LSG203___ as manufactured by Liberty Pumps.

2.01 OPERATING CONDITIONS

Each submersible pump shall be rated at 2 hp, ___208___ volts, ___3___ phase, 60 Hz, 3450 RPM. The unit shall produce ___5___ GPM at _____ feet of total dynamic head.

The submersible pump shall be capable of handling residential and commercial sewage and grinding it to a fine slurry enabling it to be pumped over long distances in pipelines as small as 1.25" in diameter. The LSG-Series single stage submersible pump shall have a shut-off head of 110 feet and a maximum flow of 50 GPM @ 10 feet of total dynamic head. The LSGX-Series two stage submersible pump shall have a shut-off head of 185 feet and a maximum flow of 38 GPM @ 10 feet of total dynamic head.

3.01 CONSTRUCTION

Each centrifugal grinder pump shall be equal to the $_{C}$ $_{US}$ certified LSG/LSGX-Series Grinder pumps as manufactured by Liberty Pumps, Bergen NY. The castings shall be constructed of class 25 cast iron. The motor housing shall be oil filled to dissipate heat. Air filled motors shall not be considered equal since they do not properly dissipate heat from the motor. All mating parts shall be machined and sealed with a Buna-N O-ring. All fasteners exposed to the liquid shall be stainless steel. The motor shall be protected on the top side with sealed cord entry plate with molded pins to conduct electricity eliminating the ability of water to enter internally through the cord. The motor shall be protected on the lower side with a dual seal arrangement. The first seal is a double lip seal molded in fluoroelastomer or Buna-N. The second/main seal shall be a unitized hard face silicon carbide seal with stainless steel housings and spring.

The upper and lower bearing shall be capable of handling all radial thrust loads. The lower bearing shall have the additional ability to handle the downward axial thrust produced by the impeller and cutters by design of angular contact roller races. The pump housing shall be of the concentric design thereby equalizing the pressure forces inside the housing which will extend the service life of the seals and bearings. Additionally there shall be no cutwater in the housing volute in order to discourage the entrapment of flowing debris. The pump shall be furnished with a stainless steel handle having a nitrile grip.

4.01 ELECTRICAL POWER CORD

The submersible pumps shall be supplied with 25 feet of multi-conductor power cord (35 feet for external capacitor models). It shall be cord type SJOOW (1-phase), SEOOW (3-phase), or SOOW (external capacitor models), capable of continued exposure to the pumped liquid. The power cord shall be sized for the rated full load amps of the pump in accordance with the National Electric Code. The power cable shall not enter the motor housing directly but will conduct electricity to the motor by means of a water tight compression fitting cord plate assembly, with molded pins to conduct electricity. This will eliminate the ability of water to enter internally through the cord, by means of a damaged or wicking cord.

5.01 MOTORS

All motors shall be oil filled and class B insulated NEMA B design, rated for continuous duty. Since air filled motors are not capable of dissipating heat as effectively, they shall not be considered equal. At maximum load, the winding temperature shall not exceed 105°C for model LSG202 and 135°C for LSG202-C and LSGX models (unsubmerged). Single-phase motors shall be capacitor start/capacitor run and have an integral thermal overload switch in the windings for protecting the motor.

6.01 BEARINGS AND SHAFT

An upper radial and lower thrust bearing shall be required. The upper bearing shall be a single ball / race type bearing. The lower bearing shall be an angular contact heavy duty ball/race type bearing, designed to handle axial grinder pump thrust loads. Both bearings shall be permanently lubricated by the oil, which fills the motor housing. The bearing system shall be designed to enable proper cutter alignment from shut off head to maximum load at 10 feet of TDH. The motor shaft shall be made of 300 series stainless steel and have a minimum diameter of 0.670".

7.01 SEALS

The pumps shall have a dual seal arrangement consisting of a lower and upper seal to protect the motor from the pumping liquid. The lower seal shall be fluoroelastomer OR Buna-N molded double lip seal, designed to exclude foreign material away from the main upper seal. The upper seal shall be a unitized silicon carbide hard face seal with stainless steel housings and spring equal to Crane Type T-6a. The motor plate/housing interface shall be sealed with a Buna-N O-ring.

8.01 IMPELLER

The impeller shall be an investment cast stainless steel impeller, with pump out vanes on the back shroud to keep debris away from the seal area. It shall be keyed and bolted to the motor shaft.

9.01 CUTTER MECHANISM

The cutter and plate shall consist of 440 stainless steel with a Rockwell C hardness of 55–60. The stationary cutter plate shall have specially designed orifices through it, which enable the slurry to flow through the pump housing at an equalized pressure and velocity. The stationary cutter shall consist of V shapes to maximize cutting action and arc shape exclusion slots to outwardly eject debris from under the rotary cutter. The rotary cutter shall have (4) blades and be designed with a recessed area behind the cutting edge to prevent the accumulation and binding of any material between rotary cutter and the stationary cutter. The cutting system must incorporate close tolerances for optimum performance. Ring or radial cutters, or those that grind on the outside circumference, shall not be considered equal.

10.01 CONTROLS

The pumps shall be controlled with a NEMA 4X outdoor duplex control panel with three float switches and a high water alarm or with optional IP Series NEMA 4X outdoor duplex control panel with transducer, adjustable set-points, data logging, and a high water alarm.

11.01 PAINT

The exterior of the casting shall be protected with powder coat paint.

12.01 SUPPORT

The pumps shall have cast iron support legs, enabling it to be a freestanding unit. The legs will be high enough to allow solids and long stringy debris to enter the cutter assembly.

13.01 SERVICEABILITY

Components required for the repair of the pump shall be shipped within a period of 24 hours.

14.01 FACTORY ASSEMBLED TANK SYSTEMS WITH GUIDE RAIL AND QUICK DISCONNECT DISCHARGE

Factory mounted guide rail system with pump suspended by means of bolt-on quick disconnect which is sealed by means of nitrile grommets. The discharge piping shall be schedule 80 PVC and furnished with a check valve and PVC shut-off ball valve. The tank shall be wound fiberglass, and an inlet hub shall be provided with the system.

15.01 TESTING

The pumps shall have a ground continuity check and the motor chamber shall be hi-potted to test for electrical integrity, moisture content and insulation defects. The motor and volute housing shall be pressurized, and an air leak decay test is performed to ensure integrity of the motor housing. The pump shall be run, voltage current monitored, and checked for noise or other malfunction.

16.01 QUALITY CONTROL

The pumps shall be manufactured in an ISO 9001 certified facility.

17.01 WARRANTY

Standard limited warranty shall be 3 years.